

# **NATIONAL INDEX**

**OF**

## **AGRICULTURAL**

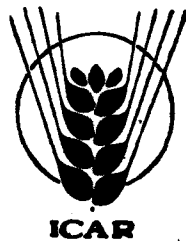
### **FIELD**

#### **EXPERIMENTS**

**VOL. 4 PART 3**

**GUJARAT**

**1960—65**



**INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS  
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)  
NEW DELHI**

## FOREWORD

The I. C. A. R. has adopted the 'Coordinated approach' to crop improvement as its strategy in agricultural research. This approach is based on the principle of giving high priority to problem solving research and for the purpose an intimate knowledge of research in progress and trends of results is very essential. To give impetus to this approach, I. C. A. R. started a scheme for collecting data of all field experiments conducted in the country. It was aimed at compilation of agronomic experiments in the country, with a view to indicate the gaps in the knowledge and to avoid duplication. The scheme entitled : "National Index of Field Experiments" is running under the Institute of Agricultural Research Statistics which has rendered a very valuable service by preparing compendia of agricultural field experiments conducted in the country. Two series of the compendia containing results of about 7,200 and 12,000 experiments conducted during the period 1948-53 and 1954-59 respectively have already been published by the Institute. The present is the third series of compendia and is expected to contain the results of about 18,000 experiments conducted during the period 1960-65.

The number and the types of experiments have been increasing at a fast rate. Further many of the experiments were being repeated over a number of years. The conclusions drawn from such experiments should take into account the seasonal variations. For this purpose it was necessary to carry out consolidated analysis of results over years. Thus the task of compilation, analysis and interpretation of results of experiments being covered in the third series became more formidable compared to those covered in the earlier two series.

The preparation of this compendium has been possible by the whole-hearted cooperation of State Departments of Agriculture, Agricultural Universities and Central Research Institutes who ungrudgingly made the results of their experimental research available. My thanks are due to various officers of these institutions for participating in this work.

I hope that the present series will be followed by periodical publications of similar compendia for later years in order that the availability of results of scientific experiments in agriculture in India may be maintained up-to-date in a consolidated form.

NEW DELHI,  
January 1, 1973

B. K. SONI  
*Deputy Director General (AS)*  
*Indian Council of Agricultural Research*

## PREFACE

The present set of volumes form Part III in the series of compendia of Agricultural Field Experiments being published under the project of National Index of Field Experiments. Volumes comprising in Parts I and II of the series pertaining to the periods 1948-53 and 1954-59 were published in 1962 and 1965 and contained the results of about 7,200 and 12,000 experiments respectively. The present volumes include results of experiments conducted during the period 1960-65. During the last one decade there has been an enormous increase in agricultural research and experimentation so much so that for the period 1960-65 to which the present volume refer, results of about 18,000 experiments are available.

Like the earlier two series, the compendium for Part III is divided into 15 volumes, one each for (1) Andhra Pradesh, (2) Assam, Manipur, Meghalaya, Arunachal, Nagaland, Mizoram and Tripura, (3) Bihar, (4) Gujarat, (5) Kerala, (6) Madhya Pradesh, (7) Maharashtra, (8) Mysore, (9) Orissa, (10) Punjab, Haryana, J & K and Himachal Pradesh, (11) Rajasthan, (12) Tamil Nadu, (13) Uttar Pradesh, (14) West Bengal and (15) All Central Institutes. A departure, has however, been made in presentation of the material contained in each volume. Whereas the results of individual experiments were presented in the volumes of previous series, the present series contains the results of pooled statistical analysis of experiments that were conducted for two or more years and concluded during the period 1960-65, in respect of those experiments conducted only for one year, and also those conducted for more than one year but were continuing beyond 1960-65, the results of individual experiments have been presented.

The work under the scheme was carried out at the Institute of Agricultural Research Statistics. As it was spread over a number of years there were changes in the officers responsible for the scheme. In successive stages, collection and analysis of data were carried out under the guidance of Shri T. P. Abraham, Assistant Statistical Advisor, now Joint Director, Central Statistical Organisation, Government of India, Dr. B. N. Tyagi, Senior Statistician, now Joint Director of Agriculture (Statistics), Uttar Pradesh and Shri M. G. Sardana, Senior Statistician, now Officer on Special Duty, Central Statistical Organisation, Government of India. The final stage of analysis and the printing was carried out under the guidance of Shri K. S. Krishnan, Sr. Statistician of the Institute. At the preparatory stage the work of the third series of compendia was looked after by Shri O. P. Kathuria, Jr. Statistician, now Statistician in Indian Agricultural Research Institute. Subsequently, Shri R. K. Khosla, Jr. Statistician was responsible for the actual working of the scheme. Servashri P. P. Rao, S. N. Bajpai, M. P. Saxena, B. L. Chaudhary, M. L. Sahani, H. C. Jain, Mahesh Kumar, J. K. Kapoor, U. N. Dikshit, S. L. Garg, G. V. S. R. Krishna, G. L. Khurana, D. P. Singh, A. Lahari, Mahender Singh, S. S. Kutaula, Kuldip Singh, and Suresh Chand Jain Statistical staff of the Institute deserve special mention for their careful and painstaking work in the analysis of the data, combination of results of similar experiments and proof reading of the compendia volumes.

The collection of data of experiments from various research stations was done by the regional staff of the Institute placed in different States. They deserve to be congratulated for the hard work they have put in.

Thanks are due to the State Departments of Agriculture, the Central Institutes and the Agricultural Universities who made the data of the experiments conducted under their jurisdiction readily available to the staff of the Institute. The I. A. R. S. acknowledge with thanks this willing co-operation without which the consolidation of the results would not have been possible. The Institute is also thankful to various officers in the State Departments of Agriculture and Agricultural Universities who worked as regional supervisors for the project from

time to time and provided guidance to the regional staff working in the scheme. The list of the names of the regional supervisors and regional staff of the project is given on the following page.

NEW DELHI,  
January 1, 1973

M. N. DAS  
*Director*  
*Institute of Agricultural Research Statistics*  
*(I. C. A. R.).*

**Regional Supervisors and Regional Staff of the National Index of  
Field Experiments**

Sl. No.	Region & Headquarter	Statistical staff from the Institute of Agricultural Research Statistics	Regional Supervisor
1.	Andhra Pradesh (Hyderabad)	1. Shri C. H. Rao 2. Shri G. V. S. R. Krishna 3. Shri P. R. Yeri	1. Shri P. Govinda Rao, Head of the Agri. Res. Instt. 2. Shri S. Vittal Rao, (H. Q.) Dy. Director (Research)
2.	Assam (Shillong)	1. Shri A. Sinha 2. Shri K. D. Saha	1. Shri U. C. Borah, Research Officer (Stat.)
3.	Bihar (Sabour)	1. Shri R. K. Jain 2. Shri S. M. G. Saran	1. Shri G. P. Singh, Statistician
4.	Gujarat (Ahmedabad)	1. Shri S. P. Doshi	1. Dr. D. K. Desai, Dy. Director of Agriculture (Stat.) 2. Shri J. B. Trivedi, I/C. Dy. Director (Stat.) 3. Shri R. L. Shah, Dy. Director of Agriculture (Stat.)
5.	Kerala (Trivandrum)	—	1. Shri N. George John, Research Officer, 2. Shri G. Rama Chandran Nair, Research Officer 3. Shri K. George, Research Officer
6.	Madhya Pradesh (Bhopal)	1. Shri Rama Rao Patil 2. Shri S. S. Kataula	1. Shri A. G. Khare, Dy. Director of Agriculture (Stat.)
7.	Maharashtra (Poona)	1. Shri P. R. Yeri 2. Shri B. Ramakrishnan	1. Shri V. G. Sharma, Sr. Statistician 2. Shri G. C. Shaligram, Dy. Statistician 3. Shri D. T. Sawant, Asstt. Statistician
8.	Mysore (Bangalore)	1. Shri K. A. Balakrishnan, 2. Shri P. T. N. Nambiar	1. Dr. N. P. Patil, Director of Research
9.	Orissa (Bhubaneswar)	1. Shri Rama Rao Patil	1. Shri B. Mishra, Dy. Director of Agri. (HQ) 2. Shri A. Mishra Chief Statistician
10.	Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir (Ludhiana)	1. Shri B. L. Kaistha 2. Shri U. N. Dixit 3. Shri D. L. Manocha 4. Shri M. S. Batra 5. Shri D. P. Singh	1. Shri P. S. Sahota, Director of Crop Insurance 2. Shri Darshan Singh, Asstt. Statistician 3. Shri M. S. Pannu, Statistician, Department of Agriculture

- |     |                            |   |  |
|-----|----------------------------|---|--|
|     |                            |   | 4. Dr. D. Raghavarao,<br>Prof. & Head, Dept. of<br>Math. & Stat., PAU<br>Ludhiana.   |
| 11. | Rajasthan<br>(Jaipur)      | 1. Shri N. K. Ohri<br>2. Shri C. H. Rao   | 1. Shri H. C. Kothari,<br>Dy. Director (Statistics),<br>Department of Agriculture.   |
| 12. | Tamil Nadu<br>(Coimbatore) | 1. Shri P. Narayanan<br>2. Shri M. V. George  | 1. Shri K. R. Nagaraja Rao,<br>Secretary, Research Council<br>2. Dr. K. Ramakrishnan,<br>Associate Dean.<br>3. Dr. D. Daniel Sunderaraj<br>Principal |
| 13. | Uttar Pradesh<br>(Lucknow) | 1. Shri S. N. Bajpai<br>2. Shri M. P. Saksena<br>3. Shri G. N. Bahuguna<br>4. Shri O. P. Sharma<br>5. Shri R. Sharma<br>6. Shri C. B. Tiwari<br>7. Shri R. S. Singh<br>8. Shri A. C. Srivastava | 1. Dr. K. Kishen, Jt. Director<br>of Agriculture (Statistics)<br>2. Shri K. P. Avasthy,<br>Officer-on-Special Duty                                   |
| 14. | West Bengal<br>(Calcutta)  | 1. Shri A. K. Mukherjee<br>2. Shri A. Sinha   | 1. Shri S. N. Mukherjee,<br>Dy. Director of Agriculture<br>(Statistics)  |

**ABBREVIATIONS COMMON TO EXPERIMENTS ON ANNUAL AND PERENNIAL  
CROPS AND EXPERIMENTS ON CULTIVATORS' FIELDS GIVEN IN  
EXPERIMENTAL DATA**

Crop :—In the top left corner is given the name of the crop on which the experiment is conducted. Within brackets along side the crop is mentioned the season wherever the information is available.

Ref :—Against the sub-title 'Reference' is mentioned the name of the State, the year in which the experiment is conducted and the serial number of the experiment for that year are given in brackets.

Abbreviations adopted for States are as follows :

1. A.P.	—	Andhra Pradesh	10. Mh.	--	Maharashtra
2. As.	—	Assam	11. Ms.	—	Mysore
3. Bh.	—	Bihar	12. N.L.	—	Nagaland
4. Gj.	—	Gujarat	13. Or.	—	Orissa
5. H.P.	—	Himachal Pradesh	14. Pb.	—	Punjab
6. Hr.	—	Haryana	15. Rj.	—	Rajasthan
7. J.K.	—	Jammu & Kashmir	16. T.N.	—	Tamil Nadu
8. K.	—	Kerala	17. Tr.	—	Tripura
9. M.P.	—	Madhya Pradesh	18. U.P.	—	Uttar Pradesh
			19. W.B.	—	West Bengal.

For the experiments conducted under the schemes sponsored by the Indian Council of Agricultural Research, like the All India Co-ordinated Agronomic Experiments (Mode<sup>1</sup> Agronomic Experiments and Simple Fertilizer Trials) scheme, no serial numbers have been given at the source as the data of these experiments were collected at the headquarters (New Delhi). In such cases the abbreviations MAE or SFT are given in the brackets against the year in which the experiment is conducted.

Site & Centre :—Name of the Research Station is mentioned along with the place where it is located, *e.g.* Agricultural Research Station Vyara for Agricultural Research Station, Vyara.

For Central Institutes, the corresponding standard abbreviations have been adopted as given below :

C. A. Z. R. I.	—	Central Arid Zone Research Institute.
C. P. C. R. I.	--	Central Plantation Crops Research Institute.
C. P. R. I.	—	Central Potato Research Institute.
C. R. R. I.	—	Central Rice Research Institute.
C. S. S. R. I.	—	Central Soil Salinity Research Institute
C. T. C. R. I.	—	Central Tuber Crops Research Institute.
C. T. R. I.	—	Central Tobacco Research Institute.
C. T. R. L.	—	Cotton Technological Research Laboratory.
I. A. R. I.	—	Indian Agricultural Research Institute.
I. G. F. R. I.	—	Indian Grassland & Fodder Research Institute.
I. H. R.	—	Institute of Horticultural Research.
I. I. S. R.	—	Indian Institute of Sugarcane Research.
I. L. R. I.	—	Indian Lac Research Institute.
J. A. R. I.	—	Jute Agricultural Research Institute.
J. T. R. L.	—	Jute Technological Research Laboratory.
S. B. I.	—	Sugarcane Breeding Institute.

In case of the experiments conducted on cultivators' fields, whether under an Indian Council of Agricultural Research scheme or by the State Government, the abbreviation (c. f.) is given along with the site or centre as, for example, Cuttack (c. f.).

Type :—Abbreviations used against this item are one, or more than one, of the following :

C.—Cultural ; D—Control of Diseases and Pests ; I—Irrigational ; M—Manurial ; R—Rotational ; V—Varietal and X—Mixed cropping. In factorial experiments the treatments will be abbreviated as : for example Cultural-cum-manurial as CM.

Object :—A statement of the objective of the experiment is given indicating the main crop and the type of the experiment.

Results :—Information under this heading should be read against the following items. :

(i) General mean. (ii) S. E. per plot. (iii) Results of test of significance, (iv) Summary table(s), with critical differences for individual effect means which are significant.

#### Other abbreviations used in the Experimental Data

Kg.	=	Kilogram(s)	Dical. Phos.	=	Dicalcium Phosphate
Kg/ha.	=	Kilogram(s) per hectare.	Zn. Sul.	=	Zinc Sulphate
N	=	Nitrogen	Cu. Sul.	=	Copper Sulphate
P	=	Phosphate	Mg. Sul.	=	Magnesium Sulphate
K	=	Potash	Mn. Sul.	=	Manganese Sulphate
Nitro. Phos.	=	Nitrogen Phosphate	Ammo. Molybdate	=	Ammonium Molybdate
Ammo. Phos.	=	Ammonium Phosphate	B.	=	Boron
A/S	=	Ammonium Sulphate	Fe. Sul.	=	Ferrous Sulphate
A/S/N	=	Ammonium Sulphate Nitrate	F. M.	=	Fish Manure
C/A/N	=	Calcium Ammonium Nitrate			
A/N	=	Ammonium Nitrate	G. N. C.	=	Groundnut Cake
A/C	=	Ammonium Chloride	M. C.	=	Municipal Compost
C/N	=	Chilean Nitrate	T. C.	=	Town Compost
Mur. Pot.	=	Muriate of Potash	G. M.	=	Green Manure
Pot. Sul	=	Potassium Sulphate	G. L. M.	=	Green leaf Manure
Super.	=	Super Phosphate			

The information regarding the particulars of research stations may be obtained under the respective items as given below :

### PARTICULARS OF RESEARCH STATIONS

#### A. General Information :

(i) District and the nearest railway station with Latitude, Longitude and Altitude if available. General topography of the experimental area. (ii) Type of tract it represents. (iii) Year of establishment. (iv) Cropping pattern. (v) Programme of research.

#### B. Normal Rainfall :

Average fortnightly rainfall, specifying the period on which the figures are based.

#### C. Irrigation and drainage facilities :

(i) (a) Whether available ; if so, since when (b) Type of facilities available. (ii) Whether there is a proper drainage system.

#### D. Soil type and Soil analysis :

(i) Broad soil type with depth, colour and structure. etc. (ii) Chemical analysis. (iii) Mechanical analysis.

#### E. No. of Experiments :

No. of experiments conducted on different crops that have been included in the compendium.

Information under the following heads is to be read against the respective items under experimental data as given below :



*A. For experiments on annual crops :*

*Basal conditions :*

(i) (a) Crop rotation followed, if any. (b) Previous crop. (c) Manuring of previous crop. (State amount and kind). (ii) Soil type. (iii) Date of sowing/planting. (iv) Cultural practices : (a) Preparatory cultivation. (b) Method of sowing. (c) Seed rate. (d) Spacing. (e) No. of seedlings per hole. (v) Basal manuring given to the whole experiment with time and method of application. (vi) Variety (indicate also early, medium or late). (vii) Irrigated or un-irrigated, (viii) Important Post-sowing/planting cultural operations such as weeding, etc. (ix) Rainfall during crop season. (x) Date of harvest.

*B. For experiments on perennial crops :*

(i) Previous history of the experimental area (Give manuring and other operations). (ii) (a) Soil type (b) Analytical results of soil, if available. (iii) Method of propagation of plants. (iv) Variety. (v) Date and method of sowing/planting (including spacing) (vi) Age of seedlings at the time of planting. (vii) Basal manuring given to the whole experimental area. (viii) Important cultural operations during the experimental years (ix) Inter-cropping if any. (x) Irrigated or un-irrigated (if irrigated give the source, number, interval and intensity of irrigation). (xi) Rainfall during the experimental year. (xii) Date(s) of harvest.

*C. For experiments on cultivators' fields :*

(i) (a) Crop rotation followed, if any. (b) Previous crop. (c) Manuring of previous crop, (State amount and kind). (ii) Soil type and soil analysis, if available. (iii) Basal manuring. (Give time and method of application). (iv) Variety. (v) Cultural Practices : (a) Preparatory cultivation. (b) Method of sowing. (c) Seed rate. (d) Spacing. (e) No. of seedlings per hole. (vi) Date of sowing/planting. (vii) Irrigated or un-irrigated (viii) Important post-sowing/planting cultural operations such as weeding, etc. (ix) Rainfall during crop season. (x) Date of harvest.

**DESIGN**

*A. For experiments on annual crop :*

(i) Abbreviations for designs : C. R. D.—Completely Randomised Design ; R. B. D. Randomised Block Design ; L. Sq.—Latin Square ; Fact—Factorial ; other designs and modifications of the above to be indicated in full. (indicate confounded effects, if any). (ii) (a) No. of plots per block (in a split-plot experiment, the number of main-plots per replication as well as the number of sub-plots per main-plot should be given). (b) Block dimensions. (iii) No. of replications. (iv) (a) Gross plot-size. (b) Net plot-size. (v) Border or guard rows kept. (vi) Whether treatments are randomised (independently in each block).

*B. For experiments on perennial crops :*

(i) Abbreviations for designs. C. R. D.—Completely Randomised Design ; R. B. D.—Randomised Block Design ; L. Sq.—Latin Square ; Fact.—Factorial ; other designs and modifications of the above to be indicated in full. (indicate confounded effects, if any) (ii) (a) No. of plots per block. (in split-plot experiments the number of main-plots per replication as well as the number of sub-plots per main-plot should be given). (b) Block dimensions. (iii) No. of replications. (iv) (a) Net plot size. (b) No. of trees per plot (In case of experiments on grasses give plot size). (v) Border or guard rows kept. (vi) Whether the treatments are randomised (independently in each block).

*C. For experiments on cultivators' fields :*

(i) Design with No. of plots/block and No. of replications. In split-plot experiments the number of main-plots per replication as well as the number of sub-plots per main-plot should be given), (ii) Method of selection of sites with number and distribution of experiments. (iii) (a) Gross plot size. (b) Net plot size. (iv) Whether treatments are randomised (independently in each block).

**GENERAL INFORMATION**

*A. For experiments on annual crops: B. For experiments on perennial crops, and C. For experiments on cultivators' fields.*

(i) General crop condition during growth (if lodged, state date of lodging). (ii) Incidence of pests and diseases and control measures taken, if any. (iii) Type of quantitative observations taken. (iv) (a) If the experiment has continued for more than one year indicate year of commencement and year of termination. (b) Whether treatments assigned to the same plots every year. (c) Reference to combined analysis, if any. (v) Other centres, if any, where the same experiment has been conducted with reference numbers, if any. (vi) Abnormal occurrences such as heavy rains, frost, storm, drought etc. (vii) Any other important information.

**GLOSSARY OF VERNACULAR NAMES OF CROPS**

Sl. No.	Name of Crop	Botanical Name	Assamese	Bengali	Oriya	Telugu	Tamil	Malayalam	Kannada	Marathi	Gujarati	Hindi	Punjabi
1	Paddy	<i>Oryza Sativa</i> L.	Dhan	Dhan	Dhano	Vadlu ; Biyyamu	Nel	Nellu	Bhatta	Bhat	Dangar	Dhan; Chawal	Chaul; Dhan
2	Wheat	<i>Triticum Sativum</i> Lamk. <i>Triticum aestivum</i> L.	Gaum ; Ghehu	Gam	Gaham	Godumalu	Kothumai	Gothambu	Godhi	Gahu	Ghahu	Gehon	Kanak
3	Jowar	<i>Andropogon Sorghum</i>	—	Jowar	Juara	Jonua	Cholam	Cholam	Jola	Jowari Jondhla	Jowari Juar	Jowar; Jaur	Jowar
4	Bajra	<i>Pennisetum typhoides</i> Stapf Ex Hubbard.	—	Bajra	Bajra	Sajja	Kambu	Kambu	Sajje	Bajri	Bajri	Bajra	Bajra
5	Maize	<i>Zea Mays</i> L.	Gomdhan	Bhutta	Macca	Mokka- Jonna	Makka- cholam	Cholam ; Makka- cholam	Musukina Jola	Makka	Makkai	Makka	Makki ; Makayee
6	Gram	<i>Cicer arietinum</i> L.	Butmah	Chola	Boot	Sanagalu	Kadalai; Sundal- Kadalai	Kadala	Kadale	Harbara	Chana	Chana	Chole; Chana
7	Green Gram	<i>Phaseolus aureus</i> Roxb.	Magumah	Sonamug	Mung	Pachape- salu	Pachai- Payaru Pasipayaru	Cerupaya- ru ; Payaru	Hesaru	Mug	Mag	Moong	Moong; Mug
8	Red Gram (Pigeon Pea)	<i>Cajanus cajan</i> Milsp, <i>Cajanus indicus</i> sprengl.	Arhar	Arhar	Harad	Kandulu	Thuvarai	Thuvaran Payaru	Thogari	Tur	Tuver	Arhar	Harhar ; Arhar
9	Brinjal ; (eggplant)	<i>Solanum melongena</i> L.	Bengena	Begun	Baigan	Vankaya	Kathari- kai	Vazhuth- ana	Badne- Kayi	Vange	Vengan	Baingan	Bengan Bataun
10	Potato	<i>Solanum tuberosum</i> L.	Alooguti	Alu	Bilati Alu	Bangala- dumpa ; Ulagadda	Urala Kizhangu	Urala Kizangu	Alugedde	Batata	Aloo ; Batat	Aaloo	Alu
11	Sugarcane	<i>Saccharum officinarum</i> L.	Kuhiar	Akh	—	Cheruku	Karumbu	Karimbu	Kabbu	Oos	Sherdi	Ganna; Kamad; Naishaker	Kamad Gonna; Eakh

**GLOSSARY OF VERNACULAR NAMES OF CROPS—Contd.**

Sl. No.	Name of crop.	Botanical Name	Assamese	Bengali	Oriya	Telugu	Tamil	Malayalam	Kannada	Marathi	Gujarati	Hindi	Punjabi
12	Cotton	<i>Gossypium spp.</i>	Kapah	Karpas	Kapa	Pratti	Paruthi	Paruthi	Hatti	Kapus	Kapas	Kapas	Kapah
13	Ground-Nut	<i>Arachis hypogaea L.</i>	China Badam	Cheena Badam	China Badam	Veru Senaga	Nilakada-lai	Nilakadai	Kadale Kayi	Bhuimug	Bhei sing Magafali	Mung-phali	Mungfali
14	Sesamum	<i>Sesamum Oriental L.</i>	Til	Til	Rasi	Nuvvulu	Ellu	Ellu	Yellu	Til ; Tili	Tal	Til	Til
15	Castor	<i>Ricinus Communis</i>	Eri	Rehri	Jada	Amudalu	Amarakku	Avanakku	Haralu	Erandi	Diyeli; Erando	Rehri	Arind ; Harind ; Rind
16	Tobacco	<i>Nicotiana tobacum L.</i>	Dhopat	Tamak	Uanpatra	Pogaku	Pugayilai	Pukayila	Hoge Soppu	Tambaku	Tamaku	Tambaku	Tamaku ; Tambaku
17	Lucerne	<i>Medicago Sativa L.</i>	Lucerne ghah	Lucerna	Lusarna	Garam Masal	Kuthirai-masal	Lecerne	Kudure masale	Lasunghas Vilaithi ghavat	Gadal Rajko	—	Lusan
18	Sannhemp	<i>Crotalaria Juncea L.</i>	San	Shan	Chain	Janumu	Sadambu	Kattu- chanam	Apsenabu	Tag	San	Sann	San
19	Onion	<i>Allium Cepa L.</i>	Piyaz	Piaz	Peas; Ulli	Ulli	Vengayam Eranga-yam	Ulli	Eerulli	Kanda	Dungle	Piaz	Ganda ; Payaz
20	Coconut	<i>Cocosnucifera L.</i>	Narikol	Narikel	Nadia	Kobbari	Ther.ga	Thengu	Thenga	Naral	Nalleri	Narial	Naryal
21	Mango	<i>Mangifera indica L.</i>	Am	Am	Amba	Mamidi	Mangai	Mavu	Mavu	Amba	Keri	Aam	Amb
22	Cheeku (Sapota)	<i>Achras Sapota L.</i>	Sopata	Sobeta	Sapeta	Sapota	Sapota ; Seema ; Elluapi	Sapota	Sapota hannu	Chiku	Chiku	Cheeku	Cheeku

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# GUJARAT

( Salient features of experimentation )

The general information regarding the agro-climatic regions, extent of irrigation, normal cropping pattern etc. of the State of Gujarat has been given in the first and the second series of the National Index of Agricultural Field Experiments already published for the periods 1948—53 and 1954—59 respectively.

This volume includes the results of 1331 experiments conducted during the period 1960—65, besides experiments belonging to All India Co-ordinated Agronomic Experiments scheme of I. C. A. R., as against about 700 experiments for the period 1954—59 and 200 for the period 1948—53. The consolidated results of experiments conducted for more than one year and concluded during the period 1960—65, numbering about 969, and forming 345 groups, have been presented in Table 1. Also the results of experiments conducted for only one year during the period under report, numbering 234 and also those of the experiments which are continued beyond 1965, numbering 128, and forming 40 groups, have been presented. The distribution of all experiments, according to crop and *type of treatment* is furnished in Table 2.

The principal crops of Gujarat State are paddy, wheat, jowar, bajra, cotton and groundnut. The salient features of the experimentation on these crops are given below :—

*Wheat* :—Wheat covers about 444\* thousand hectares i. e. 4.3% of the total cropped area. In all, 228 experiments of manurial, cultural, irrigational type, were reported on wheat crop : of these 167 experiments were carried out under irrigated and 61 under rainfed conditions. Most of the experiments conducted under irrigated conditions were of manurial type. The variety NP—824 was used in 84 experiments, NP—718 in 35, NP—710 in 13 and a number of minor varieties in the remaining experiments. The variety Arnej 206 was used in all the experiments under rainfed conditions.

Under irrigated conditions the results of response of wheat to the application of N, P and K are available. Different levels have been tried up to a maximum of 70 kg./ha in the case of all the nutrients N, P and K. Some experiments were also conducted with micro-nutrients. A few experiments were conducted on cultural practices mostly on the seed rates and dates of sowing.

Under rainfed conditions, nitrogen was tried upto 53 Kg/ha. No experiment was conducted during the period to determine the effect of P and K on un-irrigated wheat. Foliar experiments which were few in number, did not establish the superiority of foliar spray over soil application.

*Paddy* :—Paddy covers about 549 thousand hectares i.e. about 5.3% of the total cropped area. 120 experiments were reported on paddy crop, of which 93 concluded during the period covered and 26 experiments were continuing beyond 1965. Of these 119 experiments, 107 were on irrigated paddy. The varieties J—280, S—20, K—42 and Z—31 were used in about 80 percent of the experiments. Experiments conducted for finding out the response to principal plant nutrients covered the range of 0—100 Kg. per hectare for N and O to 70 Kg. for P as well as K. Experiments on micro-nutrients also did not show any evidence of their effect on the yield. Some experiments were also conducted on cultural practices, viz. spacing, sowing dates etc. Closer spacing and early sowing were more conducive for high yield for the crop varieties tried. Very few experiments were conducted on the control of pests and diseases on paddy.

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\*Figures taken from Indian Agricultural Statistics, Vol. 1 by Directorate of Economics and Statistics, Ministry of Food and Agriculture, C. D. and Co-operation, for 1964—65

*Jowar* :—Jowar is one of the most important crops of the State and covers about 308.5 thousand hectares i.e. about 3.0 percent of total cropped area. The total number of experiments conducted on the crop were 106, of which 37 were under irrigated and 69 under rainfed condition. Under irrigated conditions the variety BP—53 was used in 26 experiments out of 37 and the other varieties used were Malwan, E—56—A, M—35—1 and S—210. Under rainfed condition, E—56—A was used in 20 experiments, Malwan in 10, BP—53 in 7 and a number of varieties in the remaining experiments. In the experiments conducted to find out the response of Jowar to N, the level of N used was generally upto 30 Kg. but in some cases higher doses upto 50 Kg. per hectare were also tried. A few experiments were also conducted on irrigation requirements of jowar.

*Bajra* :—This is an important millet crop of the State and covers about 1403 thousand hectares i.e. nearly 13.8% of the total cropped area. 171 experiments were conducted on the crop out of which 59 were under irrigated conditions. Bavapuri, Bajra—207, S—207, N—28—15—2 and N—207 were the varieties commonly tried and these accounted for 123 experiments conducted. A number of experiments were carried out on the effect of N, P and K, on the yield of bajra, and also with different spacings and seed rates.

*Groundnut* :—Groundnut is the most important cash crop of the State and covers about 2143 thousand hectares i.e. nearly 21.2% of the total cropped area. The area under groundnut in the State is a little over one quarter of the total area under groundnut in the entire country. The varieties AM—32, AK—12—24, Punjab—1 and Samarala—1, accounted for nearly two-thirds of the experiments conducted on the crop. Most of the experiments were carried out to find out the optimum doses of P in combination with spacing and seed rates. Although the results on spacing and seed rate are not conclusive, there are indications that closer spacing is favorable for building up plant population in the field. Some experiments with micro-nutrients were also conducted. Experiments conducted to study the effectiveness of sulphur in controlling Tikka disease did not give positive result.

*Cotton* :—This is also an important cash crop of the state and covers about 1845.5 thousand hectares i.e. about 18.2% of the total cropped area. The State has the largest share of area under cotton in the cotton in the country. 374 experiments were conducted on cotton, of which 210 were concluded in the period of study and 165 were continued beyond 1965. Of the 210 concluded experiments, 122 were on irrigated crop and 89 on un-irrigated crop.

The experiments conducted for finding out the response of cotton to the application of N, K showed response to nitrogen upto 100 Kg. of the nutrient at a number of places. In a number of experiments the zero level of nitrogen was not included. Relative to other crops, larger number of experiments were conducted on micro-nutrients.

**TABLE--I**  
Number of groups of experiments concluded during 1960-65 period.  
( Crop-wise and Type-wise )

Crop	TYPE	M	MV	C	CV	CM	CMV	I+IV	IM	IC	ICM	ICMV	D	X	R	Total
Paddy		14(46)	3(9)	3(9)	—	3(11)	—	—	—	—	—	—	4(11)	—	—	27(86)
Wheat		32(91)	—	2(4)	—	4(15)	6(13)	5(12)	3(7)	1(2)	3(6)	4(10)	—	—	—	60(160)
Jowar		6(14)	2(5)	4(11)	—	8(22)	1(3)	2(5)	—	—	6(16)	—	—	—	—	29(76)
Bajra		11(28)	2(6)	8(27)	—	14(39)	—	—	—	—	16(42)	—	—	—	—	51(142)
Maize		1(2)	—	—	—	1(3)	—	—	—	—	—	—	—	—	—	2(5)
Gram		3(11)	—	—	—	—	—	—	3(9)	—	—	—	—	—	—	6(20)
Brinjal		1(3)	—	—	—	—	—	—	—	—	—	—	—	—	—	1(3)
Sugarcane		5(16)	—	2(5)	3(9)	6(19)	—	—	—	—	—	—	—	—	—	16(49)
Cotton		22(63)	2(9)	9(32)	1(4)	23(57)	—	8(21)	3(6)	—	29(72)	—	4(12)	—	—	101(276)
Tobacco		3(7)	—	—	—	—	—	—	—	—	—	—	—	—	—	3(7)
Groundnut		12(34)	2(9)	10(34)	—	6(16)	—	—	3(8)	—	—	—	1(3)	—	—	34(104)
Til		—	—	—	—	1(3)	—	—	—	—	—	—	—	—	—	1(3)
Lang		1(3)	—	—	—	—	—	—	—	—	—	—	—	—	—	1(3)
Castor		—	—	—	—	1(2)	—	—	—	—	—	—	—	—	—	1(2)
Lucerne		—	—	—	—	1(3)	—	—	—	—	—	—	—	—	—	1(3)
Sann		—	—	—	—	—	—	—	—	—	—	—	1(2)	—	—	1(2)
X		—	—	—	—	—	—	—	—	—	—	—	—	8(21)	—	8(21)
R		—	—	—	—	—	—	—	—	—	—	—	—	—	2(7)	2(7)
		111(318)	11(38)	38(122)	4(13)	68(190)	7(16)	15(38)	12(30)	1(2)	54(136)	4(10)	10(28)	8(21)	2(7)	345(969)

( Figures in the brackets indicate total number of experiments in the groups )



TABLE 2  
Number of experiments Crop-wise and Type-wise

Crop	TYPE	M	MV	C	CV	CM	CMV	I+IV	IM	IC	ICM	ICMV	D	X	R	TOTAL
Paddy		56	10	16	—	23	—	—	—	—	—	—	15	—	—	120
Wheat		132	—	4	2	19	14	14	11	2	9	21	—	—	—	228
Jowar		18	5	22	—	33	3	6	—	—	19	—	—	—	—	106
Bajra		40	7	30	—	54	—	—	—	—	40	—	—	—	—	171
Maize		2	2	—	—	3	—	—	—	—	—	—	—	—	—	7
Gram		12	—	—	—	—	—	—	—	—	—	—	—	—	—	21
Other Pulses (Tur, Mung, Wal).		5	—	—	—	—	—	—	9	—	—	—	—	—	—	5
Brinjal		3	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Onion		—	—	—	—	—	—	—	2	—	—	—	—	—	—	2
Potato		—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
Sugarcane		19	—	5	9	21	—	—	1	—	—	—	—	—	—	55
Cotton		99	9	40	4	68	6	26	11	6	92	—	13	—	—	374
Tobacco		5	—	—	2	—	—	—	—	—	3	—	—	—	—	10
Groundnut		56	9	43	—	27	—	1	10	—	—	—	8	—	—	154
Other Oil-seeds (Caster, Til, Lang)		3	—	1	—	5	—	—	—	—	—	—	—	—	—	9
Fodder Crops (Sann, Lucern, jowar fodder, legumes)		2	—	—	—	3	—	—	—	—	—	—	3	—	—	8
Coconut		4	—	—	—	—	—	—	—	—	—	—	—	—	—	4
Mango		5	—	—	—	—	—	—	—	—	—	—	—	—	—	5
Chiku		—	—	—	6	—	—	—	—	—	—	—	—	—	—	6
X		—	—	—	—	—	—	—	—	—	—	—	—	24	—	24
R		—	—	—	—	—	—	—	—	—	—	—	—	—	18	18
<b>TOTAL</b>		<b>461</b>	<b>42</b>	<b>161</b>	<b>17</b>	<b>262</b>	<b>23</b>	<b>47</b>	<b>44</b>	<b>8</b>	<b>164</b>	<b>21</b>	<b>39</b>	<b>24</b>	<b>18</b>	<b>1331</b>

## PARTICULARS OF RESEARCH STATIONS AND SOIL ANALYSIS

### 1. Agricultural Research Station, Amreli.

#### A. General information :

(i) District Amreli, 1 Km. from Amreli R. S. with Latitude : 21°-35°N, Longitude : 71°-17° E, Altitude : 129 Meters (M. S. L.)

(ii) It represents plain tract with levelled plots. (iii) Started in 1926. (iv) Millets—Cotton—Groundnut is the cropping pattern. Wherever irrigation facilities are available, irrigated wheat is taken in Rabi after Kharif groundnut. (v) Plant breeding, agronomic and other cultural trials on main crops of the tract are the main aspects of research.

#### B. Normal rainfall :

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.1	—	—	0.1	0.3	—	0.4	—	—	0.4	3.0	5.3
July		Aug.		Sept.		Oct.		Nov.		Dec.	
8.0	6.1	8.1	4.1	3.1	7.0	0.8	—	0.7	0.6	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

#### C. Irrigation and drainage facilities :

(i) (a) Facilities available since 1926. (b) Two working wells, one operated by oil engine and the other with motor. (ii) Proper drainage is available.

#### D. Soil type and soil Analysis :

- (i) Medium black soil.  
(ii) Chemical analysis.

	% on air dry soil	
	Sample No. 556	Sample No. 557
Stone	2.97	4.54
Moisture	8.45	8.87
Time reserve	3.06	3.06
Organic Matter	1.31	1.14
Water soluble salts	0.12	0.15

#### (iii) Mechanical Analysis :

Sand	10.38	10.56
Silt	14.62	14.20
Clay	67.46	68.80
Textural classification	Clayey	Clayey

	% on air dry soil	
Dist. Co-effi.	6.2	6.2
Humus.	0.58	0.54
Organic Carbon	0.76	0.66
Total Nitrogen	0.06	0.08
C/N ratio.	12.7	8.25
pH.	7.2	7.5
Conductivity	0.15	0.15

...m. e/100 gm. oven dry soil.

#### Base Exchange.

Exchangeable Calcium.	52.08	53.80
Exchangeable Magnesium	12.13	13.63

Exchangeable Sodium & Potassium	2.40	2.60
Total exchangeable Bases.	66.61	70.03
Base exchange capacity.	67.0	70.0
<i>Available constituents :</i>		
Potassium (K <sub>2</sub> O) in kg/ha,	121.1	114.3
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> ) in kg/ha.	19.6	19.6
<i>Physical constants :</i>		
Sticky point moisture	37.39	37.87
Maximum water holding capacity	72.61	77.19
Real specific gravity	2.30	2.30
Apparent specific gravity	1.16	1.13
Pore space percentage	49.57	50.90

Note :—The details of the soil samples analysed are as under ;

1. 556 : 0-15 cm. one acre plot
2. 557 : 15-30 cm. without any replication.

Water analysis report

Description.	Parts per 100,000 parts of water
Total soluble salts.	71.940
Calcium carbonate	6.000
Calcium bi-carbonate	9.306
Magnesium bi-carbonate	20.680
Sodium bi-carbonate	12.554
Sodium chloride	23.400
Conductivity m.mhs/cm.	—
pH.	8.4

E. No. of experiments ;

Wheat—7, Bajra—9, Cotton—8, Groundnut—13, Mixed cropping—1, Rotational—1 :  
Total=39.

2. Institute of Agriculture, Anand.

A. General information :

(i) District Kaira, 6 Km. from Anand R. S., Levelled area with few slopy plots. Latitude 22.62°N, Longitude 73.0°E, Altitude 46 meters. (ii) It represents charotar tract of Kaira district. (iii) Started in 1947. (iv) Generally Tobacco, Bajri, Jowar, Wheat, Hybrid Maize. Vegetables etc. is the cropping pattern. (v) Investigations into the improvement and production of common field crops of Gujarat State, are the main aspects of research.

B. Normal rainfall.

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.05	—	0.12	—	—	—	—	—	0.24	0.01	5.25	2.44
July		Aug.		Sep.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
20.23	7.63	14.68	3.09	8.63	5.34	0.91	0.37	0.08	0.78	0.01	—

(Av. fortnightly rainfall in cm. based on data for 60—64 period)

C. Irrigation and drainage facilities :

(i) (a) Facilities available since 1952-53. (b) Type of facilities N. A. (ii) Open drains are provided for removing excess rain water.

D. Soil type and soil analysis.

(i) Broad soil type is loamy sand. It is light reddish brown in colour and massive in structure.

(ii) *Chemical analysis :*

Total N : 700 Kg/ha.  
 Available P<sub>2</sub>O<sub>5</sub> : 30—40 Kg/ha.  
 Available K<sub>2</sub>O : 300—400 Kg/ha.

(iii) *Mechanical analysis :*

Coarse sand = 0.5 %  
 Fine sand = 80.0 %  
 Salt = 10.0 %  
 Clay = 9.5 %

E. *No. of experiments :*

Paddy—4, Wheat—6, Bajra—17, Sugarcane—2, Tobacco—5, Total=34.

**3. Agricultural Research Station, Arnej.**A. *General information :*

(i) District Arnej, 400 meters from Arnej R. S. The station is situated more or less in the centre of Bhal tract of Ahmedabad district with latitude, 22.6° N, Longitude 72.2° E. (ii) The soils are lighter on the western side of the Farm than the Eastern side. (iii) Started in 1944. (iv) Wheat and Gram in rotation. (v) Genetic improvement of Wheat and Gram and improvement of Agricultural practices are the main programme of Research.

B. *Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	3.1	—	3.74	1.04	15.7	58.8
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
114.6	69.1	117.8	65.6	93.76	51.1	1.8	7.5	1.5	7.5	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

C. *Irrigation and drainage facilities :*

(i) (a) Facilities not available. (b) Types of facilities N. A. (ii) There is no proper drainage system.

D. *Soil type and soil analysis :*

(i) Medium black to deep black soil to a depth of 6.3 to 7.6 cm. and clayey in structure.

(ii) *Chemical analysis :*

Depth of soils	Total salts.	CaCO <sub>3</sub>	pH	Exchangeable basis		
				Ca.	Mag.	Na.
0 to 23 cm.	0.29	10.0	8.55	25.00	2.50	3.00
23 to 46 cm.	0.36	10.4	8.75	22.00	8.50	2.50

(iii) *Mechanical analysis :*

Depth.	Silt.	Clay.
0 to 23 cm.	28.25	38.00
23 to 46 cm.	16.00	40.00

E. *No. of experiments :*

Wheat—18, Gram—7, Total=25.

**4 Trial-cum-Demonstration Farm, Bardoli.**A. *General Information :*

(i) District Surat, half Km. from Bardoli R. S. Land is levelled. Its

Latitude is 21.2°N, Longitude 73.3°E and Altitude 34.6 meters. (ii) South Gujarat black soil. (iii) Started in 1957. (iv) Paddy, Cotton, Sugarcane, Banana, Wheat and Jowar is the cropping pattern. (v) Cultural, manurial, varietal trials are the main aspects of research.

**B. Normal rainfall.**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	3.0	—	—	—	—	—	—	8.2	50.1	117.9
July		Aug.		Sep.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
415.5	221.6	231.7	166.1	152.3	176.2	18.2	—	—	—	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1958. (b) Canal irrigation. (ii) Open drains are there.

**D. Soil type and soil analysis :**

(i) Broad soil type N. A. 1.5 meters deep and black in colour also clay in structure.

(ii) *Chemical analysis :*

pH=7.9

Conductivity=0.10 m.m.

Organic carbon=0.36%

Available phosphate=68.6 Kg/ha.

(iii) *Mechanical analysis ;* N. A.

**E. No. of experiments :**

Paddy—17, Wheat—3, Jowar—3, Sugarcane—4, Cotton—18, Mixed Cropping—2, and Wal—1, Total=48.

**5. Agricultural Research Station, Bhachau.**

**A. General information :**

(i) District Kutch, just near to Bhachau R. S. Well levelled, well drained and banded soils. (ii) Sandy soils having scanty rainfall. (iii) Started in 1954. (iv) Pajra, Jowar, Groundnut, Castor, Cotton and Wheat is the cropping pattern. (v) Programme of Research is as directed by Agronomy, Plant breeding and soil science sub-committee.

**B. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	0.17	—	—	—	—	—	—	—	0.30	4.65
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
3.99	6.07	3.76	3.78	4.65	0.99	0.30	1.78	—	0.58	0.38	0.20

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1954. (b) N. A. (ii) Proper drainage is available.

**D. Soil type and soil analysis ;**

(i) Sandy alluvial soil having varying depth, light reddish in colour and loose in structure.

(ii) *Chemical analysis :*

	Sample 1	Sample 2
Course matter	1.66%	1.66%
Moisture	2.53%	1.95%
Loss on ignition	0.21%	0.05%
Acid soluble matter	91.25	93.20
Iron	2.50	2.33
Lime	0.55	0.79
N	0.65	0.05
P	Nil (traces)	Nil (traces)
Magnesium	0.15	0.10

(iii) *Mechanical analysis :*

Sand = 70 %  
Silt = less than 20%  
Clay = more than 10%.

*E. No. of experiments :*

Wheat—8, Bajra—6, Cotton—6, Total=20.

**6. Cotton Breeding Station, Broach.***A. General information :*

(i) District Broach, 16 Km. from Broach R.S. Upper layer of soil is fertile and it is about 1.22 to 1.83 meters deep while lower layer of soil is granular having light yellow colour. Soil absorbs moisture on being dry big cracks formed. (ii) Medium black soil. (iii) Started in 1913. (iv) Cotton—Jowar is the cropping pattern. (v) Research programme is to evolve cotton varieties superior to Digvijaya.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.01	—	—	—	—	—	—	—	—	—	0.61	1.91
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
18.41	7.32	10.57	9.07	8.53	7.8.	1.91	3.68	0.13	0.58	—	0.03

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

*C. Irrigation and drainage facilities :*

(i) (a) Facilities N. A. (b) Types of facilities N. A. (ii) Proper drainage is available.

*D. Soil type and soil analysis :*

(i) Broad soil type N. A Deep soils with 1.22 to 1.83 meters depth and black in colour. (ii) Chemical analysis and (iii) Mechanical analysis—N. A.

*E. No. of experiments :*

Cotton—9, Total = 9.

**7. Trial-cum-Demons. Farm, Chanasura.***A. General information :*

(i) District Mehsana, two kilometers from Chanasura R. S. (ii) Sandy to sandy loam. (iii) Started in 1960. (iv) Kharif Jowar, Bajri, Cotton. Castor is the cropping pattern. (v) The major research on irrigation cum fertilizer requirement of different crops viz. Hybrid Bajri, Jowar, Cotton etc. under taken at this farm. The minor research to study the suitability of the several new crops and other allied problems.

**B. Normal rainfall :**

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
—	—	—	—	—	26.8	119.8	100.3	109.2	3.5	3.9	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1961. (b) Type of facilities : N. A. (ii) No proper drainage system exists.

**D. Soil type and soil analysis :**

(i) Broad soil type : N. A. Depth 3.05 meters and medium to medium black in colour.

**(ii) Chemical analysis :**

	% on dry sample										
	1	2	3	4	5	6	7	8	9	10	11
Hygroscopic Moisture	0.5	1.3	1.0	0.7	0.4	0.2	0.6	1.1	1.0	0.6	0.5
Organic matter	·3765	·3560	·5109	·4775	·4378	·3560	·4840	·9547	·4840	·4303	·3765
Lime reserve	1.26	2.26	3.36	2.66	2.16	1.86	2.16	2.36	2.56	1.76	2.26
Total soluble Salts	·095	·010	·112	·146	·110	·084	·082	·118	·205	·141	·083

**(iii) Mechanical analysis :**

Sand	79.77	63.98	61.02	63.99	65.79	74.50	76.67	61.46	71.75	72.07	70.78
Silt	7.0	14.0	17.0	13.0	7.0	10.8	5.0	18.0	5.0	10.0	10.0
Clay	11.0	18.0	17.0	19.0	24.0	13.0	15.0	16.0	19.0	15.0	16.0
Textural class	Loamy										
	sand					Sandy loam					
pH.	8.4	8.4	8.4	8.0	8.1	8.0	7.8	8.2	8.2	8.0	7.9

**Result on air dry sample**

Organic carbon %	·218	·206	·296	·268	·312	·206	·281	·554	·281	·249	·218
Total Nitrogen %											
C/N Ratio	·039	·252	·011	·020	·011	·011	·039	·031	·036	·028	·022
Available phosphorus	4.00	6.40	16.8	16.8	6.40	6.40	12.4	10.2	12.4	24.8	24.8
Available Potash	140	175	150	180	155	190	165	165	155	200	165

**Milli-equivalent/100 grams of dry sample****Exchangeable Bases**

	1	2	3	4	5	6	7	8	9	10	11
Exch. Calcium	5.6	5.6	6.8	7.2	6.5	6.4	7.2	6.8	4.8	5.2	7.2
Exch. Magnesium	2.8	2.3	2.0	1.0	2.4	1.6	2.8	3.2	5.2	2.0	1.2
Exch. Na+K	0.80	1.20	1.60	2.00	0.80	1.20	1.20	1.20	0.80	0.40	0.80
Base Exch. capacity	7.00	8.00	11.00	9.00	10.00	9.00	13.00	12.00	8.00	10.00	13.00

**E. No. of experiments :**

Wheat—5, Jowar—4, Bajra—6, Cotton—5, Rotational—1 ; Total=21.

**8. Trial-Cum-Demons, Farm, Chickhli.****A. General information :**

(i) District Bulsar, 15 Km. from Billimora R. S. (ii) Deep black Kayari land at south Gujarat under rainfed conditions. (iii) Started in July 1950. (iv) Paddy, Wheat, Gram is the cropping pattern. (v) Programme of Research is trials on cultivation practices under the concept of Canal irrigation to access the Kakrapur projects.

**B. Normal Rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.16	—	—	—	—	—	—	—	—	0.6	0.7	24.2
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
43.1	23.6	32.6	20.4	14.3	13.0	0.1	—	—	—	—	0.24

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1959. (b) Type of facilities—Canal irrigation. (ii) No proper drainage system is available.

**D. Soil type and soil analysis :**

(i) Broad soil type N. A. Depth varying from 23 to 30 cm., colour is black and structure is black clay.

**(ii) Chemical analysis :**

Moisture : 15 to 20 %  
 Potash : 0 to 20 mg./100 gm.  
 Phosphorus : 5 to 10 %  
 Carbon & Nitrogen : 10 to 15 %  
 pH : 7 to 8.  
 T. S. S. : 0.05 to 0.25 %

**(iii) Mechanical analysis : N.A.****E. No. of experiments :**

Paddy—22, Total = 22.

**9. Agricultural Research Station, Dabhoi.****A. General information :**

(i) District Baroda, distance 3.2 Km from Dabhoi R. S. with latitude 22°—11' North, longitude 73°—25' East. (ii) The soil of this tract is medium black having certain patches at some places in certain plots. (iii) Started in 1938. (iv) Cotton, Jowar, Paddy, Wheat etc. is the cropping pattern. (v) To conduct varietal trials on drilled and transplanted paddy for conforming suitability of paddy strains and agronomic experiments on paddy crop.

**B. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
3.4	—	2.1	—	—	0.9	0.9	—	—	8.1	23.3	735.
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
113.7	176.5	127.7	67.1	124.3	50.0	19.6	1.64	11.6	—	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1938. (b) Types of facilities N. A. (ii) No proper drainage system is available.

**D. Soil type and soil analysis :**

(i) Broad soil types N. A. 0.9 m. to 1.22 m. deep. Black to besar (slightly brown) in colour. (ii) Chemical analysis : Moisture—2.11 to 4.35, N<sub>2</sub>—0.04 to 0.05, P<sub>2</sub>O<sub>5</sub>—16.5 to 19.20, K<sub>2</sub>O—28.09, CaCO<sub>3</sub>—0.15 to 2.87, T. S. S.—0.11 to 0.15 and pH.—7.6 to 8.2. (iii) Mechanical analysis—N. A.

**E. No. of experiments :**

Paddy—18, Wheat—10, Gram—4. Total=32.

**10. Agricultural Research Station, Deesa.****A. General information :**

(i) District Banaskantha. (ii) Type of tract is Banaskantha district tract. (iii) Started in 1953. (iv) Bajra, Makki and Guwar etc. is the cropping pattern. (v) Research Programme is field experimentation.



**B. Normal rainfall :**

June	July	Aug.	Sept.	Oct.	Nov. to March.	April	May	Total
0.50	145.54	42.16	109.22	67.31	—	1.77	—	366.5

(Av. fortnightly rainfall in cm. based on the period : N. A.).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities—N. A. (b) Type of facilities—N. A. (iii) No proper drainage available.

**D. Soil type and soil analysis :**

(i) Sandy loam. Indefinite in depth, yellowish in colour. (ii) Chemical analysis : P—8.34, Total salt in %—0.04, CaCO<sub>3</sub>—0.74, Ca—2.0, Mg—0.3, Na+K<sub>2</sub>O—1.1. (iii) Mechanical analysis in % : Salt—4.80, Clay—12.50.

**E. No. of experiments :**

Wheat—1, Jowar—6, Bajra—10, Total=17.

**11. Dry Farming Research Station, Dhandhuka,****A. General information :**

(i) District Ahmedabad, 4.2 Km. from the Dhandhuka R. S. (ii) Type of tract is "Bhal" tract. (iii) Started in 1958. (iv) Wheat after cotton and gram ; wheat after wheat is the normal cropping pattern. (v) To find out the best Agronomical practices i.e. time of application and quantity of fertilizers to get more yield, under agroclimatic conditions of Bhal by conducting different Agronomic experiments on wheat, cotton and gram crops is the programme of research.

**B. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	.1	.5	—	6.3	1.0
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
14.2	2.4	7.6	6.6	10.6	1.6	.6	—	—	.6	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities are not available. (b) Type of facilities N, A. (ii) No proper drainage system exist.

**D. Soil type and soil analysis :**

(i) Broad soil type is medium black type and 1.21 to 1.5 meters deep, black in colour and loamy in structure. (ii) Chemical analysis and (iii) Mechanical analysis not done.

**E. No. of experiments :**

Wheat—13, Gram—1, Cotton—5, Mixed cropping—3, Total=22.

**12. Agricultural Research Station, Dohad.****A. General informatian :**

(i) District Panchmahals, 4.0 Km. from Dohad R. S. (ii) Type of tract is hilly. (iii) Started in 1907. (iv) Paddy-gram, Paddy-wheat, Maize-gram, is the cropping (v) Research programme is to conduct experiments on Paddy, Maize. Wheat and Gram.

**B. Normal rainfall :**

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
3.81	—	4.1	3.8	9.8	80.6	242.4	179.9	169.3	26.2	19.2	10.0

(Av. based on rainfall data for the period 1960—64).

*C. Irrigation and drainage facilities :*

(i) (a) Irrigation facilities available. (b) One Tank. (ii) No proper drainage system is available.

*D. Soil type and soil analysis :*

(i) Broad soil type N. A. .76 to .91 meters deep, black in colour and sticky in structure. (ii) Chemical analysis and (iii) Mechanical analysis N. A.

*E. No. of experiments :*

Paddy—2, Wheat—9, Maize—5, Gram—3, Sann—3. Total=22.

**13. Fruit Research Station, Gandevi.***A. General information :*

(i) District Bulsar, 3.2 Km. from Gandevi R. S. with uniform land. (ii) Type of tract N. A. (iii) Started in 1938. (iv) Perennial crop is the cropping pattern. (v) Research programme is experimentation on Chickoo and Mango crops.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	—	—	0.92	6.34
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
16.8	9.1	12.5	7.3	6.2	3.5	0.35	—	0.08	0.29	0.08	Nil

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

*C. Irrigation and drainage facilities :*

(i) (a) Facilities available from the beginning of farm. (b) Type of facilities—N. A. (ii) No proper drainage is available.

*D. Soil type and soil analysis :*

(i) Sandy loam soil 3.05 meters deep, black in colour.  
 (ii) Chemical analysis : ( in % )  
 N—0.57, P<sub>2</sub>O<sub>5</sub> 0.095 K<sub>2</sub>O 0.304 and Organic matter 0.057.  
 (iii) Mechanical analysis : ( in % )  
 Coarse sand—2.52, Fine sand—53.83, Silt—14.22, Clay 21.90.

*E. No. of experiments :*

Mango—5, Chickoo—6, Total=11.

**14. Irrigation Demonstration Farm, Halvad.***A. General information :*

(i) District Surendranagar 7 Kms. from Halvad R. S. Most of the plots are levelled with Latitude 23°—39' N, longitude 71°—15'E and Altitude 43.7 meters. (ii) Medium black soil. (iii) Started in 1954. (iv) Kharif Bajri, Groundnut, Jowar and Cotton, Rabi—Wheat is the normal cropping pattern. (v) Research programme is Agronomic breeding and irrigational experiments on various crops.

*B. Normal rainfall.*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	.4	—	.3	—	—	—	.4	.1	1.7	5.2
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
5.9	7.6	4.7	5.0	2.6	2.7	.3	.4	—	.6	—	—

(Av. fortnightly rainfall in em. based on for the period 1960-64)

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1954. (b) Canal irrigation. (ii) Proper drainage is available.

**D. Soil type and soil analysis :**

(i) (a) Loamy to clayey loam in nature. Soil is neutral in reaction and total soluble salt content is fairly low. (ii) Chemical analysis :

Determination.	% on air dry sample			
	Depth :			
	0-23 cm.	23-46 cm.	46-114 cm.	115-140 cm.
Hygroscopic Moisture.	4.92	4.93	5.30	5.30
Organic matter	0.256	0.232	0.101	0.082
Lime reserve	17.86	17.86	18.16	12.46
Total soluble salts	0.075	0.045	0.195	0.085
Mechanical analysis :				
Sand	29.79	33.24	28.10	26.07
Silt	32.80	13.58	10.38	12.70
Clay	14.3	30.12	37.76	43.30
Textural class	Loam	Clay loam	Clay loam	Clay loam
		Results on air dry sample		
Fertility constituents :				
Organic carbon %	0.148	0.134	0.059	0.048
Total Nitrogen (N <sub>2</sub> )%	0.019	0.031	0.045	0.031
Available phosphorus (P <sub>2</sub> O <sub>5</sub> ) (Kg/ha)	2.24	2.24	2.24	2.24
Available Potash (K <sub>2</sub> O) (Kg/ha).	56.0	56.0	56.0	56.0

**E. No. of experiments :**

Wheat—17, Jowar—5, Bajra—4, Cotton—23, Groundnut—5, Castor—1, Mixed cropping—3, Total = 58.

**15. Agricultural Research Station, Jagudan.****A. General information :**

(i) District Mehsana, near Jagudan Railway Station. (ii) Type of tract it represents—N. A. (iii) Started in 1932. (iv) Cropping pattern : Bajra—Wheat, Bajra—Onion, Cotton—Bajra etc. (v) Programme of research—N. A.

**B. Average rainfall :**

Av. annual rainfall = 73.7 cm.  
(Period on which it is based in N.A.)

**C. Irrigation and drainage facilities :**

(i) (a) Irrigation facilities are available, (b) Oil engine. (ii) Drainage facilities are N. A.

**D. Soil type and soil analysis :**

(i) Sandy loam. (ii) Chemical analysis : P<sub>2</sub>O<sub>5</sub>—25.17%, Calcium carbonate—7.34% Sodium—2.19%, Carbon—0.17% and pH—8.2.

(iii) Mechanical analysis : Sand—81.9%, Silt—6.5%, Clay—11.1%.

**E. No. of experiments :**

Cotton—9 ; Total=9.

**16. Dry Farming Research Station, Jam-khambhalia.****A. General information :**

(i) District Jamnagar, 4 Km. from Jam-khambhalia R. S. Some plots are levelled while some plots are slopy, Some plots have 15 cm. depth of soil. (ii) Type of tract is N. A. (iii) Started in 1957. (iv) Groundnut—Bajri, Jowar—Groundnut is the cropping pattern. (v) Research programme is to evolve suitable dry farming method of cultivation. Also to make extensive research in soil conservation with reference to moisture, physico-chemical characteristic and fertility status of soil.

**B. Av. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	—	—	0.57	7.65
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
5.65	6.80	5.83	5.58	1.86	1.66	1.37	0.58	—	2.21	—	—

(Av. fortnightly rainfall in cm. based on data for 1960—64)

**C. Irrigation and drainage facilities :**

(i) (a) Facilities are not available. (b) Type of facilities N. A. (ii) No proper drainage system exist but contour bunding was done 1960.

**D. Soil type and soil analysis :**

(i) Broad soil type N. A. 15 cm to 46 cm. deep, colour is grey to medium black. (ii) Chemical analysis and (iii) Mechanical analysis N. A.

**E. No. of experiments :**

Jowar—6, Bajra—13, Cotton—11, Groundnut—18, Total=48.

**17. Irrigation-cum-Demons. Farm Jamnagar.****A. General information :**

(i) District Jamnagar, 11.3 Km. from Jamnagar R. S. Levelled land with medium fertility. (ii) Type of tract is medium black soil and below normal rainfall area, (iii) Started in 1952. (iv) Groundnut—Bajri—Cotton—Jowar, Jowar—Groundnut, Paddy—Wheat and pulses—Wheat is the cropping pattern. (v) Research programme is to study the agronomic aspects of various crops, and also the water requirements on different crops.

**B. Normal rainfall :**

Information—N. A.

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1959. (b) Type of facilities are well and canal. (ii) Proper drainage is N. A.

**D. Soil type and soil analysis :**

(i) Broad soil type—N.A. 15 cm. to 46 cm. deep, black in colour and gravelly in structure.

**(ii) Chemical analysis :**

	% on air dry soil			
	1	2	3	4
Moisture	6.12	5.49	5.91	5.83
Lime reserve	Nil	Nil	Nil	Nil
Organic matter	1.06	1.20	1.30	1.31
Water soluble salt	0.046	0.085	0.105	0.087

**(iii) Mechanical analysis :**

Sand	9.25	8.50	15.50	16.72
Silt	15.14	9.54	21.50	36.54
Clay	68.38	75.18	55.68	39.52
Textural Classification :	Clay	Clay	Clay	Clay

Organic carbon	0.62	0.698	0.759	0.761
Total Nitrogen	0.037	0.035	0.042	0.036
pH	7.4	7.5	7.55	7.35
M/mhs/cm	0.45	0.40	0.70	0.95

*Bases Exchange : m e./100 gm Oven dry soil*

Exchangable Ca	35.60	36.40	35.60	34.80
Exchangable Mg.	16.84	14.25	12.71	21.60
Exchangable Na + k	1.80	1.40	2.00	2.40
Total Exchangeable bases	54.24	52.05	55.31	58.80
Base Exchange capacity	55.00	52.50	55.00	60.00
Available P	0.688	0.516	0.946	1.978

*Analysis of Water sample*

	1	2
Total soluble salts	54.02	35.90
Calcium Carbonate	5.60	5.00
Calcium bicarbonate	1.81	2.11
Magnesium bicarbonate	19.47	7.91
Sodium bicarbonate	10.17	7.90
Sodium chloride	16.98	12.99
Conductivity m/mhs/cm	0.8	0.5
pH	8.5	8.5
Quality	Suitable for irrigation	

*E. No. of experiments :*

Wheat—12, Jowar—1, Bajra—15, Sugarcane—2, Cotton—7, Groundnut—6, Gram—3, Coconut—1, and mixed cropping—3. Total=50.

**18. Central Experimental Station, Junagadh.***A. General information :*

(i) District Junagadh, 8 Km. from Junagadh R. S. The land is levelled. (ii) Type of tract is medium black clayey soil, the depth of which varies from 30 to 61 cm. The parental material of the tract is lime stone. (iii) Started in 1951. (iv) Groundnut in Kharif and Wheat in Rabi, Cotton in Kharif and Wheat in Rabi is the cropping pattern. (v) Programme of Research are conducted according to advise and plan of State Specialist.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	—	2.7	21.3	162.6
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
195.3	166.2	142.3	70.1	61.3	81.5	38.3	8.5	—	—	—	—

(Av. fortnightly rainfall in cm. based on data for 1960--64 period).

*C. Irrigation and drainage facilities :*

(i) (a) Irrigation facilities are available in limited area since 1955. (b) Type of facilities N. A. (ii) No specific drainage system exist.

*D. Soil type and soil analysis :*

(i) Broad soil type N. A. 30 cm. to 61 cm deep. Colour is medium black and structure is black (Sub-angular)

(ii) Chemical analysis : Nitrogen : Moderate,  $P_2O_5$  (available) : Moderate Potash : High, Lime reserve : 5 to 10%

(iii) Mechanical analysis : N. A.

*E. No. of experiments :*

Paddy—5, Wheat—20, Jowar—4, Bajra—13, Cotton,—20, Groundnut—27, Lucerne—3, Mixed cropping—3, and Rotational—1. Total=96.

**19. Trial-Cum-Demons. Farm, Kholwad.***A. General information :*

- (i) District Surat, 9.6 Km. from Sayan R. S. with Latitude 21.3°N and Longitude 73°E  
(ii) Type of tract—'D' region in Kakrapara project. (iii) Started in 1957. (iv) Cotton, Jowar Paddy, Groundnut in Kharif and Wheat, Linseed, Safflower in Rabi is the cropping pattern. (v) Research Programme is to change the present cropping pattern and to find out the manurial requirements and rotational practices, demonstration of agricultural practices under irrigation and to find out water requirements of different crops, effect of various agronomic practices on soil and sub-soil water.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	—	—	1.8	13.6
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
37.7	23.3	37.5	23.9	14.0	5.3	0.7	—	—	0.6	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

*C. Irrigation and drainage facilities :*

- (i) (a) Facilities available since 1957. (b) Type of facilities is canal irrigation. (ii) Proper drainage system is available.

*D. Soil type and soil analysis :*

- (i) Broad soil type : N. A. Dark brown or light yellowish in colour, depth varies upto 1.81 meters. Structure is medium black. (ii) Chemical analysis N—0.02, P<sub>2</sub>O<sub>5</sub>—Trace, K<sub>2</sub>O—22.7—158.7 Kg/ha. pH—7.9—8.5. (iii) Mechanical analysis : N.A.

*E. No. of Experiments :*

Wheat—17, Jowar—9, Cotton—19, Groundnut—9 : Total=54.

**20. Trial-Cum-Demonstration Farm, Kim.***A. General information :*

- (i) District Surat, 1 Km. from Kim R. S. Levelled land. (ii) Type of tract N. A. (iii) Started in 1959. (iv) Cotton, Jowar, Paddy and Wheat is the cropping pattern. (v) Research Programme is water requirement of various crop.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	1.5	—	3.5	9.4
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
29.6	17.9	8.8	6.8	.3	.2	—	—	—	.6	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

*C. Irrigation and drainage facilities :*

- (i) (a) Irrigation facilities are available since 1959. (b) Canal irrigation. (ii) Proper drainage system exists.

*D. Soil type and soil analysis :*

- (i) Broad soil type N.A. Depth is 2.74 meters and above. Colour is black and structure is angular blocky.

(ii) Chemical analysis : pH=7.5 to 8.9 with low nitrogen content and poor phosphorus.

(iii) Mechanical analysis : N. A.

*E. No. of Experiments :*

Wheat—8, Jowar—3, Sugarcane—2, Cotton—21, Groundnut—7 ; Total=41.

**21. Regional Sugarcane Research Sub-Station, Kodinar.****A. General information :**

(i) Amreli District near Kodinar Railway Station. 20.75°N. latitude and 70.75E. Longitude level land. (ii) Type of tract it represents—N.A. (iii) Started in 1958. (iv) Sugarcane, Groundnut—Bajra etc. in the normal cropping pattern. (v) Programme of research (a) to find out suitable Sugarcane variety for this tract. (b) Research work on sugar beat crop.

**B. Normal rainfall :**

Information—N.A.

**C. Irrigation and drainage facilities :**

(i) (a) Available since 1958. (b) Well irrigation. (ii) Proper drainage system is not available.

**D. Soil type and soil analysis :**

(i) Medium black soil, 1 to 1.5 m. deep. (ii) Chemical analysis : Organic carbon and Nitrogen 0.4 to 0.8%, available  $P_2O_5$  and  $K_2O$  are 70.0 and 504 Kg/ha respectively. (iii) Mechanical analysis : N. A.

**E. No. of experiments :**

Bajra—2, Sugarcane—17 : Total=19.

**22. Agricultural Research Station, Kothara.****A. General information :**

(i) District Kutch, 78 Km. from Kothara R. S. (ii) Type of tract is Arid Zone type—sandy loam soil (iii) Started in 1958—59 (iv) Bajri—Guwar, Groundnut—Bajri, Moong—Bajri (Rotation), Bajri—Wheat (Rabi) is the cropping pattern (v) Programme of research is varietal, manurial experiments on Bajri, Groundnut, Pulses and to multiply seeds of improved varieties of Bajri, Groundnut and Pulses.

**B. Normal rainfall :**

20.0 to 25.0 cm. rainfall during the kharif season i. e. from June to September.

**C. Irrigation and drainage facilities.**

(i) (a) Facilities available since 1969 (b) Type of facility is well irrigation. (ii) Proper drainage system exists.

**D. Soil type and soil analysis :**

(i) Sandy loam type, soil depth varies from 30 to 45 cm. (ii) Chemical analysis :  
% on air dry soil.

	Sample number							
	1	2	3	4	5	6	7	8
Stone	17.40	15.0	15.38	7.14	11.11	12.50	15.63	6.66
Moisture	1.554	1.564	1.438	1.686	1.478	1.254	1.532	2.045
Lime reserve	—	—	—	—	0.26	—	—	0.16
Organic matter	.1475	.1542	.1815	.3092	.5311	.0134	.3227	.3765
Organic carbon	.0858	.0897	.1053	.1794	.3081	.0078	.1872	.2184
Water soluble salts.	.1010	.0830	.0920	.0920	.0840	.0750	.0870	.0820
Exchangeable Calcium	7.27	11.36	12.72	12.26	11.81	6.58	5.45	13.4
Exchangeable Magnesium	4.85	0.46	0.46	4.62	3.47	5.55	12.26	3.47
Exchangeable Sodium+Potassium	1.2	1.40	1.0	1.2	1.4	0.4	2.6	2.2
Total exchangeable base.	13.32	13.22	14.18	18.08	16.68	12.53	20.31	19.07
% sticky point moisture	14.0	13.5	13.0	14.0	15.5	12.5	12.0	14.0
% maximum water holding Capacity	32.6	32.6	34.67	32.52	33.18	27.52	31.62	35.56
Real Sp. Gravity	2.5	2.0	2.32	2.27	2.5	2.33	3.33	2.63

Apparant Sp. gravity	1.40	1.45	1.49	1.44	1.46	1.58	1.54	1.4
% Pore space conductivity	41.6	27.51	35.78	36.57	41.6	32.19	53.76	46.74
pH. Value.	7.5	7.5	8.0	7.5	8.0	8.0	8.0	7.5
(iii) Mechanical analysis	67.22	68.48	65.97	69.27	82.73	85.44	76.65	66.21
Sand								
Silt	12.04	9.94	10.12	7.46	3.22	5.04	6.06	8.70
Clay	18.94	19.78	22.20	21.18	11.72	8.18	15.34	22.42
Textural Calssification	Sandy loam	Sandy loam	Sandy clay	Sandy clay	Loamy sand	Loamy sand	Sandy loam	Sandy clay
			loam	loam				loam

E. No. of experiments :

Jowar—5, Bajra—11, Cotton—3, Groundnut—5 : Total=24.

### 23. Irrigation Demonstration Farm, Knkada.

A. General information :

(i) District Surendranagar, 14 Km. from Kukada R. S. Atmosphere is dry. Very hot in summer and cool in winter. (ii) Type of tract is medium black. (iii) Started in 1961, (iv) Groundnut—Wheat—Cotton; Bajri—Cotton; Bajri—Wheat—Cotton; Jowar—Cotton is the cropping pattern. (v) Programme of research is irrigational experiments on various crops.

B. Normal rainfall :

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
—	—	—	—	—	1.4	5.2	7.7	4.2	0.5	0.8	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

C. Irrigation and drainage facilities :

(i) (a) Facilities available since 1961. (b) Type of facilities : N.A. (ii) No proper drainage system exists but local facilities made available for some area.

D. Soil type and soil analysis :

(i) Broad soil type. N. A. 15 cm to 61 cm. deep, medium black in colour and clay loam in structure. (ii) Chemical analysis and (iii) Mechanical analysis : N. A.

E. No. of experiments :

Jowar—2, Bajra—9, Cotton—11, Groundnut—3 : Total=25.

### 24. Government Plantation Farm, Mahuva.

A. General information :

(ii) Bhavanagar District, near Mahuva Railway Station. Latitude 20°—51'N, Longitude 71°—57'E. Generally level land. (ii) Sandy to sandy with alkaline patches. (iii) Started in 1952. (iv) Coconut, arecannt and Mango crops. (v) Agronomical, botonical and economical programme of Research on coconut plantation.

B. Normal rainfall :

June		July		Aug.		Sept.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd
8.9	6.8	15.0	15.2	18.0	15.1	9.0	6.1

(Av. fortnightly rainfall in cm. based on the years 1970—1971).

C. Irrigation and drainage facilities :

(i) (a) Irrigation facilities are available since long. (b) Canals, wells and tube-wells. (ii) Proper drainage system exists.



*D. Soil type and soil analysis :*

- (i) Sandy to sandy loam brownish to medium black colour, (ii) Chemical analysis and (iii) Mechanical analysis :

*Analysis of Soil*

Sr. No.	1	2	3
Survey No.	Coconut Plantation plot wise samples.		
Lab. No.	1343	1353	1357
Depth			
Location	Vadlavadi, (Nursery)	Sandavalu.	Panvadi
Village	Mahuva	Mahuva	Mahuva
District	Bhavnagar	Bhavnagar	Bhavnagar
Restriction if any.	—	—	—
	<i>% on air dry soil</i>		
Stone	3.566	2.902	2.388
Moisture	3.566	2.902	2.388
Lime reserve	6.46	5.06	3.66
Organic Matter	0.9344	1.4454	1.8355
Water soluble salts	0.0500	0.319.	0.234
Mechanical analysis			
Sand	60.85	42.2736	55.8625
Silt	8.06	22.36	22.98
Clay	20.08	25.64	23.04
Dispersion Co. Eff.			
Textural Classification	Sandy clay loam	Loam	Sandy clay loam
	<i>% on air dry soil.</i>		
Humus			
Organic carbone	0.542	0.8385	1.0647
Total Nitrogen	0.0406	0.0588	0.120
	<i>.....m. e./100 gm. dry soil.</i>		
Base Exchange			
Exchangeable Ca.	21.92	17.4	20.4
Exchangeable Mg.	6.045	5.4	7.6
Exchangeable Na+K	16.4	8.0	2.0
Total Exchangeable base			
Base exchange capacity	49.00	50.00	59.00
	<i>Lbs./acre air dry soil</i>		
Available constituents	1	2	3
Potassium (K)	144	108	180
Phosphoric acid (P)	14.4	14.4	13.2
PH	7.8	8.2	7.7
Conductivity m/mhs/cm.	0.3	1.7	1.7
Sl. No.	1	2	3
Lab. No.		1353	1357
	<i>% On air dry soil.</i>		
Total water soluble salts.	Nil	0.317	0.234
Calcium carbonate	Nil	Nil	Nil
Calcium bicarbonate		0.0324	0.05765

Calcium chloride	Nil	Nil
Calcium Sulphate	Nil	Nil
Magnesium carbonate	Nil	Nil
Magnesium bicarbonate	0.0438	0.006671
Magnesium chloride	0.01187	0.015434
Magnesium Sulphate	0.0100	0.065007
Sodium Carboeate	Nil	Nil
Sodium bicarbonate	Nil	Nil
Sodium chloride	Nil	Nil
Sodium sulphate	0.238929	0.08919

E. *No. of experiments :*

Coconut—4 : Total=4.

25. **Oilseed Research Station, Manund.**

A. *General information :*

- (i) District Mahsana, 2 kilometers from Manund R. S. The soil of the experimental area is sandy. Its latitude 23°N longitude 74°E and altitude=70 meters. (ii) It represents North Gujarat region of Mehsana and Banaskuntha District. (iii) Started in 1961. (iv) Bajra—Cumin—Cotton ; Wheat—Cotten and Jowar—Cotton—Wheat is the cropping pattern. (v) To evolve improved varieties of sesamum, castor, sarson and mustard.

B. *Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	—	—	—	—
										1.5	4.6
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
9.2	7.2	8.4	4.2	12.5	2.5	1.0	.5	—	.7	—	—

(Av. fortnightly rainfall in cm. based on data for period 1960—64).

C. *Irrigation and drainage facilities :*

- (i) (a) Facilities Not Available. (b) Type of facilities is not available. (ii) Proper drainage system exist.

D. *Soil type and soil analysis :*

- (i) Broad soil type : N. A. It is very deep and light brown in colour. (ii) Chemical analysis :

	% on air dry soil at 23 cm. depth.
Organic matter	0.455
Water soluble salts	0.032
Organic carbon	0.265
Total Nitrogen	0.042
Conductivity m/mhs/cms.	0.45
Base exchange	m.e./100 gm. air dry soils.
Exchangeable Ca	6.80
Exchangeable Mg.	11.65
Exchangeable Na+K.	0.60
Total exchangeable bases	19.05
Base exchange capacity	20.0
Available constituents :	mg. 100 gm air dry soils.
Potassium (K <sub>2</sub> O)	9.25
Phosphoric acid (P <sub>2</sub> O <sub>5</sub> )	2.408

(iii) *Mechanical analysis :*

Sand	46.74%
Silt	22.68%
Clay	28.02%

Taxtural classification—Clay loam.

*E. No. of experiments :*

Jowar—1, Castor—3, Til—3, Mixed cropping—2 : Total=9.

**26. Agricultural Research Station, Navagam.***A. General information :*

(i) District Kaira, 18 Km. from Barejadi R. S. with Latitude 22°48'N, Longitude 71°38' East and Altitude 32.4 meters. (ii) Type of tract is Kiyari land having good moisture capacity. Also the land is levelled and uniform. (iii) Started in 1945. (iv) Paddy—Wheat is the cropping pattern. (v) Research programme is breeding and agronomic experiments on paddy crop varieties.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.4	—	0.1	—	—	0.01	—	—	0.02	—	2.8	9.6
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
13.9	8.3	11.6	8.0	9.1	7.1	0.7	0.01	0.06	0.4	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

*C. Irrigation and drainage facilities :*

(i) (a) Facilities are available since 1950. (b) Canal irrigation. (ii) Proper drainage system exists.

*D. Soil type and soil analysis :*

(i) Broad soil type N.A. 2.74 meters deep, light black in colour.

(ii) Chemical analysis :

pH=8.4, conductivity=0.25 m/mhs/cm., Organic Carbon=0.26%, Available Phosphorus=122.2 Kg/ha., and Available potash=371.0 Kg/ha.

(iii) Mechanical analysis ; Not available.

*E. No. of experiments :*

Paddy—47 : Total=47.

**27. Trial Cum Demonstration Farm, Pilwai.***A. General information :*

(i) Mehsana District, near Pilwai Road Railway Station. (ii) Represents North Gujarat Zone tube-well area. (iii) Started in 1960. (iv) Cotton, Tobacco, Bajra, Lucern, cumion are normal crops of the tract. (v) Manurial, Irrigational type of experiments are conducted.

*B. Normal rainfall :*

June		July		Aug.		Sept.		Oct.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	2.4	11.0	12.5	8.1	5.2	16.8	2.4	2.5	—

(Av. fortnightly rainfall in cm. based on the period 1961—65).

*C. Irrigation and drainage facilities :*

(i) (a) Available since 1960. (b) Tubewell. (ii) Proper drainage system exists.

*D. Soil type and soil analysis :*

(i) Loamy sand. (ii) Chemical analysis and (iii) Mechanical analysis :

Soil type and soil analysis	% on air dry soil
1. Stone	—
2. Moisture	0.6100
3. Lime reserve	1.6600
4. Organic matter	0.2578
5. Water soluble salts	0.0280

**6. Mechanical analysis**

(a) Sand	81.54
(b) Silt	6.26
(c) Clay	10.26

**7. Dispersion co off.**

% on air dry soil

8. Humus	—
9. Organic carbon	0.1404
10. Total N <sub>2</sub>	0.0112
11. Ammonical N <sub>2</sub>	—
12. Nitrate N <sub>2</sub>	—
13. C/N ratio	—
14. Base Exchange M.e./100 gms. air dry soil	
(a) Exchangeable Ca...	11.56
(b) Exchangeable Mg...	0.206
(c) Exchangedble Na+k...	0.40
15. Total Exchangeable clase—Base Exchangeable capacity.	17.0
	mg/100 air dry soil
16. Available constituents	—
17. Pottassium (K)	0.25
P <sub>2</sub> O <sub>5</sub> (P)...	0.229
	Mg/100
18. PH...	7.5
19. Conductivity...	0.1

**E. No. of experiments :**

Wheat—11, Jowar—4, Bajra—6, Brinjal—3, Onion—1, Potato—1, Cotton—7, Groundnut—1 : Total=34.

**28 Agricultural Research Station, Porbandar.****A. General information :**

(i) (a) District Junagadh, 5 Km. from Porbandar R. S. Hilly area, climate on the whole is dry. (ii) Type of tract is Porbandar tract. (iii) Started in 1954. (iv) Cotton—Groundnut is the cropping pattern. (v) Research programme—research on Bajri, Jowar, Groundnut, Wheat, Cotton etc. is carried out with reference to spacing, manure and irrigation.

**B. Normal rainfall :**

June	July	Aug.	Sept to May	Total
116.6	74.4	—	—	191.0

(Av. fortnightly rainfall in cm. based on data for the period N: A.)

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available since 1954. (b) Type of facilities—Well with 12 H.P. oil engine. (ii) Proper drainage N. A.

**D. Soil type and soil analysis :**

(i) Broad soil type N.A. 23 cm. deep. Light red colour. Structure : sandy loam. (ii) Chemical analysis : pH value is 7.3 (iii) Mechanical analysis : N. A.

**E. No. of Experiments :**

Cotton—14 : Total=14.

**29. Dry Farming Research Station, Rajkot.****A. General information :**

(i) District Rajkot, 13 Km. from Rajkot R. S. Land is well levelled. (ii) It represents tract of Madhya Saurashtra. (iii) Started in 1958. (iv) Groundnut—Cereals is the

cropping pattern. (v) Research programme is to investigate the agronomic practices for dry land farming.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	0.83	—	1.27	7.95
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
7.61	14.04	7.46	4.98	3.01	4.81	0.3	—	—	—	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960-64).

*C. Irrigation and drainage facilities :*

(i) (a) Facilities Available. (b) One well. (ii) Proper drainage system exists.

*D. Soil type and soil analysis :*

(i) Broad soil type N.A. 45 to 60 cm. deep, medium black in colour and crumbly in structure. (ii) Chemical analysis : It is neutral in reaction, free of salinity, has good amount of organic matter and total nitrogen and lime. But it is poor in available potash and phosphorus. (iii) Mechanical analysis ; Texturally soil is clayey in nature.

*E. No. of Experiments :*

Jowar—13, Bajra—13, Groundnut—14 : Total—40.

**30. Agricultural Research Station, Surat.**

*A. General information :*

(i) District Surat, 6.4 Km. from Surat R. S. Levelled. (ii) Type of tract : Black Cotton soil of south Gujarat. (iii) Started in 1896. (iv) Cotton and Jowar is the cropping pattern. (v) Research programme is plant breeding, agronomic and entomological work on cotton and jowar and crop weather study.

*B. Normal information :*

Jan.	Feb.	March	April	May	June
0.15	0.25	1.19	0.41	6.1	169.3
July	Aug.	Sept.	Oct.	Nov.	Dec.
412.9	273.7	245.9	51.0	0.74	2.1

(Av. based on data for the period : N.A )

*C. Irrigation and drainage facilities :*

(i) (a) Facilities available since 1957. (b) Canal irrigation. (ii) Proper drainage system is available.

*D. Soil type and soil analysis :*

(i) Broad soil type—Black cotton soil. 1.21 meter to 1.81 meters deep. Black with sticky yellow sub soil. Structure—Fine.

(ii) Chemical analysis : N 0.24 to 0.43%, P<sub>2</sub>O<sub>5</sub> 0.05%, K<sub>2</sub>O 0.0263 to 0.61% and CaO 0.19 to 1.52% (iii) Mechanical analysis : Soil surface (23 cm.) : Clay and silt 62%, Fine sand 35% and Stone and gravel 3%. Sub soil : Clay and silt 34%, Fines and 48% and Stone and gravel 18%.

*E. No. of Experiments :*

Jowar—16, Tur—3, Cotton—10, Rotational—3 : Total=32.

**31. Agricultural Research Station, Talod.**

*A. General information :*

(i) District Sabarkantha 3 Km. away from Talod R. S. The soil is sandy and moisture holding capacities of the soil is very poor. (ii) Type of tract is sandy. (iii) Started in

1955. (iv) Bajri—Cotton—Groundnut, is the cropping pattern. (v) Research in Bajri, Pulses, Groundnut, Castor and Cotton for increasing yield and also Agronomic practices such as spacing, thinning, manural requirements etc. is the programme of research.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	1.26	—	—	0.34	—	—	5.6	—	8.6	28.9
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
113.2	106.8	96.2	30.6	138.5	48.1	2.18	—	—	6.34	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960--64).

*C. Irrigation and drainage facilities ;*

(i) (a) Facilities are available since 1959. (b) Type of facilities is not known. (ii) Drainage system exist.

*D. Soil type and soil analysis ;*

(i) Broad soil type is N. A. Depth varies from 30 cm. to 91 cm. Colour is brown and structure is single grain.

(ii) Chemical analysis : N. A.

(iii) Mechanical analysis : Course sand = 42.01%  
 Fine sand = 41.20%  
 Clay + Silt = 9.53%

*E. No. of Experiments :*

Bajra—5, Groundnut—10 : Total=15

**32. Agricultural Research Station, Tancha.**

*A. General information :*

(i) District Broach, 1.61 Km. from Tancha R. S. Latitude=21.5°N, Longitude=72°E, Altitude at M. S. L.=15—64 M. (ii) Type of tract is middle Gujarat. (iii) Started in June, 1959. (iv) Jowar—Lang, Cotton—Wheat and Lang—Wheat is the cropping pattern. (v) Programme of research is breeding and agronomic experiments on various crops.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
2.8	—	1.6	—	—	0.1	—	—	—	—	12.0	70.5
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
148.3	87.2	107.3	85.8	94.4	77.3	8.5	0.4	14.1	7.0	1.2	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

*C. Irrigation and drainage facilities :*

(i) (a) Facilities are not available. (b) Nil. (ii) No proper drainage system exist.

*D. Soil type and soil analysis :*

(i) Broad soil type is medium black soil of about 76.1 cm. deep with murum kanker under lying it. The structure is granular. (ii) Chemical analysis : pH=8.2 : Conductivity=0.70 m/mhs/cm. : Organic matter=0.33%. Available P= 11.2 Kg/ha. ; Available K=762.2 Kg/ha. ; and CaCO<sub>3</sub> = Nil. Texture is Clay loam. (iii) Mechanical analysis : N. A.

*E. No. of Experiments :*

Wheat—7, Jowar—4, Lang—3, Rotational—4 : Total—18.

**33. Trial-Cum-Demonstration Farm, Thasra.****A. General information :**

(i) District Kaira, 2 Km. from Thasra R. S. Topography of the farm generally well drained. (ii) Type of tract is sandy loam. (iii) Started in 1958—59. (iv) Kharif Hy. Bajri, Paddy, Cotton and Rabi Wheat is the cropping pattern. (v) Programme of research is to change the present cropping pattern so as to utilize maximum quantity of water, to find out the requirement of canal irrigation with different manurial dose on different crops and demonstration of new high yielding Hy. varieties.

**B. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.42	—	—	—	—	—	—	—	—	—	9.78	73.57
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
140.1	69.7	137.9	63.6	106.0	72.5	2.05	—	0.92	—	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available from 1959. (b) Canal irrigation. (ii) No proper drainage system exists

**D. Soil type and soil analysis :**

(i) Broad soil type : N. A. Light block in colour. Depth is 45 cm. and structure is loose and well drained.

**(ii) Chemical analysis :**

	% on air dry soil
Stickly point moisture	20.40
Maximum water holding capacity.	38.20
Texture	Sandy loam
Moisture (Hygroscopic)	1.10
Lime reserve (CaCO <sub>3</sub> )	2.76
Organic matter	1.29
Water soluble salt	0.13
Total nitrogen	0.056
Available Phosphoric acid (P <sub>2</sub> O <sub>5</sub> )	44.0 (High)
Available potash (K <sub>2</sub> O)	Medium
pH	7.50
Electric conductivity m/mhs/cm.	0.40

**(iii) Mechanical analysis : N. A.****E. No. of Experiments :**

Wheat—24, Bajra—7, Gram—3, Cotton—14, Groundnut—7, Mixed Cropping—1 :  
Total=56,

**34. Irrigation-cum-Demonstration Farm, Umrjala.****A. General information :**

(i) District Bhavnagar 4 Km. away from Dhola R. S. Land is levelled (ii) Type of tract : this Farm situated in zone 7, North Saurashtra region in which rainfall is between 40 cm. to 70 cm. and soils are shallow medium black to sandy in nature. (iii) Started in 1955—56. (iv) The major crops grown in this area are G. nut, Bajra, Cotton, Seasmum, Jowar, (for fodder) in *kharif* and Wheat, Gram, Lucern and Carrot, (for fodder) in *rabi* season. (v) Programme of research is as per recommendation of plant breeding. Agronomy and soil science sub-committee.

*B. Normal rainfall :*

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	0.1	—	—	0.4	—	—	—	—	1.0	3.1
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
11.8	7.0	6.6	4.7	5.0	2.3	1.0	—	—	0.7	—	—

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

*C. Irrigation and drainage facilities :*

(i) (a) Facilities available since 1955—56. (b) Raghola dam canal water. (ii) Proper drainage exists.

*D. Soil type and soil analysis :*

(i) Broad soil type N. A. Depth varies from 30 to 181 cm. Its colour is medium black.  
(ii) Chemical analysis :

	% on air dry soil
Moisture	4.72
Lime reserve	27.66
Organic matter	1.15
Water soluble salts	0.069
Total nitrogen	0.045
pH	7.65
Conductivity m/mhs/cm.	0.15
(iii) Mechanical analysis:	
Sand	16.27
Silt	10.64
Clay	39.55
Textural classification	Clay
Organic Carbon	0.75
<i>Base exchange</i> M.E./100 gms. oven dry soil	
Exchangeable Ca	29.62
Exchangeable Mg.	12.59
Exchangeable Na+K	1.51
Total exchangeable base	43.77
Base exchange capacity	44.75
Potassium (K)	34.50
Phosphoric acid (P)	22.04

*E. No. of Experiments :*

Paddy—2, Wheat—16, Bajra—16, Cotton—11, Groundnut—10 : Total=55.

**35. Dry Farming Research Station, Vallabhipur.***A. General information :*

(i) District Bhavnagar 22 Km. from Dhola R. S. This farm is surrounded by two national high way, one is Bhavnagar and the second is Vallabhipur—Dhola. (ii) Type of tract is Bhal and saltish land. (iii) Started in 1959. (iv) Groundnut—Jowar—Cotton and Wheat is the cropping pattern. (v) Programme of research is breeding and agronomic experiments on various crops.

*B. Normal rainfall :*

Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
—	—	.2	—	—	2.0	10.0	11.6	8.2	.8	.9	—

(Av. fortnightly rainfall in cm, based on data for the period 1960—64).



**C. Irrigation and drainage facilities :**

(i) (a) Facilities : Not Available. (b) Type of facilities N. A. (ii) No proper drainage system exists.

**D. Soil type and soil analysis :**

(i) Broad soil type is medium deep black soil, (ii) Chemical analysis :

	% on air dry soil
Coarse matter	2.56
Moisture	7.50
Loss on ignition	8.52
Water soluble salts	0.15
Acid insoluble matter	56.25
Iron and aluminium oxides	15.89
Lime (CaO)	10.37
Nitrogen (N)	0.18
Phosphate (P <sub>2</sub> O <sub>5</sub> )	Poor
Potash (K <sub>2</sub> O)	0.03
Magnesium (Mgo)	0.50
pH value	7.60

(iii) Mechanical analysis : N. A.

**E. No. of Experiments :**

Wheat—13, Jowar—7, Cotton—4, Groundnut—6, Mixed cropping—4 : Total=34.

**36. Soil Conservation Research Demonstration and Training Centre, Vasad.****A. General information :**

(i) District Kaira, 2.5 Km. from Vasad R. S. Latitude=22.7°N, Longitude=72.7°E : Altitude=34.2 Meters above M. S. L. (ii) Type of tract—Charotar tract. (iii) Started in 1956—57. (iv) Bajri—Wheat ; Cowpea—Wheat—Bidi ; Tobacco—Bajri; Tobacco—Kodra + Tur is the cropping pattern. (v) Programme of research is Agronomy, forestry and engineering aspects of soil and water conservation, reclamation and use of gullied lands for agriculture, orchard, grassland and afforestation etc.

**B. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	.1	.4	2.5	5.2
July		Aug.		Sept.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
17.9	10.0	11.5	6.2	8.1	6.9	.2	.7	.3	.8	.03	—

(Av. fortnightly rainfall in cm. based on data for the period—N.A.)

**C. Irrigation and drainage facilities :**

(i) (a) Facilities available from 1965—66. (b) Type of Facilities N. A. (ii) The gullies serve as drainage system.

**D. Soil type and soil analysis :**

(i) Broad soil type is alluvial, sandy loam, loam, loamy sand. Very deep. Colour is greyish brown (Charotar) and poor in structure.

(ii) Chemical analysis :

pH=7.2—9.5

Organic carbon=0.048 to 0.68%.

Total Nitrogen = 0.01 to 0.07%.

Total Phosphate = 0.05 to 0.10%.

T. E. C. = 13.30.7 m.e./100 gm with Ca++ as the predominant cation.

(iii) Mechanical analysis : Texture varies from field to field.

*E. No. of Experiments :*

Bajra—2, Mung—1, Cotton—5 : Total=8.

**37. Agricultural Research Station, Vijapur.**

*A. General information :*

(i) District Mehasana 1.2 Km. from Vijapur R. S. Experimental plots are levelled. (ii) Type of tract—Sandy loam soils. (iii) Started in 1944. (iv) Bajra—Wheat—Tobacco ; Jowar—Cotton ; Lucern—Castor is the cropping pattern. v) Programme of research is to evolve better yielding types in Tobacco, Hy. Bajra, Wheat, Cumin and Hybrid Castor by means of Agronomical investigation and breeding.

*B. Normal rainfall :*

(Av. annual rainfall for the period 1960—65=62.6 cm.)

*C. Irrigation and drainage facilities :*

(i) (a) Facilities available from 1966. (b) Three wells. (ii) No proper drainage system exists.

*D. Soil type and soil analysis :*

(i) Broad soil type N. A. Depth varies from 1.22 to 1.52 meters. Colour is light chocolate and structure is sandy loam.

(ii) Chemical analysis :

% on air dry samples

Hygroscopic Moisture	1.0
Organic matter	0.31
Lime reserve	2.66
Total soluble salts	0.039
Organic carbon	0.179
Total Nitrogen (N <sub>2</sub> )	0.020
Available phosphorus (P <sub>2</sub> O <sub>5</sub> )	31.2
Available Potash (K <sub>2</sub> O)	32.5
pH	7.5
(iii) Mechanical analysis :	
Sand	45.94
Silt	25.0
Clay	25.0
Textural class	Sandy clay loam.
Electric conductivity m/mhs/cm.	0.05
Milli-equivalent/100 grams of air dry sample.	
Exchangeable Calcium	6.6
Exchangeable Magnesium	6.2
Exchangeable Na + K	1.1
Total exchangeable bases	13.7
Base Exchange capacity	12.0

*E. No. of Experiments :*

Wheat—1, Bajra—4, Cotton—4, Tobacco—5 : Total=14.

**38. Agricultural Research Station, Viramgam.****A. General information :**

(i) District Ahmedabad 1.6 km. from Viramgam R. S. Area is slightly saltish. (ii) Type of tract — North Gujrat Region. (iii) Started in 1922. (iv) Cotton and Jowar is the cropping pattern. (v) Programme of Research is breeding, agronomical entomological and pathological work on cotton and jowar.

**B. Normal rainfall :**

Jan.		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
—	—	—	—	—	—	—	—	·6	·1	1·3	3·5
July		Aug.		Sep.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
12·6	8·6	6·4	4·7	9·4	3·0	·1	·1	—	·8	—	0·6

(Av. fortnightly rainfall in cm. based on data for the period 1960—64).

**C. Irrigation and drainage facilities :**

(i) (a) Facilities N. A. (b) Nil. (ii) No proper drainage system exists.

**D. Soil type and soil analysis :**

(i) Broad soil type N. A. Kali Besar in colour. The structure is cloddy and clay loam in-texture. (ii) Chemical analysis ; and (iii) Mechanical analysis :

Soil depth	pH	Total soluble Salts	Calcium Carbonate	Exchangeable in bases milliequivalents.		
				Ca	Mg.	Na + K
Percent on fine matter						
0—25 cm.	8·64	0·19	11·2	24·5	4·0	1·0
25—66 cm.	8·64	0·19	12·0	32·5	8·5	1·5
66—99 cm.	8·73	0·24	13·2	23·5	3·6	3·0
99—122—cm.	8·74	0·22	16·4	17·0	8·0	3·0
0—33 cm.	8·53	0·16	11·2	22·0	3·0	1·5
33—58 cm.	8·61	0·18	16·16	28·5	6·5	1·0
58—81 cm.	8·66	0·19	15·2	29·5	5·0	1·0
81—107 cm.	8·61	0·16	28·8	20·5	5·0	1·0
107—127 cm.	8·63	0·11	22·8	13·6	4·5	0·5

Soil depth	Fertility constituents			Mechanical composition		
	Organic carbon	Total Nitrogen	Available P <sub>2</sub> O <sub>5</sub> mg.	C/N ratio	Silt Percent on fine matter	Clay
0—25 cm.	0·363	0·056	9·38	6·3	13·25	29·25
25—66 cm.	—	—	—	—	15·00	34·25
66—99 cm.	—	—	—	—	14·75	37·50
99—122 cm.	—	—	—	—	9·25	48·25
0—33 cm.	0·408	0·056	10·02	7·3	8·75	25·75
33—58 cm.	—	—	—	—	10·75	38·00
58—81 cm.	—	—	—	—	10·00	32·50
81—107 cm.	—	—	—	—	10·00	22·50
107—127 cm.	—	—	—	—	8·25	14·00

*Exchangeable bases in milliequivalents per 100 dry soil.*

0—23 cm. 23—46 cm. 46—69 cm. 69—91 cm. 91—114 cm. 114—137 cm.

Exchangeable Calcium	22·47	27·72	25·67	22·99	16·45	14·29
Exchangeable Mg.	3·00	0·59	3·65	1·18	3·00	1·19
.. Potassim	0·09	3·22	2·50	0·41	0·66	0·50
.. Sodim	1·59	0·41	—	2·42	2·42	2·78

*Exchangeable bases expressed as percent of total exchangeable base*

Exchangeable Calcium	82.3	84.4	80.7	85.1	73.1	76.1
Exchangeable Mg.	11.0	2.2	11.6	4.4	13.3	6.1
,, Potassium	0.3	11.9	7.8	1.8	2.9	2.7
,, Sodium	5.9	1.5	—	9.0	10.7	14.9
pH Value	8.28	8.21	8.26	8.28	8.37	8.12
Total Soluble salts percent on dry matter	0.62	0.31	0.56	0.78	0.67	0.36

*E. No. of experiments :*

Jowar—4. Cotton—9 : Total=13.

**39. Agriculture Research Station, Vyara.***A. General information :*

(i) District Surat, 3.2 Km. from Vyara R. S. Its Latitude is 21° 6' North, Longitude 73°—51' East and Altitude = 87.5 Meters. (ii) Type of tract is black soil, fairly deep and heavy in texture Kyari type black soil. (iii) Started in 1934. (iv) Paddy—Wheat—Paddy, Paddy—Wal is the cropping pattern. (v) Research programme is experiments on paddy crop.

*B. Normal rainfall :*

Jan:		Feb.		March		April		May		June	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
0.8	—	—	—	—	—	—	—	1.5	0.4	27.6	110.0
July		Aug.		Sep.		Oct.		Nov.		Dec.	
1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
373.4	249.7	283.4	224.7	172.6	150.0	27.5	12.6	—	6.9	—	—

*C. Irrigation and drainage facilities :*

(i) (a) Facilities available Since 1934. (b) Type of facilities is Canal irrigation.  
(ii) No proper drainage system exists.

*D. Soil type and soil analysis :*

(i) Broad soil type N. A. 144 cm. in depth and very dark greyish brown in colour and clay in structure. (ii) Chemical analysis & (iii) Mechanical analysis :

Depth in cm.	Clay %	Silt %	Moisture %	Water Holding Capacity	Specific gravity	pH	Conductivity m/mhs/cm
0.15	12.5	37.5	9.70	60.30	1.3	7.3	0.10
15.60	7.0	23.0	39.05	60.19	1.9	6.8	0.10
60.12	6.5	27.0	9.42	68.14	1.8	7.7	0.10
115.14	10.5	51.0	6.40	34.16	1.9	8.2	0.20

Depth in cm.	N <sub>2</sub> %	P <sub>2</sub> O <sub>5</sub> Kg/ha	K <sub>2</sub> O Kg/ha	Lime reserve	Organic carbon	Organic matter	T.S.S. %	Excha. Na.
0.15	0.045	24.6	175.1	—	0.63	1.09	0.085	812.0
15.60	0.196	—	168.1	0.16	0.32	0.57	0.025	287.0
60.12	0.003	—	154.1	0.16	0.43	0.73	0.020	625.0
115.14	0.050	—	119.1	—	0.44	0.24	0.010	712.0

*E. No. of experiments :*

Paddy—2, Sugarcane—25 : Total=27.

Journal of the American Medical Association

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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## **EXPERIMENTAL DATA**



**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(127), 61(112), 62(22).**

**Site :- Institute of Agri. Farm, Anand.**

**Type :- 'M'.**

Object :—To find out the optimum dose of N, P and K for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Wheat for 60(127) ; Nil for others. (b) Wheat for 60(127) ; Paddy for others. (c) 44.8 Kg/ha. of N as G.N.C. + 16.8 Kg/ha. of  $P_2O_5$  for 60(127) ; 71.7 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$  for others. (ii) Black soil. (iii) 15.7.1960 ; 14.7.1961 ; 18.7.1962. (iv) (a) 1 to 2 ploughings. (b) Transplanting. (c) 18 Kg/ha. (d) 30 cm. × 30 cm. (e) 2. (v) Nil. (vi) Sukhvel—20. (vii) Irrigated. (viii) 1 to 2 weedings. (iv) 48 cm. ; 78 cm. ; 89 cm. (x) 9.10.1960 ; 23.10.1961 ; 3.11.1962.

**2. TREATMENTS :**

All combinations of (1) and (2) + 3 extra treatments

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

Extra treatments :  $E_0$ =Control (no manure),  $E_1=33.6$  Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super + 33.6 Kg/ha. of  $K_2O$  as Pot. Sul. and  $E_2=67.2$  Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as super + 33.6 Kg/ha. of  $K_2O$  as Pot. Sul.

N applied in 3 doses :  $\frac{1}{3}$  at puddling,  $\frac{1}{3}$  at tillering and  $\frac{1}{3}$  at flowering.  $P_2O_5$  and  $K_2O$  were applied at puddling.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 3 for 61(112) ; 4 for others. (iv) (a) 13.7 m. × 4.6 m. for 60(127) ; 13.7 m. × 4.3 m. for others. (b) 11.6 m. × 3.0 m. for 60(127) ; 11.9 m. × 3.1 m. for others. (v) 76 cm. × 107 cm. for 60(127) ; 91 cm. × 61 cm. for others. (vi) Yes.

**4. GENERAL :**

(i) Normal. Heavy lodging due to rain at the time of maturity for 61(112). (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—62. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Exceptionally high yield for 61(112). Errors are heterogeneous and Treatments × years interaction is present.

**5. RESULTS :**

(i) 2543 Kg/ha. (ii) 527.8 Kg/ha. (22 d.f. made up of various components of Treatments × years interaction). (iii) Main effect of N is highly significant. Main effect of E and 'E vs. others' are significant. (iv) Av. yield of grain in Kg/ha.

	$E_0=1953,$	$E_1=2450,$	$E_2=2672$	
	$P_0$	$P_1$	$P_2$	Mean
$N_1$	2359	2413	2155	2309
$N_2$	2838	2355	2880	2691
$N_3$	2840	2920	2687	2816
Mean	2679	2563	2574	2605

C.D. for N marginal means = 269.5 Kg/ha.

C.D. for E marginal means = 466.6 Kg/ha.



**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63 (266).**

**Site :- Agri. College Farm, Anand.**

**Type :- 'M'.**

**Object :-**To find out the optimum dose of N, P and K for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy. (c) 67.2 Kg. N+33.6 Kg.  $P_2O_5$ /ha. (ii) Sandy loam. (iii) N.A. (iv) 2 Ploughings 1 Harrowing. (b) Transplanting. (c) Nil. (d) 30.5 cm.  $\times$  30.5 cm. (e) 2 seedlings/hill. (v) Nil. (vi) Sukhvel -20. (vii) Irrigated. (viii) 2 weedings. (ix) 8.8 cm. (x) N.A.

**2. TREATMENTS :**

Same as in 60(127) excepting that the level of  $K_2O$  in  $E_2$  is changed to 67.2 Kg/ha.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 3. (iv) (a) 4.3 m.  $\times$  13.7 m. (b) 3.0 m.  $\times$  11.9 m. (v) 61.0 cm.  $\times$  91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1960-1963. (b) No. (c) Combined analysis for 1960 to 1962 is given separately. (v) N.A. (b) Nil. (vi) Heavy rainfall of 44.2 m.m. in October with strong winds caused lodging. (vii) Treatments modified in 63 hence the results are given separately for 1963.

**5. RESULTS :**

(i) 3518 Kg/ha. (ii) 330.5 Kg/ha. (iii) Extra treatments Vs others and main effect of N are significant. (iv) Av. yield of grain in Kg/ha.

$E_0=2258, E_1=2698, E_2=3800$

	$P_0$	$P_1$	$P_2$	Mean
$N_1$	2755	2802	3227	2928
$N_2$	3674	4319	3911	3968
$N_3$	4146	4331	4292	4256
Mean	3525	3817	3810	3717

C.D. for N marginal means = 330.4 Kg/ha

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62 (107), 63 (114), 64(43), 65(130).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'M'.**

**Object :-**To study the effect of P with different doses of N on Paddy and its residual effect on the succeeding Wal crop.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Wal for 63 (114), 64(43), 65 (130); Nil for 62 (107). (b) Wheat for 62 (107); Wal for others. (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as super for 62 (107); Nil for others. (ii) Clay loam. (iii) 2.8.1962; 30.7.1963; 28.7.1964; 23.7.1965. (iv) (a) 2 ploughings, harrowings for 62 (107); Nil for others. (b) Transplanting. (c) 17 Kg/ha. for 62 (107); 20 Kg/ha. for others. (d) 25 cm.  $\times$  25 cm. for 62 (107), 63 (114), 64 (43); 30 cm.  $\times$  15 cm. for 65(130). (e) 1 to 2. (v) 12.4 C.L./ha. of press mud sugarcane by product for 63 (114); 12.4 C.L./ha. of F.Y.M. for others. (vi) Z-31. (vii) Irrigated. (viii) Nil for 62 (107); 8 weedings and 2 inter culturings for others. (ix) 135 cm., 139 cm., 224 cm.; 106 cm. (x) 11.11.1962; 11.11.1963; 26.10.1964; 26.10.1965.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_0=0, N_1=44.8$  and  $N_2=67.2$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0, P_1=22.4$  and  $P_2=44.8$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) 27.4 m. × 9.1 m. for 62 (107), 63 (114), 64 (43); N.A. for 65 (130) (iii) 4. (iv) 9.1 m. × 3.0 m. (v) Nil. (vi) yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—65. (b) No. (c) Pooled analysis presented under results. (v) Nil. (vi) Nil. (vii) Error variances are homogeneous and "Treatments × years interaction is present.

## 5. RESULTS :

(i) 3146 Kg/ha. (ii) 230.3 Kg/ha. (24 d.f. made up of interaction of Treatments with years). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	3008	3304	3270	3194
P <sub>1</sub>	2622	3384	3432	3146
P <sub>2</sub>	2596	3428	3271	3098
Mean	2742	3372	3324	3146

C.D. for N marginal means = 194.0 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(115), 64(45), 65(129).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'M'.**

**Object :-** To find out the suitable G.M. crop for Paddy on kyari land at Bardoli.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 63(115), 64(45); Paddy-Paddy for 65(129). (b) Onion and Garlic for 63(115); Paddy and Tobacco for 64(45); Paddy for 65(129). (c) Nil for 63(115); 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(45); 61.7 Kg/ha. of N + 37.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(129) (ii) Clay loam. (iii) 8.8.1963; 11.8.1964 26.7.1965. (iv) (a) N.A. for 63(115), 64(45); 2 ploughings and 1 planking for 65(129). (b) Transplanting. (c) 19.8 Kg/ha. for 63(115); 64(45); 24.7 Kg/ha. for 65(129). (d) 15 cm. × 15 cm. for 63(115), 64(45); 30 cm. × 15 cm. for 65(129). (e) 1 to 2 seedlings/hole. (v) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Z-31. (vii) Irrigated. (viii) Nil for 63(115), 64(45); 2 weedings and 2 interculturings for 65(129). (ix) 139 cm.; 234 cm.; 106 cm. (x) 14.11.63; 2.11.64; 8.11.65.

## 2. TREATMENTS :

5 manurial treatments : M<sub>1</sub> = *Sannhemp* buried in situ, M<sub>2</sub> = *Dhanincha* buried in situ, M<sub>3</sub> = *Sesbania speciosa* buried in situ, M<sub>4</sub> = *Glyricidia* at 5604 Kg/ha. and M<sub>5</sub> = 12.4 C.L./ha. of F.Y.M.

Amount of G.M. is N.A.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5 (b) N.A. (iii) 6. (iv) (a) 11.0 m. × 5.5 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil but Endrex was applied once for 63(115), 64(45). (iii) Yield of grain and fodder. (iv) (a) 1963—65 (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and "Treatments × years interaction is found to be absent.

## 5. RESULTS :

Results of individual years are presented.

## 63(115) :

(i) 2767 Kg/ha. (ii) 438.7 Kg/ha. (iii) Treatment differences are highly significant (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	2543	3233	2967	2731	2361

C.D. = 528.3 Kg/ha.

## 64(45)

(i) 2006 Kg/ha. (ii) 287.0 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	1933	2177	2288	2005	1626

C.D. = 345.6 Kg/ha.

## 65(129)

(i) 2303 Kg/ha. (ii) 229.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	2322	2310	2406	2262	2214

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(13), 64(51), 65(6).**

**Site :- Trial-cum-Demons. Farm, Chikhli.**

**Type :- 'M'.**

**Object :-** To study the effect of different G.M. crops as compared to F.Y.M. under transplanted conditions on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Maize ; Paddy-Wheat ; Paddy-Wheat. (b) Maize ; Wheat for 64(51) and 65(6). (c) 24.7 Kg/ha. of F.Y.M. + 112 Kg/ha. of N + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> ; 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(51) and 65(6). (ii) Deep-black. (iii) 13.6.63 ; 15.6.64 ; 25.7.65. (iv) (a) 2 ploughing + 1 - 2 harrowing (b) Transplanting. (c) 22.4 Kg/ha. for 63(13) ; 16.8 Kg/ha. for 64(51) and 65(6). (d) 25.4 cm. × 25.4 cm. (e) 3. (v) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Koda—176—12 (early). (vii) Irrigated (viii) 2 weeding + 2 hoeings ; 3 interculturings ; 2 interculturings. (ix) 212 cm. ; 222 cm. ; 139 cm. (x) 23.11.63 ; 20.10.64 ; 21.10.65.

## 2. TREATMENTS :

5 manurial treatments : M<sub>1</sub> = Sann-hemp (seed rate 83 Kg/ha.) buried *in situ*. M<sub>2</sub> = Dhaincha (seed rate 66.4 Kg/ha.) buried *in situ*. M<sub>3</sub> = Sasbenia (seed rate 58.1 Kg/ha.) buried *in situ*. M<sub>4</sub> = Glyricidia at 5604 Kg/ha. and M<sub>5</sub> = 12.4 C.L. of F.Y.M./ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 27.4 m. × 11.0 m. (iii) 6 (iv) (a) 11.0 m. × 5.5 m. (b) 9.1 m. × 4.6 m. (v) 91.5 cm. × 45.7 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Slight attack of top shoot borer for 63(13) and 64(51) ; Nil. (iii) Yield of grain (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis are given under 5 Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

- (i) 2966 Kg/kg. (ii) 358.5 Kg/ha. [68 d.f. made up of pooled error and Treatments  $\times$  years interactions]  
 (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	3009	2975	2926	3112	2810

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62(34), 63(12), 64(54), 65(2).**

**Site :- Trial-cum-Demons. Farm, Chikhli. Type :- 'M'.**

Object :—To study the utility of digested B.M. as a plant nutrient in place of Super to Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Gram. (b) Gram. (c) Nil. (ii) Deep black. (iii) 25.6.62/6.8.62 ; 19.6.63/1.8.63 ; 20.6.64/4.8.64 ; N.A./10.8-65. (iv) (a) 2 ploughings, 1 harrowing. (b) Transplanting. (c) 22 Kg/ha. (d) 25 cm.  $\times$  25 cm. (e) 3 to 4. (v) 24.7 C.L./ha. of F.Y.M. for 64(54), 65(2) and 12.4 C.L./ha. of F.Y.M. for others. (vi) Kolam- 42 (late). (vii) Irrigated. (viii) 2 to 3 interculturings for 64(54), 65(2) ; 2 weedings + 2 hoeings for others. (ix) 138 cm., 212 cm., 222 cm., 139 cm. (x) 21.11.62, 21.11.63, 26.11.64, 22.11.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 2 sources of P<sub>2</sub>O<sub>5</sub> at 44.8 Kg/ha. : S<sub>1</sub>=Super and S<sub>2</sub>=Digested Bone meal

N applied in 2 equal doses : half at puddling and half at top dressing. P<sub>2</sub>O<sub>5</sub> applied at top dressing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) 21.3 m.  $\times$  13.7 m. for 62(34), 63(12) and N.A. for others. (iii) 4. (iv) (a) 10.7 m.  $\times$  4.6 m. (b) 9.1 m.  $\times$  3.1 m. (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Light attack of catter-piller for 62(34) ; light attack of catter-piller and root grubs and appearances of red spots on leaves for 63(12) ; light attack of top shoots borers for 64(54) and Nil for 65(2). (iii) Yield of grain. (iv) (a) 1962—1965. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Errors are heterogeneous and Treatments  $\times$  years interaction is absent. Hence results for individual years are presented.

## 5. RESULTS :

## 62(34) :

(i) 2922 Kg/ha. (ii) 364.5 Kg/ha. (iii) N effect alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	2063	2969	3561	2864
S <sub>2</sub>	2502	2825	3615	2981
Mean	2282	2897	3588	2922

C.D. for N marginal means = 388.4 Kg/ha.

## 63(12)

(i) 3387 Kg/ha. (ii) 248.3 Kg/ha. (iii) N effect alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	2843	3462	3955	3420
S <sub>2</sub>	2682	3588	3794	3355
Mean	2762	3525	3874	3387

C.D. for N marginal means=264.6 Kg/ha.

64(54)

(i) 3197 Kg/ha. (ii) 235.0 Kg/ha. (iii) N effect alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	2906	3211	3615	3244
S <sub>2</sub>	2798	3256	3399	3151
Mean	2852	3233	3507	3197

C.D. for N marginal means=250.4 Kg/ha.

65(2):

(i) 2840 Kg/ha. (ii) 311.1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	2538	2556	3238	2777
S <sub>2</sub>	2673	2969	3068	2903
Mean	2605	2762	3153	2840

C.D. for N marginal means=331.5 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 65(4).**

**Site :- Trial-cum-Demons. Farm, Chikhli.**

**Type :- 'M'.**

**Object :-** To find out the long term effect of different levels of different fertilizers in conjunction with F.Y.M. on continuous cropping of Paddy-Wal.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Wal. (b) Wal. (c) Nil. (ii) Deep black soil. (iii) 2.8.65. (iv) (a) 2 ploughings+1 harrowing. (b) Transplanting. (c) Nil. (d) 25.4 cm. x 25.4 cm. (e) 3 to 4 seedling/bunch. (v) Nil. (vi) Z-31 (mid-late). (vii) Irrigated. (viii) 2 interculturings. (ix) 139 cm. (x) 8.11.65.

**2. TREATMENTS :**

All combinations of (1), (2), (3) and (4)

- (1) 3 levels of N as A/S in a doses (i)  $\frac{1}{2}$  at puddling. (ii)  $\frac{1}{2}$  as top dressing : N<sub>0</sub>=0, N<sub>1</sub>=33.6 & N<sub>2</sub>=67.2 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Supper at puddling : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha..
- (3) 3 levels of K<sub>2</sub>O as Pot. Sul. at puddling : K<sub>0</sub>=0, K<sub>1</sub>=33.6 & K<sub>2</sub>=67.2 Kg/ha.
- (4) 2 levels of F.Y.M. before puddling : F<sub>0</sub>=0 & F<sub>1</sub>=12.4 C.L./ha. of F.Y.M.

**3. DESIGN :**

(i) 3<sup>3</sup> x 2 fact. confd., (NPK<sup>2</sup> confounded). (ii) (a) 9 plots/block, 6 blocks/replication. (iii) 1. (iv) (a) 10.7m. x 4.6 m. (b) 9.1 m. x 3.0 m. (v) 76 cm. x 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 only. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2551 Kg/ha. (ii) 179.9 Kg/ha. (iii) Effects of F, N, P and interaction K×F are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
P <sub>0</sub>	2063	2416	2834	2529	2362	2422	2216	2659	2438
P <sub>1</sub>	2075	2727	2960	2625	2709	2428	2388	2787	2587
P <sub>2</sub>	2165	2709	3014	2703	2589	2595	2508	2751	2629
Mean	2101	2617	2936	2619	2553	2482	2371	2732	2551
F <sub>0</sub>	1910	2404	2798	2488	2440	2183			
F <sub>1</sub>	2292	2830	3074	2751	2667	2779			
K <sub>0</sub>	2129	2757	2972						
K <sub>1</sub>	2135	2601	2924						
K <sub>2</sub>	2039	2494	2912						

C.D. for F marginal means = 102.9 Kg/ha.

C.D. for P or N marginal means = 126.1 Kg/ha.

C.D. for body of K×F table = 178.2 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- GJ. 65 (5).**

**Site :- Trial-cum-Demons. Farm, Chikhli.**

**Type :- 'M'.**

**Object :-** To study the effect of different Nitrogenous and Phosphatic fertilizers on Paddy.

## 1. BASAL CONDITIONS :

(i) Paddy—Wheat or Wal. (b) Wal. (c) Nil. (ii) Deep black soil. (iii) 4.8.65. (iv) (a) 2 ploughings, and 2 harrowings. (b) Transplanting. (c) —. (d) 25.4 cm.×25.4 cm. (e) 3 to 4 seedlings/hill. (v) Nil. (vi) Z-31 (mid late). (vii) Irrigated. (viii) 1 interculturing. (ix) 139 cm. (x) 8.11.65.

## 2. TREATMENTS :

4 sources of 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> : T<sub>0</sub>=control, T<sub>1</sub>=Di. Ammo. Phos., T<sub>2</sub>=Ammo. Sul. Phos. and T<sub>3</sub>=A/S+Super.

[Adjustment in the levels of N or P<sub>2</sub>O<sub>5</sub> is made by applying A/S or Super].

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (b) 11.0 m.×5.5 m. (b) 9.1 m.×3.7 m. (v) 91.5 cm.×183.0 cms. (vi) Yes.

## 4. GENERAL :

(i) No. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2614 Kg/ha. (ii) 150.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	2262	2736	2691	2766

C.D.=185.1 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(127), 64(63), 65(8).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type :- 'M'.**

Object :-To study the effect of different G.M. crops on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy ; Paddy and Wheat ; Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium Black. (iii) 23.8.63 ; 12.8.64 ; 21.8.65. (iv) (a) 1 ploughing + 2 harrowing ; N.A. ; 2 ploughing+2 harrowing. (b) Transplanting. (c) N.A. (d) 23 cm.×23 cm. (e) 2. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) K-42. (vii) Irrigated. (viii) 2 interculturing+1 weeding. (ix) 101 cm. ; 84 cm. ; 75 cm. (x) 11.12.63 ; 10.12.64 ; 2.12.65.

2. TREATMENTS :

5 manurial treatments :-T<sub>1</sub>=Sannhemp, T<sub>2</sub>=Dhaincha, T<sub>3</sub>=Sesbania Speciosa, T<sub>4</sub>=Guar and T<sub>5</sub>=12.4 C.L./ha. of F.Y.M.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) —. (iii) 6. (iv) (a) 11.0 m.×5.5 m. (b) 9.1 m.×4.6 m. (v) 91.5 cm.×45.7 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil for 63 (12) and 64 (63) ; slight attack of Rice case worm. (iii) yield of grain. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) Nil. (vi) Nil. (vii) As the error variances are heterogeneous and Treatments×years interaction is absent, the results of the individual experiments are given below.

5. RESULTS :

63(12)

(i) 2327 Kg/ha. (ii) 235.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	2145	2376	2412	2400	2300

64(63)

(i) 3421 Kg/ha. (ii) 474.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	3927	3309	3269	3349	3249

65(8)

(i) 3438 Kg/ha. (ii) 386.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	3478	3418	3648	3269	3379

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 65(7).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type :- 'M'.**

Object :-To study effect of different fertilizers on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy and Wheat. (c) 44.8 Kg. N+22.4 Kg.  $P_2O_5$ /ha. (ii) Medium black. (iii) 18.7.65 ; T.P. on 16.8.65. (iv) (a) 2 ploughings and 2 harrowings. (b) Transplanting. (c) Nil. (d) 15.2 cm.  $\times$  15.2 cm. (e) 2 seedlings/hill. (v) Nil. (vi) K-42. (vii) Irrigated. (viii) 2 weedings, 1 inter-culturing. (ix) 75 cm. (x) 3.12.65.

## 2. TREATMENTS :

Same as in expt. no. 65(5) on page 7.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) Nil. (iii) 6. (iv) (a) 7.6 m.  $\times$  4.3 m. (b) 6.4 m.  $\times$  3.0 m. (v) 61.0 cm.  $\times$  61.0 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Slight attack of Rice case worms (b) Nil. (iii) Grain and fodder yield. (iv) (a) 1965. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 3370 Kg/ha. (ii) 260.0 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	2956	3468	3733	3323
			C.D.	= 319.9 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 65(10).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type :- 'M'.**

Object :- To determine the optimum doses of N and P for Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy and Jowar. (c) 44.8 Kg. N+22.4 Kg.  $P_2O_5$ /ha. (ii) Medium black. (iii) 18.7.65. (iv) (a) 2 ploughings+2 harrowings. (b) Transplanting. (c) Nil. (d) 30.5 cm.  $\times$  30.5 cm. (e) 2 seedlings/hill. (v) Nil. (vi) K-42. (vii) Irrigated. (viii) 2 weedings, 1 interculturing. (ix) 75 cm. (x) 2.12.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S at sowing :  $N_1=67.3$ ,  $N_2=100.9$  and  $N_3=134.5$  Kg. N/ha.

(2) 2 levels of  $P_2O_5$  as Super at sowing :  $P_1=33.6$  and  $P_2=67.3$  Kg.  $P_2O_5$ /ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) Nil. (iii) 4. (iv) (a) 7.9m.  $\times$  4.9 m. (b) 7.3 m.  $\times$  3.7 m. (v) 30.5 cm.  $\times$  61.0 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Slight attack of Rice case worms. Endrex was sprayed. (iii) Grain and fodder yield. (iv) (a) 1965. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 4289 Kg/ha (ii) 323.8 Kg/ha. (iii) Only the main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
P <sub>1</sub>	4261	4064	4466	4264
P <sub>2</sub>	4111	4186	4644	4314
Mean	4186	4125	4555	4289

C.D. for N marginal means = 345.0 Kg/ha.



**Crop :- Paddy (Kharif).**  
**Site :- Agri. Res. Stn., Dabhoi.**

**Ref :- Gj. 63(129), 64(62), 65(9).**  
**Type :- 'M'.**

**Object :-**To study the cumulative effect of different nitrogenous fertilisers on Paddy.

1. **BASAL CONDITIONS :**

(i) (a) Paddy—Wheat. (b) Wheat. (c) As per treatments. (ii) (a) Medium black (b) Refer soil analysis, Dabhoi. (iii) N.A./4.8.64 ; 18.7.65/16.8.65. (iv). (a) 2 ploughings, 2 to 3 harrowings. (b) Transplanting. (c) —. (d) 23 cm. × 23 cm. (e) 2. (v) 12.3 C.L./ha. of F.Y.M. applied in 1 replication. (vi) E.K.—70 (vii) Irrigated. (viii) 2 weedings, 1 interculturing. (ix) 84 cm. ; 75 cm. (x) 28.10.64 ; 10.11.65.

2. **TREATMENTS :**

7 sources of 44.8 Kg/ha. of N : S<sub>0</sub>=No N (2 plots), S<sub>1</sub>=A/S, S<sub>2</sub>=Urea, S<sub>3</sub>=A/S/N, S<sub>4</sub>=C/A/N, S<sub>5</sub>=Nitro. Phos. and S<sub>6</sub>=Ammono. Phos.

Fertilisers applied by broadcast, 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super applied in all treatments excepting S<sub>4</sub> and S<sub>6</sub>.

3. **DESIGN :**

(i) R.B.D. (ii) (a) 8 for 64(62), 65(9) ; 6 for 63(129). (b) N.A. (iii) 2 with and without F.Y.M. (iv) (a) 18.3 m. × 10.1 m. (b) 16.8 m. × 8.2 m. (v) 91 cm. × 91 cm. (vi) No.

4. **GENERAL :**

(i) Normal. (ii) Slight attack of rice case worms in 65(9). Endrine sprayed. (iii) Grain and fodder yield. (iv) (a) 1963—Contd. (modified in 1964). (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Treatment S<sub>6</sub> has not been applied in 63(129) and treatment S<sub>6</sub> has been tried in single plot for 63 (129).

5. **RESULTS :**

64(62)

Yield of grain in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
With F.Y.M.	3209	2582	3099	1992	2656	3246	4574
Without F.Y.M.	2914	1697	2803	1844	1697	3099	3541

65(9)

Yield of grain in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
With F.Y.M.	2139	3541	2582	2066	2435	2818	3541
Without F.Y.M.	1885	2508	1955	1623	1586	2435	3010

63(129)

(i) 2904 Kg/ha. (ii) 569.2 Kg/ha. (iii) Treatment differences are not significant. (v) Av. yield of grain in Kg/ha.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>
Av. yield	2547	2953	2990	2824	2861	3248

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(121), 63(125).**

**Site :- Trial-cum-Demons. Farm, Chikhli., Agri. Res. Stn., Dabhoi. Type :- 'M'.**

**Object :-**To study the effect of different micronutrients applied through foliar spraying on Paddy.

## 1. BASAL CONDITIONS :

- (i) (a) Paddy—Wheat or Wal for 63(121); Nil for 63(125). (b) N.A. for 63(121); Wheat for 63(125). (c) N.A. for 63(121); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63(125). (ii) Deep black for 63(121); Medium black for 63(125). (iii) 18.6.1963/23.7.1963 for 63(121); 13.7.1963 for 63(125). (iv) (a) 2 ploughings+2 harrowings for 63(121); 3 harrowing for 63(125). (b) Transplanting for 63(121); Drilling for 63(125). (c) N.A. for 63(121); 28 Kg/ha. for 63(125). (d) 25 cm.  $\times$  25 cm. for 63(121); 46 cm. between rows for 63(125). (e) 3 for 63(121). (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +G.M. for 63(121); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63(125). (vi) Z-31 (medium) for 63(121); *Sathi* : 34—36 for 63(125). (vii) Irrigated for 63(121); Unirrigated for 63(125). (viii) 2 interculturings+2 weedings for 63(121); 2 interculturings for 63(125). (ix) 213 cm. for 63(121); 101 cm. for 63(125). (x) 5.11.1963 for 63(121); 22.10.1963 for 63(125).

## 2. TREATMENTS :

6 Micronutrient treatments :  $T_0$ =Control,  $T_1$ =2.2 Kg. Borax+0.6 Kg. bentenite,  $T_2$ =9.0 Kg. of C/S +9.0 Kg. of lime,  $T_3$ =3.4 Kg. of Mn. Sul.+2.2 Kg. of lime,  $T_4$ =3.4 Kg. of Zn. Sul.+2.2 Kg. of lime and  $T_5$ =0.2 Kg. of Sod. Molybdate.

Foliar application of the above micronutrients in 1123 litres of water and sprayed on the foliage of crop in two doses till the solution just drips in one hectare.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) 25.0 m.  $\times$  9.1 m. for 63(121); 20.1 m.  $\times$  10.1 m. for 63(125). (b) 24.4 m.  $\times$  8.2 m. for 63(121); 18.2 m.  $\times$  9.1 m. for 63(125). (v) 30 cm.  $\times$  46 cm. for 63(121); 91 cm.  $\times$  46 cm. for 63(125). (vi) Yes.

## 4. GENERAL :

- (i) Normal. Same lodging occurred for 63(125). (ii) Nil. (iii) Yield of grain. (iv) (a) No. (b) No. (c) Results of combined analysis given under 5. (v) Chikhli and Dabhoi. (vi) Nil. (vii) Errors are heterogenous and Treatments  $\times$  years interaction is absent. Hence results of individual years are presented.

## 5. RESULTS :

## 63(121)

- (i) 2407 Kg/ha. (ii) 426.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	2384	2337	2300	2526	2324	2569

## 63(125)

- (i) 1451 Kg/ha. (ii) 28.05 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	1480	1241	1516	1540	1444	1486

C.D.=72.1 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(120), 63(128).**

**Site :- Trial-cum-Demons. Farm, Chikhli., Agri. Res. Stn., Dabhoi. Type :- 'M'.**

**Object :-** To study the effect of different micronutrients given through soil on Paddy.

## 1. BASAL CONDITIONS :

- (i) (a) Paddy—Wheat or Wal for 63(120); Nil for 63(128). (b) N.A. for 63(120); Wheat for 63(128). (c) N.A. for 63(120); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63(128). (ii) Deep black for 63(120); Medium black for 63(128). (iii) 15.6.1963/24.7.1963 for 63(120); 26.6.1963 for 63(128). (iv) (a) 1 to 2 ploughings + 2 to 3 harrowings. (b) Transplanting for 63(120); Drilling for 63(128). (c) N.A. for 63(120); 28 Kg/ha. for 63(128). (d) 25 cm.  $\times$  25 cm. for 63(120); 46 cm. between rows for 63(128). (e) 3 for 63(120). (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +G.M. (*Dhaincha*) for 63(120); 44.8 Kg/ha. of N for 63(128). (vi) Z-31 (medium) for 63(120); *Sattri*—34.4 for 63(128). (vii) Irrigated for 63(120); Un-irrigated for 63(128). (viii) 2 inter-culturings+2 weedings for 63(120); 3 inter-culturings for 63(128). (ix) 213 cm. for 63(120); 101 cm. for 63(128). (x) 5.11.1963 for 63(120); 20.10.1963 for 63(128).

## 2. TREATMENTS :

7 micronutrient treatments :  $T_0$ =Control,  $T_1$ =11.2 Kg/ha. of Borax,  $T_2$ =28.0 Kg/ha. of C/S,  $T_3$ =5.6 Kg/ha. of Mn. Sul.  $T_4$ =28.0 Kg/ha. of Zn. Sul.,  $T_5$ =1.1 Kg/ha. of Sodium Molybdate and  $T_6$ =Mixture of all the above nutrients.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7 (b) N.A. (iii) 2. (iv) (a) 10.7 m.×10.7 m. for 63(120); 10.1 m.×10.1 m. for 63(128). (b) 10.4 m.×10.1 m. for 63(120); 9.1 m.×9.1 m. for 63(128). (v) 30 cm.×30 cm. for 63(120); 46 cm.×46 cm. for 63(128). (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) No. (b) No. (c) Results of combined analysis given under 5. (v) Chikhli and Dabhoi. (vi) Nil. (vii) Errors variances are homogeneous and Treatments×years interaction is absent.

## 5. RESULTS :

(i) 2280 Kg/ha. (ii) 176.8 Kg/ha. (18 d.f. made up of pooled error and Treatments×Places interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	2371	2120	2150	2316	2038	2402	2566

C.D. = 262.7 Kg/ha.

**Crop :- Paddy (Kharif).**

**Site :- Agri. Res. Stn., Nawagam.**

**Ref :- Gj. 60(18).**

**Type :- 'M'.**

Object :—To study the effect of graded doses of K on lodging and yield of Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Wheat. (b) Wheat. (c) N.A. (ii) Black soil. (iii) 3.7.60/27.7.60. (iv) 3 ploughings. (b) Transplanted. (c) N.A. (d) 22.9 cm.×22.9 cm. (e) One. (v) 12.3 C.L./ha. of F.Y.M. (vi) S-20. (vii) Irrigated. (viii) One interculturing. (ix) 51.6 cm. (x) 24, 25.11.60.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of fertilizers :  $L_1$ =33.6 Kg/ha. of  $P_2O_5$ +67.2 Kg/ha. of N,  $L_2$ =Twice the level of  $L_1$ .

(2) 3 levels of  $K_2O$  :  $K_0$ =0,  $K_1$ =67.2 and  $K_2$ =134.5 Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) 4. (iii) 4. (iv) (a) 10.5 m.×5.0 m. (b) 9.1 m.×3.7 m. (v) 69 cm.×69 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain and straw yield. (iv) 1956—60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 4278 Kg/ha. (ii) 298.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$K_0$	$K_1$	$K_2$	Mean
$L_1$	4342	4295	4043	4227
$L_2$	4264	4358	4368	4330
Mean	4303	4326	4206	4278

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 61(171), 62(228), 63(253), 64(271), 65(37).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'M'.**

**Object :-**To study the effect of different doses of N, P and K on the yield of Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Wheat for 61(171) and Paddy—Paddy for others. (b) Wheat for 61(171) and Paddy for others. (c) Nil for 61(171) and as per treatments for others. (ii) Medium black. (iii) 3.7.61, 5.6.62, 16.6.63, 6.7.64, 9.7.65/31.7.61, 22.7.62, 23.7.63, 1.8.64, 30.7.65. (iv) (a) 2 ploughings and 1 harrowing for 61(171); 2 ploughings and 1 puddling for others. (b) Transplanting (c) 9 Kg/ha. for 61(171) and 123 Kg/ha. in Nursery bed for others. (d) 30 cm.×15 cm. for 61(171) and 30 cm.×20 cm. for others. (e) One plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) Sukhawal—20 (early). (vii) Irrigated. (viii) 4 interculturings for 61(171) and 2 weedings and 1 interculturing for others. (ix) 74 cm., 95 cm., 88 cm., 56 cm., 41 cms. (x) 19.10.61, 14.10.62, 30.10.63, 19.10.64, 30.10.65.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=44.8$  and  $K_2=89.7$  Kg/ha.

(2) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$ ,  $N_2=44.8$  and  $N_3=67.2$  Kg/ha.

(3) 4 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$ ,  $P_2=44.8$  and  $P_3=67.2$  Kg/ha.

$K_2O$  and  $P_2O_5$  applied at transplanting by broadcasting,  $N_1$  applied at transplanting,  $N_2$  applied  $\frac{1}{2}$  at transplanting +  $\frac{1}{2}$  at tillering and  $N_3 = \frac{1}{3}$  at transplanting +  $\frac{1}{3}$  at tillering +  $\frac{1}{3}$  at flowering.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) 48. (b) N.A. (iii) 2. (iv) (a) 7.6 m.×4.3 m. (b) 6.4 m.×3.0 m. (v) 61 cm.×61 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961—65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is absent. Hence results of individual years are presented.

**5. RESULTS :**

**61(171)**

(i) 2880 Kg/ha. (ii) 473.1 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	Mean	$K_0$	$K_1$	$K_2$
$P_0$	2158	2736	3124	3757	2944	3085	2968	2778
$P_1$	2032	2534	2922	3445	2734	2820	2792	2589
$P_2$	2292	2626	3031	3548	2874	3001	2857	2765
$P_3$	2366	2569	3290	3649	2969	3052	3012	2843
Mean	2212	2616	3092	3600	2880	2989	2908	2743
$K_0$	2561	2696	3214	3487				
$K_1$	2293	2711	3086	3540				
$K_2$	1782	2443	2976	3773				

C.D. for N marginal means =274.6 Kg/ha.

**62(228)**

(i) 3317 Kg/ha. (ii) 456.4 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant. (iv) Av. yield of grain is Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>
P <sub>0</sub>	2584	2819	3887	4246	3384	3418	3357	3376
P <sub>1</sub>	2409	2691	3426	4066	3148	3075	3248	3120
P <sub>2</sub>	2580	2811	3203	4216	3202	3287	3255	3066
P <sub>3</sub>	2836	3250	3683	4366	3534	3492	3415	3694
Mean	2602	2893	3549	4223	3317	3318	3319	3314
K <sub>0</sub>	2739	2749	3556	4229				
K <sub>1</sub>	2774	2800	3530	4171				
K <sub>2</sub>	2294	3130	3562	4270				

C.D. for N or P marginal means = 264.9 Kg/ha.

63(253)

(i) 2494 Kg/ha. (ii) 223.0 Kg/ha. (iii) Main effect of N is highly significant. Interactions N×P, N×K are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>
P <sub>0</sub>	1888	2025	2862	3289	2516	2621	2351	2576
P <sub>1</sub>	2033	2059	2785	2998	2469	2537	2371	2499
P <sub>2</sub>	1931	1640	2956	3306	2458	2371	2454	2550
P <sub>3</sub>	1845	1965	3007	3315	2533	2614	2492	2492
Mean	1924	1922	2902	3227	2494	2536	2417	2529
K <sub>0</sub>	1916	1858	2960	3409				
K <sub>1</sub>	1743	1980	2864	3082				
K <sub>2</sub>	2114	1929	2883	3191				

C.D. for N marginal means = 129.3 Kg/ha.  
 C.D. for body of K×N table = 224.0 Kg/ha.  
 C.D. for the body of N×P table = 258.6 Kg/ha.

64(271)

(i) 3119 Kg/ha. (ii) 296.8 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>
P <sub>0</sub>	2341	2665	3400	3853	3065	3095	3191	2909
P <sub>1</sub>	2699	2699	3084	3998	3120	3184	3075	3101
P <sub>2</sub>	2409	2785	3323	4032	3137	3101	3063	3248
P <sub>3</sub>	2546	2905	3203	3964	3154	3005	3139	3319
Mean	2499	2764	3253	3962	3119	3096	3117	3144
K <sub>0</sub>	2524	2749	3210	3902				
K <sub>1</sub>	2454	2717	3210	4088				
K <sub>2</sub>	2518	2826	3338	3895				

C.D. for N marginal means = 172.2 Kg/ha

65(37)

(i) 4035 Kg/ha. (ii) 547.4 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>
P <sub>0</sub>	3219	3683	4321	4764	3997	4104	3949	3937
P <sub>1</sub>	3409	3838	4451	4743	4110	4331	3902	4097
P <sub>2</sub>	3259	3657	4433	4916	4066	4154	4010	4035
P <sub>3</sub>	3872	3561	4425	4808	4166	4257	4124	4119
Mean	3440	3685	4407	4808	4085	4211	3996	4047
K <sub>0</sub>	3490	3792	4575	4989				
K <sub>1</sub>	3459	3648	4313	4565				
K <sub>2</sub>	3370	3614	4334	4869				

C.D for N marginal means = 317.5 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(246), 64(259), 65(26).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'M'.**

**Object :-** To study the effect of different green manures in kyari land on Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(246), 65(26) and 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(259). (ii) Medium clay soil. (iii) 10.7.63, 29.7.64, 26.7.65/25.8.63, 27.8.64, 26.8.65. (iv) (a) 2 ploughings. (b) Transplanting. (c) —. (d) 30 cm. × 23 cm. (e) 1 plant/hill. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> at the time of sowing of green manure crops (vi) J—280 (late). (vii) Irrigated. (viii) 2 weedings and one interculturing. (ix) 88 cm., 56 cm., 40 cm. (x) 22.11.63, 24.11.64, 25.11.65.

**2. TREATMENTS :**

5 manurial treatments : T<sub>1</sub>=44.8 kg./ha. of N as A/S+12.3 C.L./ha. of F.Y.M., T<sub>2</sub>=Sannhemp, T<sub>3</sub>=Dhanicha, T<sub>4</sub>=S. Spacirosa and T<sub>5</sub>=Glyricidia.

Green manures buried in soils before transplanting of Paddy. Amount of G.M. crops applied is N.A.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) 21.3 m. × 3.6 m. (b) 20.1 m. × 3.0 m. (v) 61 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963—65. (b) No. (c) Results of combined analysis are given under 5. Results. (v) N.A. (vi) Nil. (vii) Errors are homogeneous and (Treatment × year) interaction is absent.

**5. RESULTS :**

(i) 3246 Kg/ha. (ii) 298.4 Kg/ha. (44 d.f. made up of treatments × years interaction and pooled error). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	3138	3299	3494	3090	3211

C.D. = 245.6 Kg/ha

**Crop :- Paddy (Kharif).**  
**Site :- Agri. Res. Stn., Nawagam.**

**Ref :- Gj. 63(244), 64(261), 65(25).**  
**Type :- 'M'.**

**Object :-**To study the effect of different micronutrients on Paddy by foliar application.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super. (ii) Medium clay. (iii) 28.6.63/2.8.63 ; 8.7.64/21.8.64 ; 13.7.65/15.8.65. (iv) (a) 2 ploughings, 1 puddling for 63(244) and 2 ploughings for others. (b) Transplanting. (c)—(d) 30 cm. × 23 cm. (e) 1. (v) Nil for 63(244) and 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for others. (vi) J—280. (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 88 cm. ; 56 cm. ; 40 cm. (x) 4.12.1963 ; 7.12.64 ; 30.11.65.

**2. TREATMENTS :**

8 Micronutrient treatments :  $T_0$ =Control,  $T_1$ =Boron at 2.21 Kg/ha. as Borax,  $T_2$ =Copper at 9.0 Kg/ha. as Cu. Sul.+9.0 Kg/ha. of lime,  $T_3$ =Zinc at 3.4 Kg/ha. as Zn/Sul.+2.2 Kg/ha. of lime,  $T_4$ =Manganese at 3.4 Kg/ha. as Mn/Sul.,  $T_5$ =Molybdenum at 210 gm./ha. as Na. Molybdate,  $T_6$ =Iron at 11.2 Kg/ha. as Fe. Sul.+11.2 Kg/ha of lime and  $T_7$ =Mixture of the above treatments.

Lime applied at 3.36 Kg/ha. in treatment  $T_3$  and Treatments  $T_6$ ,  $T_7$  were not applied in 63(244).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6 for 63(244) ; 8 for others. (b) N.A. (iii) 2 for 63(244) ; 4 for others. (iv) 22.9 m. × 8.8 m. for 63(244) ; 9.1 m. × 6.1 m. for others. (b) 20.4 m. × 7.0 m. for 63(244) ; 7.9 m. × 4.9 m. for others. (v) 122 cm. × 91 cm. for 63(244) ; 61 cm. × 61 cm. for others. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963—65 (modified in 64, 65). (b) No. (c) Results of combined analysis for 1964 and 1965 are presented under results. (v) and (vi) Nil. (vii) For 64(261) and 65(25) Error variances are homogenous and Treatments × years interaction is absent.

**5. RESULTS :**

**63(244)**

(i) 3698 Kg/ha. (ii) 104.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	3499	3667	3559	3926	3783	3753

**Combined results of 64(261) and 65(25)**

(i) 3021 Kg/ha. (ii) 246.2 Kg/ha. (49 d.f. made up of Treatments × years interaction and pooled error) (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	3001	2995	3157	3030	2821	3128	3034	2998

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 61(170), 62(232), 63(259), 64(277), 65(44).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'M'.**

**Object :-**To study the effect of different doses of N, P and K on the yield of Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Wheat for 61(170) and Paddy—Paddy for others. (b) Wheat for 61(170) and Paddy for others. (c) Nil for 61(170) and as per treatments for others. (ii) Medium black. (iii) 5.7.61, 6.7.62, 28.6.63, 8.7.64, 13.7.65/5.8.61, 4.8.62, 27.7.63, 16.8.64, 12.8.65. (iv) (a) 1 ploughing and 2 harrowings for 61(170) and 2 ploughings and 1 puddling for others. (b) N.A. (c) 11 Kg/ha. for 61(170) and 123 Kg/ha. in nursery bed for others. (d) 30 cm. × 20 cm. (e) One plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) J—280 (late). (vii) Irrigated. (viii) 4 interculturings for 61(170) and 2 weedings and 1 interculturing for others. (ix) 74 cm., 95 cm., 88 cm., 56 cm., 41 cm. (x) 20.11.61, 21.11.62, 1.12.63, 27.11.64, 26.11.65.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=44.8$  Kg/ha. and  $K_2=89.7$  Kg/ha.

(2) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  Kg/ha.,  $N_2=44.8$  Kg/ha. and  $N_3=67.2$  Kg/ha.

(3) 4 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  Kg/ha.,  $P_2=44.8$  Kg/ha. and  $P_3=67.2$  Kg/ha.

$K_2O$  and  $P_2O_5$  applied at transplanting by broadcasting.  $N_1$  applied at transplanting.  $N_2$  applied  $\frac{1}{2}$  at transplanting +  $\frac{1}{2}$  at tillering and  $N_3$  applied  $\frac{1}{3}$  at transplanting +  $\frac{1}{3}$  at tillering and  $\frac{1}{3}$  at flowering.

$K_2O$  applied as Mur. Pot. except in 61(170).

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 48. (b) N.A. (iii) 2. (iv) (a)  $7.6 \text{ m} \times 4.3 \text{ m}$ . (b)  $6.4 \text{ m} \times 3.1 \text{ m}$ . (v) 61 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good ; lodging at flowering in 61(170) and at maturity stage in 65(44). (ii) Attack of stem borer in 61(170) and Nil for others. (iii) Grain and fodder yield. (iv) (a) 1961—65. (b) No. (c) Results of combined analysis given under 5 Results. (v) N.A. (vi) Nil. (vii) Error variances heterogeneous and Treatments  $\times$  years interaction is present for all components excepting (P  $\times$  K  $\times$  Y) interaction.

## 5. RESULTS :

(i) 3918 Kg/ha. (ii) 378.5 Kg/ha. (92 d.f. made up of interaction of N,P,N  $\times$  P,K, N  $\times$  K with years).

(iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	$K_0$	$K_1$	$K_2$	Mean
$P_0$	3654	3619	4153	4341	3932	3951	3942	3942
$P_1$	3492	3710	4068	4315	3856	3892	3941	3896
$P_2$	3551	3621	4093	4447	3820	4023	3941	3928
$P_3$	3498	3665	4050	4408	3909	3862	3944	3905
Mean	3549	3654	4091	4378	3879	3932	3943	3918
$K_0$	3448	3627	4088	4364				
$K_1$	3551	3638	4128	4411				
$K_2$	3657	3696	4058	4359				

C.D. for N marginal means = 137.6 Kg/ha.

Crop :- Paddy (Kharif).

Ref :- Gj. 63(245), 64(260), 65(27).

Site :- Agri. Res. Stn., Nawagam.

Type :- 'M'.

Object :- To study the effect of different micronutrients on Paddy by soil application.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium clay soil. (iii) 8.7.64, 21.7.65/27.8.64, 24.8.65. (iv) (a) 2 ploughings. (b) Transplanting. (c) Nil. (d) 30 cm.  $\times$  22 cm. (e) 1 plant/hill. (v) 22.4 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (vi) J-280 (late). (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 56 cm. ; 40 cm. (x) 7.12.64 ; 30.11.65.

## 2. TREATMENTS :

8 micronutrient treatments :  $T_0$ =control,  $T_1$ =Boron at 11.2 Kg/ha. of Borax,  $T_2$ =Copper at 28.0 Kg/ha. of Cu. Sul.,  $T_3$ =Zinc at 28.0 Kg/ha. of Zn. Sul.,  $T_4$ =Manganese at 56 Kg/ha. of Mn. Sul.,  $T_5$ =Molybdenum at 1.1 Kg/ha. of Sodium Molybdate,  $T_6$ =Iron at 56 Kg/ha. of Fe. Sul. and  $T_7$ =Mixture of all the above treatments.

Micronutrients applied through soil at sowing.



## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 6.1 m. (b) 7.9 m. × 4.9 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963-65 (modified in 1964). (b) No. (c) Nil. (v) and (vi) Nil. (vii) Treatment  $T_6$  has not been applied for 63(245). Error variances are heterogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

## 64(260)

(i) 2137 Kg/ha. (ii) 297.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield.	1921	2031	2096	1973	2322	2393	2063	2296

## 65(27)

(i) 2934 Kg/ha. (ii) 189.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield.	2775	3060	2846	2988	2872	3079	2820	3034

## 63(245)

(i) 3173 Kg/ha. (ii) 139.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	3221	3300	2912	3116	3228	3168	3267

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 65(36).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'M'.**

**Object :-** To study the suitability of Diammonium Phosphate and Ammo. Sulphate Phosphate for Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Paddy. (b) Paddy. (c) 44.8 Kg. N + 22.4 Kg.  $P_2O_5$ /ha. (ii) Medium black soil. (iii) 21.7.65 T.P. on 23.8.65. (iv) (a) 2 ploughings and 1 puddling. (b) Transplanting. (c) 123.3 Kg/ha. in Nursery bed. (d) 30.5 cm. × 15.2 cm. (e) One plant/hill. (v) 12.4 C.L. F.Y.M./ha. (vi) J-280. (vii) Irrigated. (viii) 2 weedings and 1 inter-culturing. (ix) 40.5 cm. (x) 17-11-65.

## 2. TREATMENTS :

$T_0$  = No fertilizer (control).  $T_1$  = Diammo. Phosphate to supply 44.8 Kg. and 22.4 Kg.  $P_2O_5$ /ha.  $T_2$  = Ammo. Sulphate Phosphate to supply 44.8 Kg. N and 22.4 Kg.  $P_2O_5$ /ha. and  $T_3$  = A/S + Super. @ 44.8 Kg. N + 22.4 Kg.  $P_2O_5$ /ha. N applied at Transplanting and tillering  $P_2O_5$  at Puddling by broadcast.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) Nil. (iii) 6. (iv) (a) 7.6 m. × 4.3 m. (b) 6.4 m. × 3.1 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965-contd. (b) Yes (permanent plots). (c) Nil. (v) to (vii) Nil.

## 5. RESULTS:

(i) 3464 Kg/ha. (ii) 248.6 Kg/ha. (iii) Treatment differences are highly significant (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	3092	3502	3648	3614

C.D. = 305.9 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 65(39).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'M'.**

Object :- To study the response of Paddy to different doses of N, P and K.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Paddy. (b) Paddy. (c) Nil. (ii) Medium black soil. (iii) 13.7.65 T.P. on 12.8.65. (iv) (a) 2 ploughings. (b) Transplanting. (c) 123.3 Kg/ha. in Nursery bed. (d) 30.5 cm. × 20.4 cm. (e) One plant/hill. (v) 12.4 C.L. F.Y.M./ha. (vi) J—280. (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 40.5 cm. (x) 26.11.65.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) :

(1) 3 levels of N as A/S : N<sub>1</sub>=60 N<sub>2</sub>=90, N<sub>3</sub>=120 Kg. N/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=40 Kg. P<sub>2</sub>O<sub>5</sub>/ha.

(3) 2 levels of K<sub>2</sub>O as Pot. Sul : K<sub>0</sub>=0, K<sub>1</sub>=40 Kg/ha.

N applied in 3 equal doses on (i) Transplanting (ii) Tillering. (iii) Boot stage and P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O broadcasted at puddling.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) Nil. (iii) 4. (iv) (a) 9.1 m. × 3.7 m. (b) 7.9 m. × 3.0 m. (v) 61.0 cm. × 30.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965—contd. (b) Yes (Permanent plots). (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3959 Kg/ha. (ii) 396.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	4104	4150	3835	3992	4067	4030
P <sub>1</sub>	4078	3778	3809	3836	3940	3888
Mean	4091	3964	3822	3914	4004	3959
K <sub>0</sub>	3974	3948	3819			
K <sub>1</sub>	4207	3980	3824			

**Crop :- Paddy (Kharif).****Ref :- Gj. 65(38).****Site :- Agri. Res. Stn., Nawagam.****Type :- 'M'.**

Object :—To study the response of Paddy to application of different doses of N, P and K.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Paddy. (b) Paddy. (c) Nil. (ii) (a) Medium black soil. (b) Nil (iii) 9.7.65 T.P. on 30.7.1965. (iv) (a) 2 Ploughings. (b) Transplanting. (c) 123.3 Kg/ha. in Nursery bed. (d) 30.5 cm. × 15.2 cm. (e) one plant/hill. (v) 12.4 C.L. F.Y.M./ha. (vi) Paddy—S.K. 20. (vii) Irrigated. (viii) 2 weeding and 1 interculturing. (ix) 40.5 cm. (x) 13.10.65.

**2. TREATMENTS :**

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S :  $N_1=60$   $N_2=90$ ,  $N_3=120$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super  $P_0=0$ ,  $P_1=40$  Kg/ha.(3) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=40$  Kg/ha.N applied in 3 equal doses on (i) T. P. (ii) Tillering (iii) Boot stage.  $P_2O_5$  and  $K_2O$  at the time of puddling by broadcasting.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) Nil. (iii) 4. (iv) (a) 9.1 m. × 3.7 m. (b) 7.9 m. × 3.0 m. (v) 61.0 cm. × 30.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965—contd. (b) Yes (Permanent plots) (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 4625 Kg/ha. (ii) 631.8 Kg/ha. (iii) Only the main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$K_0$	$K_1$	Mean
$P_0$	3845	4430	5377	4585	4516	4551
$P_1$	4011	5108	4978	4630	4768	4699
Mean	3928	4769	5178	4608	4642	4625
$K_0$	4021	4601	5201			
$K_1$	3835	4937	5154			

C.D. for N marginal means = 546.7 Kg/ha.

**Crop :- Paddy (Kharif).****Ref :- Gj. 64 (56).****Site :- Agri. Res. Stn., Vyara.****Type :- 'M'.**

Object :—To find out the remedy for Nutrient impoverishment in land caused by continuous application of fertilisers containing sulphate—Ions, for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil (iii) 16.6.64. (iv) (a) 2 puddlings. (b) Transplanting. (c) 19.8 Kg/ha. (d) 30.5 cm. × 15.2 cm. (e) — (v) Nil. (vi) Z—31 Mid—late. (vii) Irrigated. (viii) 3 Interculturings. (ix) 195.4 cm. (x) 24.10.64.

## 2. TREATMENTS :

3 manurial treatments :  $T_1=44.8$  Kg/ha. of N+ $22.4$  Kg/ha. of  $P_2O_5$ + $44.8$  Kg/ha. of  $K_2O$ ,  $T_2=T_1+22.4$  Kg/ha. of Ferric Carbonate and  $T_3=44.8$  Kg/ha. of N as Urea+ $22.4$  Kg/ha. of  $P_2O_5$  as Super+ $44.8$  Kg/ha. of  $K_2O$  as Mur. Pot.

In  $T_1$  and  $T_2$   $\frac{1}{2}$  dose of N applied as Ammo. Phosphate at planting+ $\frac{1}{2}$  as A/S one month after planting  $P_2O_5$  as Ammo. Phos. at planting and  $K_2O$  at planting. In  $T_3$ , Urea applied half at transplanting and half one month after transplanting.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) —. (iii) 2. (iv) (a) and (b)  $10.1$  m.  $\times$   $10.1$  m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1964. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3779 Kg/ha. (ii) 93.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	3805	3741	3791

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 64, 65 (MAE).**

**Site :- M.A.E. Centre, Chalthan.**

**Type :- 'M'.**

Object :-Type II :-To study the effect of N, P, K and F.Y.M. on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat—Paddy. (b) Wheat. (c) Nil. (ii) Medium black. (iii) N.A./22, 23.7.64 ; 19.7.65 (iv) (a) 1 ploughing and 2 harrowings. (b) Transplanting. (c) N.A. (d)  $25$  cm.  $\times$   $25$  cm. for 64 ;  $20$  cm.  $\times$   $20$  cm. for 65. (e) 4. (v) Nil. (vi) E.K. 70. (vii) Irrigated. (viii) 2 weedings. (ix)  $193.3$  ;  $95.9$  cm. (x) 1, 2.11.64 ; 28.10.65.

## 2. TREATMENTS :

All combinations of (1), (2), (3) and (4) :

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.
- (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.
- (3) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=33.6$  and  $K_2=67.2$  Kg/ha.
- (4) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5600$  Kg/ha.

Fertilizers and F.Y.M applied to soil before puddling.

## 3. DESIGN :

(i)  $3^3 \times 2$  Fact. Conf'd. (ii) (a) 9 plots/block ; 3 blocks each under  $F_0$  and  $F_1$  per replication. (b) N.A. (iii) 1. (iv)  $10.7$  cm.  $\times$   $4.6$  m. (b)  $9.1$  m.  $\times$   $3.0$  m. (v)  $76$  cm.  $\times$   $76$  cm. (vi) Yes.

## 4. GENERAL :

(i) Good, (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964—Contd. upto 66. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Nil.

## 5. RESULTS :

## 64(MAE)

(i) 2271 Kg/ha. (ii) 233.5 Kg/ha. (iii) Main effects of N and P are highly significant. (iv). Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1754	2320	2794	2190	2266	2411	2208	2238	2421	2289
F <sub>1</sub>	1768	2270	2718	2045	2348	2364	2196	2226	2334	2252
Mean	1761	2295	2756	2117	2307	2388	2202	2232	2378	2271
K <sub>0</sub>	1811	2128	2667	2146	2200	2260				
K <sub>1</sub>	1737	2269	2690	2048	2293	2356				
K <sub>2</sub>	1734	2487	2912	2158	2427	2548				
P <sub>0</sub>	1620	2149	2583							
P <sub>1</sub>	1812	2284	2825							
P <sub>2</sub>	1852	2451	2861							

C.D. for N or P marginal means=166.8 Kg/ha.

65(MAE)

(i) 1936 Kg/ha. (ii) N.A. (iii) N.A. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1521	1881	2140	1742	1936	1864	1808	1890	1821	1840
F <sub>1</sub>	1586	2039	2467	1869	2045	2176	1949	2134	2007	2031
Mean	1554	1960	2304	1806	1991	2020	1878	2012	1914	1936
K <sub>0</sub>	1501	1952	2217	1833	1984	1854				
K <sub>1</sub>	1665	2010	2362	1796	2123	2117				
K <sub>2</sub>	1495	1916	2332	1788	1866	2090				
P <sub>0</sub>	1444	1806	2167							
P <sub>1</sub>	1656	1976	2340							
P <sub>2</sub>	1561	2097	2404							

Crop :- Paddy (Karif).

Ref :- Gj. 62, 63, 64, 65 (MAE)

Site :- M.A.E. Centre, Chalthan.

Type :- 'M'.

Object :- Type V (a) :- To study the effect of method of application of N on Paddy.

#### 1. BASAL CONDITIONS :

(i) (a) N.A. for 62, Paddy—Wheat—Paddy for 63, 64; Nil for 65 (b) Wheat. for 62, sannhemp for 63; Wheat for 64 and sann for 65. (c) Nil. (ii) (a) Medium black. (b) N.A. (iii) N.A./26 to 28.7.62; N.A./15, 16.7.63; 16, 17.7.64; 15, 16.7.65. (iv) (a) 2 harrowings for 62, 63; 1 to 2 ploughings and harrowings for others. (b) Transplanting. (c) —. (d) 25 cm. × 25 cm. (e) 4. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62; 12 C.L./ha. of F.Y.M. for 63; 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+62 Kg/ha. of F.Y.M. for 64; 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65. (vi) Kada 176—12 (105 days). (vii) Irrigated. (viii) Nil for 62; 2 weedings for others. (ix) 137 cm.; 109 cm.; 193 cm. and 95.9 cm. (x) 9 to 11.11.62; 25 to 27.10.63. 25, 26.10.64; 21, 22.10.65.

## 2. TREATMENTS :

All combinations of (1) and (2)+a control

(1) 3 levels of N :  $N_1=33.6$ ,  $N_2=50.4$  and  $N_3=67.2$  Kg/ha.

(2) 4 methods of application :  $M_1$ =Broadcast just before last puddling and incorporated in the soil (sub-surface application),  $M_2$ =Broadcast at planting,  $M_3$ =Broadcast  $\frac{1}{2}$  at planting +  $\frac{1}{2}$  about a month after planting and  $M_4$ =Application in the form of pellets about three weeks after planting.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 4. (iv) (a) 10.7 m.  $\times$  4.6 m. (b) 9.1 m.  $\times$  3.0 m. (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good in 63 ; Normal in others. (ii) Nil. (iii) Grain yield. (iv) (a) 1962—1965. (b) No. (c) Results of combined analysis given under 5 Results. (v) and (vi) Nil. (vii) Errors are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 2104 Kg/ha. (ii) 244.8 Kg/ha. [144 d.f. made up of pooled error]. (iii) Main effects of N, M and control vs. others are highly significant. (iv) Av. yield of grain in Kg/ha.

Control = 1153 Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	Mean
$N_1$	1836	1770	2010	2112	1932
$N_2$	2156	2085	2274	2414	2232
$N_3$	2260	2214	2463	2603	2385
	2084	2023	2249	2376	2183

C.D. for N marginal means=85.2 Kg/ha.

C.D. for M marginal means=97.9 Kg/ha.

C.D. for 'Control vs. others'=123.9 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63, 64, 65 (MAE).**

**Site :- M.A.E. Centre, Chalthan.**

**Type :- 'M'.**

Object :- Type : XI :- To study the effect of micronutrients on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat—Paddy. (b) Wheat. (c) N.A. (ii) Medium black. (iii) 19, 21.7.1963 ; 19, 20.7.1964 ; 12.7.1965. (iv) (a) 1 ploughing and 2 harrowings. (b) Transplanting. (c) N.A. (d) 25 cm.  $\times$  25 cm. (e) 4. (v) Nil. (vi) Kada—176—12. (vii) Irrigated. (viii) 2 weedings. (ix) 121.0 cm. ; 193.3 cm. ; 95.9 cm. (x) 2 to 4.11.1963 ; 28, 29.10.1964 ; 19.10.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)+3 extra treatments.

(1) 2 methods of application of micronutrients :  $M_1$ =Soil and  $M_2$ =Foliar application.

(2) 6 micronutrients :  $S_1$ =Mn as 56.0 Kg/ha. of Mn. Sul.,  $S_2$ =Zn as 28.0 Kg/ha. of Zn. Sul.,  $S_3$ =Cu as 28.0 Kg/ha. of Cu. Sul.,  $S_4$ =B at 16.8 Kg/ha. of Borax,  $S_5$ =Molybdenum at 1.1 Kg/ha of Sodium molybdate and  $S_6$ =Mixture of above five micronutrients.

Extra treatments are :  $T_0$ =Control,  $T_1$ =NPK alone to soil and  $T_2$ =NPK+Spartin at 370.0 Kg/ha., NPK=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+33.6 Kg/ha. of  $K_2O$  as Mur. Pot. applied to all treatments except control.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) 10.7 m. × 4.6 m. (b) 9.1 m. × 3.0 m. (v) 76 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil for 63 ; Attack of blue beetles for 64 and 65 ; Endrine was sprayed. (iii) Grain yield. (iv) (a) 1963 to 1965. (b) No. (c) Results of pooled analysis are presented under. 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and treatments × years interaction is absent.

## 5. RESULTS :

(i) 2053 Kg/ha. (ii) 245.2 Kg/ha. (126 d.f. made up of pooled error). (iii) Extra treatment vs. others' and Between extra Treatment effects are highly significant. (iv) Av. yield of grain in Kg/ha.

$T_0=1188, T_1=2084$  and  $T_2=2242$  Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$M_1$	2001	2090	2080	2154	2223	2140	2115
$M_2$	2107	2183	2100	2086	2044	2073	2099
Mean	2054	2136	2090	2120	2134	2106	2107

C.D. for Extra vs. others' = 90.4 Kg/ha.

C.D. for T marginal means = 198.0 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(MAE).**

**Site :- M.A.E. Centre, Chikhli.**

**Type :- 'M'.**

Object :— Type II :—To study the effect of different levels of N,P, K and F.Y.M. on the yield of Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wal. (b) Wal in *rabi*. (c) N.A. (ii) Deep black clay loam. (iii) 5.7.1960/2,3.8.1960. (iv) (a) Puddling, harrowing and levelling. (b) Transplanting by Japanese method of cultivation. (c) 17 Kg/ha. (d) 25 cm. × 25 cm. (e) 4. (v) Nil. (vi) *Zinia*—31 (mid late). (vii) Irrigated. (viii) One weeding. (ix) 150.6 cm. (x) 10.11.1960.

## 2. TREATMENTS :

All combinations of (1), (2), (3) and (4).

(1) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5604$  Kg/ha.

(2) 3 levels of N as A/S :  $N_0=0, N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0, P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(4) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0=0, K_1=33.6$  and  $K_2=67.2$  Kg/ha.

P and K broadcasted at puddling (2.8.1960) and N applied in 2 doses.  $\frac{1}{2}$  as top dressing and  $\frac{1}{2}$  at puddling F.Y.M. broadcasted before puddling *i.e.* on 21.6.60.

## 3. DESIGN :

(i)  $3^3 \times 2$  confd. (ii) (a) 9 plots/block ; 6 blocks/replication. (b) 32.5 m. × 13.7 m. (iii) 1. (iv) (a) 10.7 m. × 4.6 m. (b) 9.1 m. × 3.0 m. (v) 76 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory ; slight lodging in November. (ii) Slight attack of stem borer at tillering. (iii) Yield of grain and straw. (iv) (a) 1959—60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2903 Kg/ha. (ii) 290.1 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	2116	3064	3474	2649	3031	2975	2982	2829	2844	2885
F <sub>1</sub>	2258	3071	3437	2955	2850	2961	2947	2900	2919	2922
Mean	2187	3067	3455	2802	2940	2968	2964	2864	2881	2903
K <sub>0</sub>	2330	2976	3586	2902	3011	2979				
K <sub>1</sub>	2143	3038	3411	2800	2819	2973				
K <sub>2</sub>	2088	3187	3368	2704	2989	2951				
P <sub>0</sub>	2052	2905	3450							
P <sub>1</sub>	2206	3173	3441							
P <sub>2</sub>	2304	3124	3475							

C.D. for N marginal means=204.0 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(MAE).**

**Site :- M.AE. Centre, Chikhli.**

**Type :- 'M'.**

Object :- Type V :- To study the effect of different times of application of different sources of N on the yield of Paddy.

#### 1. BASAL CONDITIONS :

(i) (a) Paddy—Wal. (b) N.A. (c) N.A. (ii) N.A. (iii) 5.7.1960/31.7.60 ; 1, 2.8.1960. (iv) (a) Puddling, harrowing and levelling. (b) Transplanting by Japanese method of Paddy cultivation. (c) 17 Kg/ha. (d) 25 cm. × 25 cm. (e) —. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super puddled on 31.7.60. (vi) Zinia—31 (mid. late) (vii) Irrigated. (viii) Weeding by hand hoe thrice. (ix) 13.11.1960.

#### 2. TREATMENTS :

All combinations of (1) and (2)+a control.

(1) 2 sources of 44.8 Kg/ha. of N : S<sub>1</sub>=Urea and S<sub>2</sub>=A/S.

(2) 7 times of application : T<sub>1</sub>=Full dose before planting, T<sub>2</sub>=Full dose at planting, T<sub>3</sub>=Full dose at tillering, T<sub>4</sub>= $\frac{1}{2}$  before planting +  $\frac{1}{2}$  at tillering, T<sub>5</sub>= $\frac{1}{2}$  at planting +  $\frac{1}{2}$  at tillering, T<sub>6</sub>= $\frac{1}{2}$  before planting +  $\frac{1}{2}$  at tillering +  $\frac{1}{2}$  one week before flowering and T<sub>7</sub>= $\frac{1}{2}$  at planting +  $\frac{1}{2}$  at tillering +  $\frac{1}{2}$  one week before flowering.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) 64.0 m. × 48.8 m. (iii) 3. (iv) (a) 10.7 m. × 4.6 m. (b) 9.1 m. × 3.0 m. (v) 76 cm. × 76 cm. (vi) Yes.

#### 4. GENERAL :

(i) Satisfactory ; lodging in the 1st week of November. (ii) Nil except slight attack of stem borer at tillering. (iii) Yield of grain and straw. (iv) (a) 1959—1960. (b) N.A. (c) Nil. (v) N.A. (vi) Nil. (vii) Nil.

#### 5. RESULTS :

(i) 2259 Kg/ha. (ii) 610.5 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of grain in Kg/ha.



Control=2112 Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	Mean
S <sub>1</sub>	1835	1798	1845	1928	1706	1752	1679	1792
S <sub>2</sub>	2785	2545	2758	2933	2647	2776	2795	2748
Mean	2310	2171	2301	2430	2176	2264	2237	2270

C.D. for S marginal means=385.8 Kg/ha.

**Crop :-Paddy (Kharif).****Ref :- Gj. 60(MAE).****Site :- Agri. Res. Stn., Chikhli.****Type :- 'M'.**

Object :- Type V (a) :-To find the best time of application of N to Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wal. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Deep black soil. (iii) 5.7.60/2.8.60. (iv) (a) 2 harrowings. (b) Transplanting. (c) N.A. (d) 25 cm.×25 cm. (e) 4. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Zenia-31 (Mid. late). Irrigated. (viii) Two interculturings+2 weedings. (ix) 150 cm. (x) 13.11.60.

**2. TREATMENTS :**

All combinations of (1) and (2)+one control (no nitrogen)

(1) Two sources of N at 45 Kg/ha. : S<sub>1</sub>=Urea and S<sub>2</sub>=A/S.

(2) 7 times of application of N : T<sub>1</sub>=full dose before planting, T<sub>2</sub>=full dose at planting, T<sub>3</sub>= full dose at tillering, T<sub>4</sub>=Half dose before planting+½ dose at tillering, T<sub>5</sub>= Half dose at planting+½ dose at tillering, T<sub>6</sub>=½ dose before planting+½ dose at tillering+½ dose one week before flowering and T<sub>7</sub>=½ dose at planting+½ dose at tillering+½ dose one week before flowering.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) (a) 10.7 m.×4.6 m. (b) 9.1 m.×3.0 m. (v) 76 cm. ×76 cm. (vi) Yes.

**4. GENERAL :**

(i) Satisfactory. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1959—contd. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Nil.

**5. RESULTS :**

(i) 2260 Kg/ha. (ii) 610.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

Control = 2112 Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	Mean
S <sub>1</sub>	1835	1798	1845	1928	1706	1752	1679	1792
S <sub>2</sub>	2785	2546	2758	2933	2647	2776	2795	2748
Mean	2310	2172	2301	2430	2177	2264	2237	2270

**Crop :- Paddy (Kharif).****Ref :- Gj. 60(MAE).****Site :- M.A.E. Centre, Chikhli.****Type :- 'M'.**

Object :—Type VII—To study the effect of manures and cultural practices on Paddy.

**1. BASAL CONDITIONS :**

(i) a) to (c) N.A. (ii) Clay to clay loam. (iii) 28.6.60, 5, 17.7.60/As per treatments. (iv) (a) Puddling and levelling. (b) Transplanting. (c) 15 to 17 Kg/ha. (d) and (e) As per treatments. (v) 56 Q/ha. of F.Y.M. (vi) Zinia—31 (80 days). (vii) Unirrigated. (viii) 1 weeding. (ix) 150 cm. (x) 18.11.60.

**2. TREATMENTS :****Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 dates of planting :  $D_1=23.7.60$ ,  $D_2=5.8.60$  and  $D_3=18.8.60$ .(2) 3 No. of seedlings/bunch :  $R_1=2$ ,  $R_2=4$  and  $R_3=6$ .(3) 3 spacings :  $S_1=15\text{ cm.} \times 15\text{ cm.}$ ,  $S_2=20\text{ cm.} \times 20\text{ cm.}$  and  $S_3=25\text{ cm.} \times 25\text{ cm.}$ **Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=44.8\text{ Kg/ha.}$ (2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=22.4\text{ Kg/ha.}$ **3. DESIGN :**(i)  $3^3 \times 4$  Split-plot confounding. (ii) (a) 3 sub-blocks/Replication ; 9 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv)  $10.7\text{ m} \times 4.6\text{ m.}$  (b)  $9.1\text{ m} \times 3.0\text{ m.}$  (v)  $76\text{ cm.} \times 76\text{ cm.}$  (vi) Yes.**4. GENERAL :**

(i) Good. (ii) Incidence of stemborer. (iii) Grain yield. (iv) (a) to (c) No. (v) to (vii) Nil.

**5. RESULTS :**

(i) 2154 Kg/ha. (ii) (a) 709.3 Kg/ha. (b) 303.1 Kg/ha. (iii) Main effect of N is highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

	$R_1$	$R_2$	$R_3$	$N_0$	$N_1$	$P_0$	$P_1$	$S_1$	$S_2$	$S_3$	Mean
$D_1$	2204	2269	2278	1826	2674	2186	2314	2260	2518	1972	2250
$D_2$	2250	2250	2380	1762	2824	2315	2271	2324	2315	2241	2293
$D_3$	1928	1918	1909	1337	2499	1780	2056	1752	2075	1927	1918
Mean	2127	2146	2189	1642	2666	2094	2214	2112	2303	2047	2154
$S_1$	2011	2084	2241	1596	2628	2057	2167				
$S_2$	2269	2343	2297	1789	2817	2232	2374				
$S_3$	2101	2011	2029	1541	2553	1993	2101				
$P_0$	2131	2048	2103	1568	2620						
$P_1$	2123	2244	2275	1716	2712						
$N_0$	1605	1577	1744								
$N_1$	2649	2715	2634								

C.D. for N or P marginal means=116.7 Kg/ha.

**Crop :- Paddy (Kharif).****Ref :- Gj. 65(SFT).****Site :- Baroda and Surat (c.f.).****Type :- 'M'.**Object :—Type  $A_1$ —To study response curves of important cereal, cash and oil seed crops to nitrogen applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

C =Control (no manure).  
 $N_1$  =35 Kg/ha. of N.  
 $N_2$  =70 Kg/ha. of N.  
 $P_1$  =35 Kg/ha. of  $P_2O_5$ .  
 $N_1P_1$  =35 Kg/ha. of N+35 Kg/ha. of  $P_2O_5$ .  
 $N_2P_1$  =70 Kg/ha. of N+35 Kg/ha. of  $P_2O_5$ .  
 $N_2P_2$  =70 Kg/ha. of N+70 Kg/ha. of  $P_2O_5$ .  
 $N_2P_2K_1$  =70 Kg/ha. of N+70 Kg/ha. of  $P_2O_5$ +35 Kg/ha. of  $K_2O$   
 N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one Revenue Circle or Thana in the zone and the Circle/Thana is changed once in two years with in the same zone. Each field assistant is required to conduct 36 trials in a year, 9 on a kharif cereal, 9 on rabi cereal 9 on Cash crops, 6 on an oil-seed crop and 3 on a leguminous crop. One-third of the number of trials conducted (other than leguminous crops) are of type  $A_1$ , another one-third are of type  $A_2$  and the remaining one-third are of type  $A_3$ . The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the four zones at the rate of one experiment per village. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1965—only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Baroda**  
 S.F.T.(65)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	170	470	252	537	515	541	325	238.2

Control yield=886 Kg/ha. ; No. of trials=7.

**Surat**  
 S.F.T.(65)

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	333	576	375	451	814	829	986	199.2

Control yield=1497 Kg/ha. ; No. of trials=11.

**Crop :- Paddy (Kharif).****Ref :- Gj. 65 (SFT)****Site :- Baroda and Surat (c.f).****Type :- 'M'**

Object :—Type  $A_3$ —To study response curves of important cereal, cash and oil-seed crops to phosphorus applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

C =Control (no manure).  
 $N_1$  =35 Kg/ha. of N.  
 $P_1$  =35 Kg/ha. of  $P_2O_5$ .  
 $P_2$  =70 Kg/ha. of  $P_2O_5$ .  
 $N_1P_1$  =35 Kg/ha. of N+35 Kg/ha. of  $P_2O_5$ .  
 $N_1P_2$  =35 Kg/ha. of N+70 Kg/ha. of  $P_2O_5$ .  
 $N_2P_2$  =70 Kg/ha. of N+70 Kg/ha. of  $P_2O_5$ .  
 $N_2P_2K_2$  =70 Kg/ha. of N+70 Kg/ha. of  $P_2O_5$ +70 Kg/ha. of  $K_2O$   
 N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

(i) Same as in type A<sub>1</sub> on page no. 28.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1965—only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Baroda**

S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	-96	-48	75	186	287	128	270	194.4

Control yield=803 Kg/ha. ; No. of trials=6

**Surat**

S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	242	215	256	354	403	482	672	49.3

Control yield=975 Kg/ha. ; No. of trials=12

**Crop :- Paddy (Kharif).****Ref :- Gj. 65 (SFT)****Site :- (District) : Baroda and Surat (c.f.).****Type :- 'M'**Object :—Type A<sub>3</sub>—To study response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) (a) N.A. (ii) Deep black. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

C =Control (no manure).

N<sub>1</sub> =35 Kg./ha. of N.K<sub>1</sub> =35 Kg/ha. of K<sub>2</sub>O.K<sub>2</sub> =70 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>1</sub> =35 Kg/ha. of N+35 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>K<sub>2</sub> =35 Kg/ha. of N+70 Kg/ha. of K<sub>2</sub>O.N<sub>2</sub>K<sub>2</sub> =70 Kg/ha. of N+70 Kg/ha. of K<sub>2</sub>O.N<sub>1</sub>P<sub>1</sub>K<sub>2</sub> =35 Kg/ha. of N+70 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+70 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

(i) Same as in type A<sub>1</sub> on page no. 28.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1965—only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Baroda**

S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	242	402	310	422	411	765	629	228.5

Control=767 Kg./ha. ; No. of trials=5

**Surat**

S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	95	115	230	271	486	381	495	74.6

Control=797 Kg/ha. ; No. of trials=12

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(26), 61(21), 61(2), 62(106).**

**Site :- Trial-cum-Demons. Farm, Bardoli. Type :- 'MV'.**

**Object :-**To find out the response of different varieties of Paddy to manuring under Bardoli conditions.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy for 60(26), cotton. for 61(2); Wal. for 62(106). (c). 44.8 kg./ha. of N+22.4 kg./ha. of  $P_2O_5$ . (ii) Black clay loam. (iii) 21,22.7.1960., 9 to 11.7.1961., 30.7.1962. (iv) (a) 2 ploughings +2 harrowings for 62(106); 3 to 5 ploughings for others. (b) Transplanting. (c) 17 kg./ha. for 62(106); N.A. for others. (d) 25 cm. x 25 cm. (e) 3 for 62(106); N.A. for others. (vi) 12.4 C.L./ha. of F.Y.M. for 61(2); Nil for others. (vii) As per treatments. (viii) Irrigated. (ix) 1 to 2 interculturings. (x) 117 cm., 178 cm., 135 cm. (xi) 23,25.10.1960., 25.10.1961 and 6.11.1961; 30.10.1962.

**2. TREATMENTS :**

**Main-plot treatments :**

4 varieties :  $V_1$ =Koda 176-12,  $V_2$ =Z-31,  $V_3$ =E.K.-70 and  $V_4$ =K-42.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=44.8$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=22.4$  Kg/ha.

N applied in two equal doses :  $\frac{1}{2}$  at sowing along with  $P_2O_5$  by broadcast and 2nd half one month after planting.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m. x 6.4 m. (b) 9.1 m. x 4.6 m. (v) 91 cm. x 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959-1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. no. 59(58) have also been included for giving combined results. Errors are homogeneous and Treatments x years interaction is absent.

**5. RESULTS :**

(i) 2520 kg./ha. (ii) (a) 553.9 kg./ha. (45 d.f. made up of pooled error and Treatments x years interaction). (b) 156.6 kg./ha. (27 d.f. made up of various components of Treatments x years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$V_4$	$P_0$	$P_1$	Mean
$N_0$	1786	1742	1813	1931	1794	1842	1818
$N_1$	3258	3294	3113	3223	3210	3234	3222
Mean	2522	2518	2463	2577	2502	2538	2520
$P_0$	2476	2488	2454	2590			
$P_1$	2568	2548	2472	2564			

C.D. for N marginal means=80.4 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref. :- Gj. 60(61), 61(3), 62(113).**

**Site :- Trial-cum-Demons. Farm, Chikhli.**

**Type :- 'MV'.**

**Object :-**To find out the response of different varieties of Paddy to manuring.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat or Wal. for 62(113) ; Paddy—Wal for others. (b) Wheat for 62(113) ; Wal for others. (c) 24.7 C.L./ha. of F.Y.M. for 62(113) ; Nil for others. (ii) Deep black soil. (iii) 6.7.1960/6.8.1960 ; 30.6.1961/4.8.1961 ; 25.6.1962/2.8.1962. (iv) (a) 1 to 2 ploughings+2 harrowings. (b) Transplanting. (c) 17 Kg/ha. except for  $V_1$  in 60(61) it is 22 Kg/ha. (d) 25 cm.  $\times$  25 cm. (e) 4 for 62(113) ; N.A. for others. (v) 24.7 C.L./ha. of F.Y.M. for 62(113) ; 12.4 C.L./ha. of F.Y.M. for others. (vi) As per treatments (vii) Un-irrigated for 61(3) ; Irrigated for others. (viii) 1 to 2 weedings+2 interculturings. (ix) 151 cm., 200 cm., 139 cm. (xi) 25.10.1960 and 8.11.1960 ; 22.11.1961 ; 18,19.11.1962.

## 2. TREATMENTS :

## Main-plot treatments :

4 varieties :  $V_1$ =Koda 176—12,  $V_2$ =Z—31,  $V_3$ =E.K.—70 and  $V_4$ =K—42.

## Sub-plot treatments :

All combinations of (1) and (2).

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=44.8$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as super :  $P_0=0$  and  $P_1=22.4$  Kg/ha.

## 3. DESIGN :

(i) Split plot. (ii) (a) 4 main plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10.7m.  $\times$  4.6 m. (b) 9.1 m.  $\times$  3.0 m. (v) 76 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal ; Crop lodged completely due to heavy rains and wind for 61(3) on 28.9.1961. (ii) Attack of crows and catter-pillers for 61(3). No incidence for others. (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Nil. (v) N.A. (vi) Crop suffered due to moisture deficiency at proper time for 60(61) ; Abnormal season and insufficient rains affected the crop in 62(113). (vii) Sub-plot errors are heterogeneous and therefore the results of individual years are given below.

## 5. RESULTS :

## 60(61) :

(i) 1830 Kg/ha. (ii) (a) 1139.3 Kg/ha. (b) 409.4 Kg/ha. (iii) Only main effect of N is highly significant (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$V_4$	$P_0$	$P_1$	Mean
$N_0$	1883	1904	1292	1237	1569	1588	1579
$N_1$	2415	2424	1967	1520	1901	2262	2081
Mean	2149	2164	1629	1378	1735	1925	1830
$P_0$	2028	2206	1463	1243			
$P_1$	2271	2121	1796	1514			

C.D. for N marginal means=207.8 Kg/ha.

## 61(3) :

(i) 2489 Kg/ha. (ii) (a) 540.3 Kg/ha. (b) 406.9 Kg/ha. (iii) Only main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$V_4$	$P_0$	$P_1$	Mean
$N_0$	2041	1898	1875	1955	1913	1971	1942
$N_1$	3005	3081	3120	2939	2973	3100	3036
Mean	2523	2489	2497	2447	2443	2535	2489
$P_0$	2422	2517	2452	2381			
$P_1$	2624	2462	2543	2513			

C.D. for N marginal means=206.3 Kg/ha.

62(113) :

(i) 2670 Kg/ha. (ii) (a) 562.5 Kg/ha. (b) 205.9 Kg/ha. (iii) Main effect of N and interaction  $V \times N$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	1731	1834	1983	2202	1931	1944	1938
N <sub>1</sub>	3229	3552	3588	3243	3438	3368	3403
Mean	2480	2693	2786	2722	2684	2656	2670
P <sub>0</sub>	2453	2727	2781	2776			
P <sub>1</sub>	2507	2659	2790	2668			

C.D. for N marginal means = 104.5 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 64(268), 65(35)**

**Site :- Agri. Res. Stn., Dohad.**

**Type :- 'MV'.**

Object :—To find out the suitable variety of Paddy and manurial dose for the tract.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy ; Wheat. (c) 269.0 Kg. of N+134.5 Kg. of P<sub>2</sub>O<sub>5</sub>+269 Kg. K<sub>2</sub>O/ha ; 50.4 Kg. of N+24.7 Kg. P<sub>2</sub>O<sub>5</sub>/ha. (ii) Medium black. (iii) 18.8.64 ; 25.8.65. (iv) (a) 4 ploughings ; 1 ploughing+2 puddlings. (b) Transplanting. (c)—. (d) 30.5 cm.×15.2 cm. (e) One plant/hill. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 interculturings. (ix) 49.1 cm. ; 33.7 cm. (x) 23.11.64 ; 6.12.65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 manurial treatments ;—M<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of K<sub>2</sub>O ; M<sub>2</sub>=89.7 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+89.7 Kg/ha. of K<sub>2</sub>O and M<sub>3</sub>=134.5 Kg/ha. of N+67.2 Kg/ha of P<sub>2</sub>O<sub>5</sub>+134.5 Kg/ha of K<sub>2</sub>O.

**Sub-plot treatments :**

4 varieties : V<sub>1</sub>=CH. 55, V<sub>2</sub>=CH-62, V<sub>3</sub>=BM-5, V<sub>4</sub>=S.K.-20.

**3. DESIGN :**

(i) Split—plot. (ii) (a) 3 Main plot/rep., 4 sub-plot/Main-plot. (b) —. (iii) 4. (iv) (a) 7.3 m.×2.4 m. (b) 6.1 m.×1.8 m. (v) 61.0 cm.×30.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Attack of shoot borer ; Nil. (iii) Yield of grain. (iv) (a) 1964 and 1965. (b) No. (c) Nil. (v) Nil. (vi) —. (vii) As the sub-plot error variances are heterogeneous the results of the individual experiments are given below.

**5. RESULTS :**

**64(268)**

(i) 3885 Kg/ha. (ii) (a) 762.9 Kg/ha. (b) 558.6 Kg/ha. (ii) Only the main effect of V is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
V <sub>1</sub>	3543	3139	3476	3386
V <sub>2</sub>	3947	4126	3879	3986
V <sub>3</sub>	3722	4306	4732	4253
V <sub>4</sub>	3633	3790	4328	3917
Mean	3711	3840	4104	3885

C.D. for V marginal means=468.1 Kg/ha.

65(35)

(i) 3418 Kg/ha. (ii) (a) 805.5 Kg/ha. (b) 313.9 Kg/ha. (iii) Only the main effect of V is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
V <sub>1</sub>	2960	3095	3610	3222
V <sub>2</sub>	3588	3655	3521	3588
V <sub>3</sub>	3229	3431	3162	3274
V <sub>4</sub>	3050	3879	3835	3588
Mean	3207	3515	3532	3418

C.D. for V marginal means=263.1 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 64(57).**

**Site :- Agri. Res. Stn., Vyara.**

**Type :- 'MV'**

**Object :-** To find out the suitable variety and fertilizer dose for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+G.M. (ii) Black soil. (iii) 11.6.64. (iv) (a) 2 puddlings and 1 planking. (b) Transplanting. (c) 19.8 Kg/ha. (d) 30.5 cm. × 15.2 cm. (e) 3—4. (v) 12.4 C.L./ha. of F.Y.M.+G.M. from sesbania. (vi) As per treatments. (vii) Irrigated. (viii) 2 interculturing. (ix) 195.4 cm. (x) 8 to 25.10.64.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+44.8 Kg/ha. of K<sub>2</sub>O as Pot. Sul.  
M<sub>2</sub>=two times M<sub>1</sub> and M<sub>3</sub>=3 times M<sub>1</sub>.

**Sub-plot treatments :**

4 varieties : V<sub>1</sub>=S.K.—20, V<sub>2</sub>=B.M.—No 5, V<sub>3</sub>=CH—62 and V<sub>4</sub>=CH—55.

**3. DESIGN :**

(i) Split—plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main—plot. (b) N.A. (iii) 4. (iv) 7.3 m. × 2.4 m. (v) 6.1 m. × 1.8 m. (vi) 61.0 cm. × 30.5 cm. (vii) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1964. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 4099 Kg/ha. (ii) (a) 600.6 Kg/ha. (b) 314.0 Kg/ha. (iii) Effect of V alone is significant. (iv) Av. yield of grain in Kg/ha.



	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	Mean
M <sub>1</sub>	3533	4236	3805	4169	3936
M <sub>2</sub>	4088	4911	4314	4091	4351
M <sub>3</sub>	3872	4597	3779	3794	4010
Mean	3831	4581	3966	4018	4099

C.D. for V marginal means = 263.1 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(113), 64(44), 65(128).**

**Site :- Trial-Cum-Demons. Farm, Bardoli. Type :- 'C'**

Object :—To find out the best time of transplanting Paddy crop.

1. **BASAL CONDITIONS :**

(i) (a) Nil for 63(113); Paddy—Paddy for others. (b) Maize for 63(113); Paddy for others. (c) 112.1 Kg/ha. of N+89.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of K<sub>2</sub>O. for 63(113); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(44); 61.7 Kg/ha. of N+37.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(128). (ii) Clay loam for 63(113), 64(44); Black soil for 65(128). (iii) As per treatments. (iv) (a) Nil for 63(113), 64(44); 2 ploughings and 1 planking for 65(128). (b) Transplanting. (c) 19.8 Kg/ha. for 63(113), 64(44); 24.7 Kg/ha. for 65 (128). (d) 15 cm. × 15 cm. for 63(113), 64(44); 30 cm. × 15 cm. for 65(128). (e) 1 to 2 seedlings/hole. (v) 44.8 Kg/ha. of N in two doses+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(113); 12.4 C.L./ha. of F.Y.M. for 64(44); 12.4 C.L./ha. of F.Y.M.+61.7 Kg/ha. of N+37.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(128). (vi) Z-31 (late). (vii) Irrigated. (viii) Nil for 63(113), 64(44); 2 weedings and interculturings for 65(128). (ix) 139 cm; 224 cm.; 106 cm. (x) 3.11.1963; 22, 27.10.64, 1.11.1964; 27.10.1965.

2. **TREATMENTS :**

5 dates of transplanting : D<sub>1</sub>=8th July, D<sub>2</sub>=15th July, D<sub>3</sub>=23rd July, D<sub>4</sub>=30th July and D<sub>5</sub>=8th August.

3. **DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 9.8 m. × 5.2 m. (b) 9.1 m. × 4.6 m. (v) 30 cm. × 30 cm. (vi) Yes.

4. **GENERAL :**

(a) (i) Good. (ii) Nil but Endrex was applied once for 63(113) only. (iii) Grain and fodder yield. (iv) 1963–65. (b) No. (c) Results of combined analysis presented under 5. Results. (v) N.A. (vi) Nil. (vii) Errors are homogeneous and Treatments × years interaction is present.

5. **RESULTS :**

(i) 2982 Kg/ha. (ii) 838.2 Kg/ha. (8 d.f. made up of interaction of Treatments with years). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>
Av. yield	3449	3339	3030	2657	2434

C.D. = 644.3 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(14), 64(53), 65(3).**

**Site :- Trial-cum-Demons. Sta., Chikhli.**

**Type :- 'C'.**

Object :—To assess the optimum planting period for Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat. (b) Gram and Wal ; Gram ; Wheat. (c) Nil. (ii) Deep-black. (iii) As per treatments. (iv) (a) 2 ploughings, 1-2 harrowing. (b) Transplanting. (c) 22.4 Kg/ha. ; N.A. (d) 15.2 cm. × 15.2 cm. (e) 3. (v) 12.4 C.L. of F.Y.M. + 44.8 Kg. of N + 22.4 Kg. of  $P_2O_5$ /ha. (vi) Z-31 (Mid.-late). (vii) Irrigated. (viii) 2 weedings + 2 hoeings ; Nil ; 2 interculturings. (ix) 211.2 cm. ; 222.2 cm ; 139.4 cm. (x) 5.11.63 ; 10.11.64 ; 3.11.65.

## 2. TREATMENTS :

5 dates of transplanting :  $D_1=8$ th July,  $D_2=16$ th July,  $D_3=23$ rd July,  $D_4=31$ st July and  $D_5=7$ th August.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 25.9 m. × 9.8 m. (iii) 6. (iv) (a) 9.8 m. × 5.2 m. (b) 9.1 m. × 4.6 m. (v) 30.5 cm. × 30.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Errors are homogeneous and Treatments × years inter action is absent.

## 5. RESULTS :

(i) 3094 Kg/ha. (ii) 285.5 Kg/ha. [60 d.f. made up of pooled error]. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$D_1$	$D_2$	$D_3$	$D_4$	$D_5$
Av. yield	3561	3682	2982	2861	2386

C.D. = 190.3 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(94).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type :- 'C'.**

Object :—To study the effect of different methods of sowing on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 67.2 Kg/ha. of N + 39.2 Kg/ha. of  $P_2O_5$  as Super. (ii) Black soil. (iii) 22.6.60. (iv) (a) 1 ploughing and 1 harrowing. (b) As per treatments. (c) 33.6 Kg/ha. (d) As per treatments. (e) N.A. (v) 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (vi) Sathi 34—36. (vii) Irrigated. (viii) 1 weeding. (ix) 66.6 cm. (x) 12.10.60.

## 2. TREATMENTS :

3 cultural treatments :  $C_1=30.5$  cm. apart sowing without thinning,  $C_2=30.5$  cm. × 15.2 cm. dibbling and  $C_3=32.5$  cm. apart sowing and thinning.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) 30.5 m × 3.7 m. (b) 27.4 m. × 3.7 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) and (b) No. (c) Nil. (v) N.A. (vi) Abnormal season. (vii) Nil.

## 5. RESULTS :

(i) 1861 Kg/ha. (ii) 363.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$C_1$	$C_2$	$C_3$
Av. yield	1830	2102	1650

**Crop :- Paddy (Kharif).****Ref :- Gj. 62(231), 63(258), 64(276).****Site :- Agri. Res. Stn., Nawagam.****Type :- 'C'.**

Object :—To study the effect of different instruments for cultural operations on Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black soil. (iii) 6.7.1962/4.8.1962 ; 28.6.1963/3.8.1963 ; 8.7.1964/11.8.1964. (iv) (a) 2 ploughings and 1 puddling. (b) Transplanting. (c) 123 Kg/ha in nursery bed. (d) 30 cm. × 20 cm. (e) 1. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) J—280 (late). (vii) Irrigated. (viii) As per treatments. (ix) 95 cm., 88 cm. ; 57 cm. (x) 25.11.1962 ; 20.11.1963 ; 16.12.1964.

**2. TREATMENTS :****Main-plot treatments :**

5 instruments of operation :  $I_0$ =Control (no operation),  $I_1$ =Karjat hoe,  $I_2$ =Nilokheri weeder and  $I_3$ =Nilokheri weeder+ridger and  $I_4$ =Hand weeding.

**Sub-plot treatments :**

3 frequencies of operations :  $F_1$ = one operation after 45 days of transplanting,  $F_2$ =2 operations after 30 and 60 days of transplanting and  $F_3$ =3 operations after 20, 40 and 60 days of transplanting.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 5 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) 6.1 m. × 3.7 m. (b) 4.9 m. × 3.3 m. (v) 61 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—1964. (b) No. (c) Results of combined analysis given under 5 Results. (v) Nil. (vi) Stray storm was observed for 63(258). (vii) Errors are homogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

(i) 3462 Kg/ha. (ii) (a) 415.7 Kg/ha. (44 d.f. made up of pooled error and Treatments × years interaction). (b) 374.4 Kg/ha. (c) 106 d.f. made up of pooled error and various components of Treatments × years interaction). (iii) Main effect of I alone is significant. (iv) Av. yield of grain in Kg/ha.

 $I_0$  (Control) = 3366 Kg/ha.

	$I_1$	$I_2$	$I_3$	$I_4$	Mean
$F_1$	3401	3346	3355	3506	3402
$F_2$	3478	3302	3648	3765	3548
$F_3$	3422	3405	3561	3639	3507
Mean	3434	3351	3521	3637	3486

C.D. for I marginal means=213.5 Kg/ha.

**Crop :- Paddy.****Ref :- Gj. 63(255), 64(273), 65(41).****Site :- Agri. Res. Stn., Nawagam.****Type :- 'C'.**

Object :—To find out the suitable spacings and No. of seedlings/hill for Paddy.

## 1. BASAL CONDITIONS :

(i)(a)Paddy—Paddy. (b) Paddy. (c) 44.8 Kg. of N+22.4 Kg. of  $P_2O_5$ /ha. (ii) Medium black. (iii) 2.6.63 ; 6.7.64 ; 9.7.65. (iv) (a) 2 ploughings and 1 puddling. (b) Transplanting. (c) 123.3 Kg/ha. in nursery bed. (d) As per treatments. (e) N.A. (v) 12.4 of C.L. F.Y.M.+44.8 Kg. of N+22.4 Kg. of  $P_2O_5$ /ha. (vi) S.K. 20 (early). (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 87.7 cm. ; 56.5 cm. ; 40.5 cm. (x) 20.11.63 ; 20.10.64 ; 11.10.65.

## 2. TREATMENTS :

## Main-plot treatments :

6 spacings :  $S_1=15.2$  cm.  $\times$   $15.2$  cm.  $S_2=20.4$  cm.  $\times$   $15.2$  cm.,  $S_3=20.4$  cm.  $\times$   $20.4$  cm.,  $S_4=25.4$  cm.  $\times$   $20.4$  cm.  $S_5=30.5$  cm.  $\times$   $15.2$  cm. and  $S_6=30.5$  cm.

## Sub-plot treatments :

No. of seedling/hill :  $H_1=1$ ,  $H_2=2$  and  $H_3=3$  seedling/hill.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main—plots/replication., 3 sub—plot/Main—plot. (b) N.A. (iii) 4. (iv) 6.1 m.  $\times$  3.7 m., 3.8 m., 3.9 m., 4.1 m., 4.3 m., 4.3 m. for  $S_1$ ,  $S_2$ ,  $S_3$ ,  $S_4$ ,  $S_5$ ,  $S_6$  respectively. (b) 4.9 m.  $\times$  3.1 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963—contd. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the experiment is continued beyond 1965., the individual results are given below.

## 5. RESULTS :

## 63(255)

(i) 3422 Kg/ha. (ii) (a) 292.0 Kg/ha. (b) 215.3 Kg/ha. (iii) Only the main effect of H is highly significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$H_1$	3465	3313	3280	3010	3364	3027	3243
$H_2$	3700	3549	3296	3549	3296	3515	3484
$H_3$	3750	3700	3448	3347	3582	3414	3540
Mean	3638	3521	3341	3302	3414	3319	3422

C.D. for H marginal means = 126.2 Kg/ha.

## 64(273)

(i) 3787 Kg/ha. (ii) (a) 384.8 Kg/ha. (b) 525.4 Kg/ha. (iii) Main effects of S and H are highly significant (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$H_1$	3633	3717	3633	3616	3128	2977	3451
$H_2$	4390	4255	3481	3818	3919	3364	3871
$H_3$	3835	4524	3767	4070	4289	3750	4039
Mean	3953	4165	3627	3835	3779	3364	3787

C.D. for S marginal means=334.8 Kg/ha.

C.D. for H marginal means=307.9 Kg/ha.

## 65(41)

(i) 3957 Kg/ha. (ii) (a) 736.0 Kg/ha. (b) 387.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	Mean
H <sub>1</sub>	4137	3750	4255	3565	4003	3347	3843
H <sub>2</sub>	4120	4003	4238	4003	4154	3532	4008
H <sub>3</sub>	4171	3885	4221	4104	3868	3868	4019
Mean	4143	3879	4238	3891	4008	3582	3957

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(256), 64(274), 65(42).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'C'.**

**Object :-** To find out the suitable spacing and No. of seedlings/hill for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Paddy. (b) Paddy. (c) 44.8 Kg. of N+22.4 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. (ii) Medium black. (iii) 28.6.63 ; 8.7.64 ; 13.7.65. (iv) (a) 2 ploughings and one puddling. (b) Transplanting. (c) 123.3 Kg/ha. in nursery bed. (d) As per treatments. (e) Nil. (v) 12.4 C.L. of F.Y.M.+44.8 Kg. of N+22.4 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. (vi) J—280 (late). (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 87.7 cm. ; 56.5 cm ; 40.5 cm. (x) 20.11.63 ; 23.11.64 ; 23.11.65.

**2. TREATMENTS :**

**Main-plot treatments :**

6 spacings : S<sub>1</sub>=15.2 cm.×15.2 cm., S<sub>2</sub>=20.4 cm.×15.2 cm., S<sub>3</sub>=20.4 cm.×20.4 cm., S<sub>4</sub>=25.4 cm.×20.4 cm., S<sub>5</sub>=30.5 cm.×15.2 cm. and S<sub>6</sub>=30.5 cm.×20.4 cm.

**Sub-plot treatments :**

3 No. of seedlings/hill : H<sub>1</sub>=1, H<sub>2</sub>=2 and H<sub>3</sub>=3 seedlings/hill.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 6 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
(iv) (a) 6.1 m.×3.7 m.,	3.8,	3.9,	4.1,	4.3	4.3	
(b) 4.9 m.×3.1 m. (v) Nil. (vi) Yes.						

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963—contd. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Expt. continued beyond 1965, therefore results of individual year are presented below.

**5. RESULTS :**

**63(256)**

(i) 4478 Kg/ha. (ii) (a) 338.4 Kg/ha. (b) 340.4 Kg/ha. (iii) Only the main effect of S is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	Mean
H <sub>1</sub>	4625	4502	4369	4457	4176	4112	4373
H <sub>2</sub>	5054	4378	4718	4630	4302	3939	4503
H <sub>3</sub>	4605	4470	4364	4874	4608	4432	4559
Mean	4761	4450	4484	4654	4362	4161	4478

C.D. for S marginal means=294.5 Kg/ha.

**64(274)**

(i) 3538 Kg/ha. (ii) (a) 325.6 Kg/ha. (b) 368.7 Kg/ha. (iii) Only the effect of interaction S×H is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	Mean
H <sub>1</sub>	3734	3515	3818	3633	3162	3414	3546
H <sub>2</sub>	3767	3078	3801	3650	3515	3481	3549
H <sub>3</sub>	3078	3313	3448	3818	3683	3784	3521
Mean	3526	3302	3689	3700	3453	3560	3538

C.D. for H means at the same level of S=529.3 Kg/ha.

C.D. for S means at the same level of H=516.4 Kg/ha.

65(42)

- (i) 3284 Kg/ha. (ii) (a) 200.5 Kg/ha. (b) 280.8 Kg/ha. (iii) Only the main effect of S is highly significant.  
(iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>	Mean
H <sub>1</sub>	3532	3465	3565	3330	3212	2994	3350
H <sub>2</sub>	3448	3296	3330	3263	3044	3027	3235
H <sub>3</sub>	3263	3565	3145	3145	3095	3397	3268
Mean	3414	3442	3347	3246	3117	3139	3284

C.D. for S marginal means=174.4 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(25), 61(1), 62(12).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'CM'.**

**Object :-** To study the effect of graded doses of N, P and K with different spacings on Paddy.

#### 1. BASAL CONDITIONS :

- (i) (a) Paddy-Wal-Paddy for 62(12) ; Nil for others. (b) Paddy for 60(25) ; Sugarcane for 61(1) ; Wal and Sann for 62(12). (c) 24.7 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60(25) ; Nil for others. (ii) Black soil. (iii) 28, 29.7.1960 ; 13 to 16.7.1961 ; 19 to 22.7.1962. (iv) (a) 4 ploughings for 61(1) ; 1 to 2 ploughings+2 harrowings for others. (b) Transplanting. (c) 17 Kg/ha. (d) 15 cm. between plants. Row spacing as per treatments. (e) Nil. (v) Nil. (vi) Z-31. (vii) Unirrigated for 60(25) ; Irrigated for others. (viii) 2 to 4 interculturings. (ix) 117 cm., 178 cm., 135 cm. (x) 26, 27.10.1960 ; 2.11.1961 ; 13, 14.11.1962.

#### 2. TREATMENTS :

All combinations of (1), (2), (3) and (4).

- (1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=44.8 and N<sub>2</sub>=89.7 Kg/ha.  
(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=44.8 and P<sub>2</sub>=89.7 Kg/ha.  
(3) 3 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0, K<sub>1</sub>=44.8 and K<sub>2</sub>=89.7 Kg/ha.  
(4) 3 row spacings : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.

#### 3. DESIGN :

- (i) 3<sup>4</sup> confd. (ii) (a) 9 plots/block ; 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 7.3 m. × 5.5 m. (b) 6.4 m. × 3.7 m. (v) 46 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

- (i) Satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959—1962. (b) No. (c) Results of combined analysis given under 5. Results. (v) Chikhli. (b) Nil. (vi) Nil. (vii) Results of expt. no. 59(66) have also been included for giving combined results. Errors are heterogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

60(25)

(i) 2832 Kg/ha. (ii) 350.3 Kg/ha. (iii) N effect is highly significant. Interactions P×K and K×S are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>0</sub>	2429	3327	2663	2915	2539	2964	2959	2760	2700	2806
P <sub>1</sub>	2525	3421	2798	2881	3055	2808	2996	2875	2873	2915
P <sub>2</sub>	2540	3148	2641	2658	2922	2751	2836	2642	2853	2776
Mean	2498	3299	2700	2818	2839	2841	2930	2759	2809	2832
S <sub>1</sub>	2630	3317	2846	3101	2739	2950				
S <sub>2</sub>	2521	3138	2617	2491	2967	2819				
S <sub>3</sub>	2345	3441	2637	2862	2811	2753				
K <sub>0</sub>	2407	3309	2738							
K <sub>1</sub>	2545	3367	2604							
K <sub>2</sub>	2541	3221	2760							

C.D. for any marginal mean =192.6 Kg/ha.

C.D. for body of any table =333.8 Kg/ha.

61(1)

(i) 2900 Kg/ha. (ii) 457.5 Kg/ha. (iii) Main effects of N and K are highly significant. Interaction K×S is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>0</sub>	1960	2947	3768	2999	2677	2999	3070	2691	2914	2892
P <sub>1</sub>	1737	3241	3787	2900	2876	2989	2900	2966	2900	2922
P <sub>2</sub>	2122	3180	3355	3265	2439	2952	2947	2776	2933	2885
Mean	1939	3123	3637	3055	2664	2980	2972	2811	2916	2900
S <sub>1</sub>	2183	3156	3578	3151	2842	2923				
S <sub>2</sub>	1946	2976	3512	2976	2283	3175				
S <sub>3</sub>	1689	3237	3820	3038	2866	2842				
K <sub>0</sub>	2245	3057	3863							
K <sub>1</sub>	1708	2814	3469							
K <sub>2</sub>	1865	3498	3578							

C.D. for any marginal mean =251.8 Kg/ha.

C.D. for body of any table =435.9 Kg/ha.

62(12)

(i) 3518 Kg/ha. (ii) 628.3 Kg/ha. (iii) N effect alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>1</sub>	3028	3602	3934	3446	3688	3431	3398	3721	3446	3522
P <sub>2</sub>	3109	3673	3830	3550	3303	3759	3417	3241	3953	3537
P <sub>3</sub>	2876	3721	3892	3289	3526	3673	3607	3659	3222	3496
Mean	3004	3665	3885	3428	3506	3621	3474	3540	3541	3518
S <sub>1</sub>	3123	3389	3911	3498	3469	3455				
S <sub>2</sub>	3184	3753	3683	3298	3588	3735				
S <sub>3</sub>	2705	3854	4063	3488	3460	3673				
K <sub>0</sub>	3028	3740	3517							
K <sub>1</sub>	3018	3460	4039							
K <sub>2</sub>	2966	3797	4100							

C.D. for marginal mean = 345.5 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(60), 61(7), 62(13).**

**Site :- Trial-cum-Demons. Farm, Chikhli.**

**Type :- 'CM'.**

**Object :-** To study the effect of graded doses of N, P, and K with different spacings on Paddy.

#### 1. BASAL CONDITIONS :

(i) (a) Paddy—*Wal*—Paddy for 62(13) ; Nil for others. (b) Wheat for 61(7) ; *Wal* for others. (c) Nil.  
(ii) Black for 62 (13) ; Deep black for others. (iii) 4.7.1960/28.7.1960 ; 24.6.1961/17.7.1961 ; N.A.  
26 to 28.7.1962. (iv) (a) 2 ploughings + 2 harrowings. (b) Transplanting. (c) N.A. (d) Between plants :  
15 cm ; Between rows : As per treatments. (e) Nil. (v) Nil. (vi) Z-31. (vii) Unirrigated for 61(7) ;  
Irrigated for others. (viii) 2 to 3 weedings. (ix) 151 cm. ; 200 cm. ; 138 cm. (x) 13.11.1960 ; 15.11.1961 ;  
20.11.1962.

#### 2. TREATMENTS :

All combinations of (1), (2), (3) and (4).

- (1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=44.8 and N<sub>2</sub>=89.7 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=44.8 and P<sub>2</sub>=89.7 Kg/ha.
- (3) 3 levels of K<sub>2</sub>O as Pot. Sul : K<sub>0</sub>=0, K<sub>1</sub>=44.8 and K<sub>2</sub>=89.7 Kg/ha.
- (4) 3 row spacings : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.

#### 3. DESIGN :

(i) 3<sup>4</sup> confd. (ii) (a) 9 plots/block , 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 7.3 m. × 5.5 m. (b)  
5.5 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal lodging of crop after maturity for 60(60) ; Complete lodging of crop due to heavy rains  
and wind on 28.9.1961 and 7.10.1961 for 61(7). (ii) Light attack of stem borer for 60(60) ; Slight attack  
of crops and catter pillers for 61(7) ; Slight attack of catter pillers and red leaf spot. (iii) Yield of  
grain. (iv) (a) 1959—1962. (b) No. (c) Nil. (v) Bardoli. (vi) Insufficient and irregular rains scorching  
heat and warm climate affected the crop for 62(13). (vii) Errors are heterogeneous. Interactions are  
not all present. Hence results of individual years are presented.



## 5. RESULTS :

60(60)

(i) 2582 Kg/ha. (ii) 368.0 Kg/ha. (iii) Only N effect is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>0</sub>	1757	2672	3092	2362	2486	2672	2439	2507	2575	2507
P <sub>1</sub>	2055	2725	2978	2642	2610	2507	2496	2798	2466	2586
P <sub>2</sub>	2000	2818	3144	2626	2595	2739	2615	2672	2673	2654
Mean	1937	2738	3071	2543	2564	2639	2517	2659	2571	2582
S <sub>1</sub>	1864	2714	2972	2455	2605	2491				
S <sub>2</sub>	1834	2896	3247	2673	2683	2621				
S <sub>3</sub>	2114	2605	2994	2502	2403	2808				
K <sub>0</sub>	1880	2637	3113							
K <sub>1</sub>	1895	2672	3123							
K <sub>2</sub>	2035	2905	2978							

C.D. for any marginal mean = 202.4 Kg/ha.

61(7)

(i) 2783 Kg/ha. (ii) 343.6 Kg/ha. (iii) Main effects of N, S and interaction N×S are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>0</sub>	1689	3273	3233	2691	2808	2696	2742	2853	2601	2732
P <sub>1</sub>	1734	3444	3243	2882	2692	2847	2614	3088	2719	2807
P <sub>2</sub>	1983	3228	3224	2902	2674	2858	2730	3035	2670	2812
Mean	1802	3315	3233	2825	2725	2800	2695	2992	2663	2783
S <sub>1</sub>	1834	3356	2896	2653	2670	2764				
S <sub>2</sub>	1745	3544	3685	3149	2819	3008				
S <sub>3</sub>	1828	3045	3116	2674	2687	2628				
K <sub>0</sub>	1861	3356	3259							
K <sub>1</sub>	1794	3322	3058							
K <sub>2</sub>	1751	3267	3382							

C.D. for any marginal mean = 188.9 Kg/ha.

C.D. for body of any table = 327.3 Kg/ha.

62(13)

(i) 2541 Kg/ha. (ii) 221.1 Kg/ha. (iii) Only N effect is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>0</sub>	1423	2568	3261	2413	2431	2408	2497	2424	2331	2417
P <sub>1</sub>	1528	2857	3377	2669	2591	2502	2552	2486	2724	2587
P <sub>2</sub>	1684	2878	3294	2573	2580	2703	2625	2623	2608	2619
Mean	1545	2768	3311	2551	2534	2538	2558	2511	2554	2541
S <sub>1</sub>	1468	2807	3399	2675	2569	2430				
S <sub>2</sub>	1589	2561	3383	2455	2475	2603				
S <sub>3</sub>	1578	2935	3150	2525	2558	2580				
K <sub>0</sub>	1506	2876	3273							
K <sub>1</sub>	1545	2780	3277							
K <sub>2</sub>	1584	2647	3382							

C.D. for N marginal mean = 121.8 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62(33), 63(15), 64(52), 65(1).**

**Site :- Trial-cum-Demons. Stn., Chikhli.**

**Type :- 'CM'.**

**Object :-** To study the economics of local vs. improved methods of Paddy cultivation and its effects on soil fertility at a fixed site.

**1. BASAL CONDITIONS :**

(i) (a) Paddy—Wal. (b) Wal. (c) Nil. (ii) Deep black. (iii) 25.6.62/16.8.62 ; 19.6.63/2.8.63, 20.6.64/3.8.64, N.A./9.8.65. (iv) (a) 2 ploughings, 1 harrowing. (b) Transplanting. (c) to (e) As per treatments. (v) Nil. (vi) K-42 (late). (vii) Irrigated. (viii) 2 weedings, 2 hoeings and 3 interculturings. (ix) 138 cm., 212 cm., 222 cm., 139 cm. (x) 28.11.62, 21.11.63, 27.11.64, 22.11.65.

**2. TREATMENTS :**

2 methods of planting : M<sub>1</sub>=Local method : 24.7 C.L./ha. of F.Y.M. 90 Kg/ha. of seeds. Seedlings raised irregular planting without any fertilizer and M<sub>2</sub>=Improved method : 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N as A/S in two doses+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super in one dose.

25 cm. × 25 cm. spacings with 3 seedlings planted by Japanese method.

**3. DESIGN :**

(i) Paired plot. (ii) (a) 2. (b) 45.7 m. × 22.9 m. (iii) 2. (iv) (a) 22.9 m. × 22.9 m. (b) 20.1 m. × 20.1 m. (v) 1 37 cm. × 137 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Light attack of catter-pillers for 63(15). slight attack of top shoot borers for 64(52). (iii) Yield of grain. (iv) (a) 1962—contd. (b) Yes. (c) Nil. (v) N.A. (vi) Heavy rains for 62(33). (vii) Nil.

**5. RESULTS :**

**62(33)**

(i) 2175 Kg/ha. (ii) 553.5 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	2041	2310

**63(15)**

(i) 2809 Kg/ha. (ii) 341.0 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	2713	2906

**64(52)**

(i) 2957 Kg/ha. (ii) 203.9 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	2791	3123

**65(1)**

(i) 3066 Kg/ha. (ii) 406.5 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	2907	3225

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(13), 61(123), 62(120), 63(126), 64(61).**

**Site :- Agri. Res. Stn., Dabhoi. Type :- 'CM'.**

Object :—To find out the optimum spacing and manurial dose for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy. (c) 12.4 C.L./ha. of F.Y.M. for 60(13); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(120), 64(61); As per treatments for others. (ii) Medium black. (iii) 10.8.1960; 21.6.1961/13, 14.8.1961; 27.8.1962; 20.8.1963; 11.8.1964. (iv) (a) 2 to 3 ploughings+2 harrowings. One planking for 62(120). (b) Transplanting. (c) 25 Kg/ha. for 64(61); N.A. for others. (d) As per treatments. (e) N.A. for 60(13), 61(123); 2 for others. (v) Nil. (vi) E.K—70 (early) for 60(13); K—42 for others. (vii) Un-irrigated for 60(13); Irrigated for other. (viii) 1 weeding+5 interculturings for 60(13); Nil for 61(123); 2 weedings+2 interculturings for 62(120); 2 interculturing for others. (ix) 67 cm., 105 cm., 90 cm., 101 cm., N.A. (x) 30.10.1960; 20.11.1961; 7.12.1962; 15.12.1963; 12.12.1964.

**2. TREATMENTS :****Main-plot treatments**

4 spacings : S<sub>1</sub>=15 cm. × 15 cm., S<sub>2</sub>=30 cm. × 15 cm.; S<sub>3</sub>=25 cm. × 25 cm. and S<sub>4</sub>=30 cm. × 30 cm.

**Sub-plot treatments**

5 manurial treatments : M<sub>0</sub>=Control (no manure); M<sub>1</sub>=33.6 Kg/ha. of N, M<sub>2</sub>=67.2 Kg/ha. of N, M<sub>3</sub>=100.9 Kg/ha. of N and M<sub>4</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super were applied by broadcast.

**3. DESIGN :**

(i) Split—plot. (ii) (a) 4 main plots/replication; 5 sub-plots/main—plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 6.1 m. (b) 4.6 m. × 4.6 m. (v) 76 cm. × 76 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal for 60(13); Good for others. Crop for 63(126) lodged due to rains in November. Due to strong winds at maturity the crop lodged for 64(61). Attack of stem borer for 60(13). Endrex—20 was sprayed; No incidence for others but endrine was sprayed for 64(61). (iii) Yield of grain. (iv) (a) 1956—1964 (Expt. failed for 1956). (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Sub-plot errors are heterogeneous. Hence individual results are presented.

## 5. RESULTS :

60(13)

(i) 1583 Kg/ha. (ii) (a) 435.0 Kg/ha. (b) 321.2 Kg/ha. (iii) Main effects of M and S are highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
S <sub>1</sub>	1710	1830	1909	2209	2056	1945
S <sub>2</sub>	1063	1402	1810	1929	1676	1576
S <sub>3</sub>	1132	1539	1384	1875	1538	1494
S <sub>4</sub>	835	1328	1712	1365	1343	1317
Mean	1185	1525	1704	1845	1653	1583

C.D. for S marginal means=311.3 Kg/ha.

C.D. for M marginal means=228.7 Kg/ha.

61(123)

(i) 2973 Kg/ha. (ii) (a) 463.1 Kg/ha. (b) 331.4 Kg/ha. (iii) M effect is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
S <sub>1</sub>	2661	3205	3203	3479	3271	3164
S <sub>2</sub>	2521	3054	2851	3082	2959	2893
S <sub>3</sub>	2622	2772	3279	3279	3133	3017
S <sub>4</sub>	2784	2903	2751	2752	2903	2819
Mean	2647	2983	3021	3148	3066	2973

C.D. for M marginal means=235.9 Kg/ha.

62(120)

(i) 4927 Kg/ha. (ii) (a) 1996.0 Kg/ha. (b) 842.0 Kg/ha. (iii) M effect is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
S <sub>1</sub>	5226	4987	5765	5801	5406	5437
S <sub>2</sub>	4628	4042	4102	5382	4473	4525
S <sub>3</sub>	4198	4880	5059	4880	5047	4813
S <sub>4</sub>	4425	4808	4688	6076	4676	4935
Mean	4619	4679	4903	5535	4900	4927

C.D. for M marginal means=599.3 Kg/ha.

63(126)

(i) 3398 Kg/ha. (iii) (a) 438.7 Kg/ha. (b) 392.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
S <sub>1</sub>	3373	3349	3707	3911	3971	3662
S <sub>2</sub>	3241	3253	3193	3289	3492	3294
S <sub>3</sub>	3385	3444	3504	3229	3468	3406
S <sub>4</sub>	3241	3074	3265	3133	3444	3231
Mean	3310	3280	3417	3390	3594	3398

64(61)

(i) 3640 Kg/ha. (ii) (a) 529.1 Kg/ha. (b) 366.0 Kg/ha. (iii) M effect is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
S <sub>1</sub>	3050	3289	3719	3528	3648	3447
S <sub>2</sub>	3349	3947	3827	3971	3947	3809
S <sub>3</sub>	2811	3588	3708	3767	4126	3600
S <sub>4</sub>	2691	3349	3947	4246	4305	3708
Mean	2975	3543	3800	3876	4006	3640

C.D. for M marginal means = 260.5 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(81)**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'CM'**

Object :- To study the response of Paddy of Nitrogen doses and the methods of their application along with phosphate doses.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy. (c) 44.8 Kg/ha. of N. (ii) Medium black. (iii) 27.6.60. (iv) (a) 2 ploughings, 2 harrowings. (b) Hand sowing. (c) 33.6 Kg/ha. (d) 22.9 cm. between rows. (e) Nil. (v) Nil. (vi) S-29. (vii) Un-irrigated. (viii) 5 inter culturings. (ix) 79.6 cm. (x) N.A.

**2. TREATMENTS :**

All combinations of (1), (2) and (3) + 3 selective treatments.

(1) 3 levels of N : N<sub>1</sub>=33.6, N<sub>2</sub>=44.8 and N<sub>3</sub>=56.0 Kg/ha.

(2) 2 methods of application of N : M<sub>1</sub>=Broadcast, and M<sub>2</sub>=Placed 5.1 cm. deep.

(3) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=44.8 Kg/ha. N as A/S applied in 3 doses 27.6.1960, 29.7.60 and 8.9.60. P<sub>2</sub>O<sub>5</sub> as Super applied at sowing.

3 selective treatments are P<sub>0</sub>=Control, P<sub>1</sub>=33.6 and P<sub>2</sub>=44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 21. (b) N.A. (iii) 4. (iv) 6.7 m. × 4.6 m. (v) 5.5 m. × 3.7 m. (vi) 61.0 m. × 45.7 cm. (vii) Yes.

**4. GENERAL :**

(i) Fair. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1960. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1283 Kg/ha. (ii) 227.4 Kg/ha. (iii) N effect alone is highly significant. (iv) Av. yield of grain in Kg/ha.

selective treatments.  $P_0=1250$ ,  $P_1=1023$  and  $P_2=1348$ .

	$N_1$	$N_2$	$N_3$	$M_1$	$M_2$	Mean
$P_0$	1094	1412	1244	1195	1306	1250
$P_1$	1059	1397	1370	1297	1253	1275
$P_2$	1289	1426	1371	1314	1410	1362
Mean	1147	1412	1328	1268	1323	1296
$M_1$	1172	1365	1267			
$M_2$	1123	1458	1389			

C.D. for N marginal means = 131.3 Kg/ha.

**Crop :- Paddy (Kharif).**

**Site :- Central Exptl. Stn., Junagadh.**

**Ref :- Gj. 60(82).**

**Type :- 'CM'.**

Object :—To determine the optimum date of sowing, spacing and seed rate with different doses of N and P for Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sann and Wheat. (c) 44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) As per treatments. (iv) (a) 2 ploughings. (b) Hand sowing. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) S-29. (vii) Irrigated. (viii) 4 interculturings. (ix) 79.6 cm. (x) N.A.

## 2. TREATMENTS :

**Main-plot treatments**

All combinations of (1), (2) and (3).

(1) 3 dates of sowing :  $D_1=5.6.1960$ ,  $D_2=15.6.1960$  and  $D_3=25.6.1960$ .

(2) 3 spacing between rows :  $S_1=22.9$ ,  $S_2=30.5$  and  $S_3=46.7$  cm.

(3) 3 seed rates :  $R_1=22.4$ ,  $R_2=33.6$  and  $R_3=44.8$  Kg/ha.

**Sub-plot treatments**

All combinations of (1) and (2).

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=44.8$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=33.6$  Kg/ha.

N applied in 3 doses :  $\frac{1}{2}$  at sowing,  $\frac{1}{4}$  on 28.7.1960 and  $\frac{1}{4}$  on 8.9.1960.  $P_2O_5$  applied at sowing.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main plots/block, 3 blocks/replication, 4 sub-plots/main plot. (b) N.A. (iii) 1. (iv) (a) 6.7 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  3.7 m. (v) 61.0 cm.  $\times$  45.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Fair. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1958—60. (b) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1036 Kg/ha. (ii) (a) 349.5 Kg/ha. (b) 197.1 Kg/ha. (iii) Main effects of D, N and P are significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	1160	857	648	882	897	887	896	824	946	851	926	888
N <sub>1</sub>	1431	1117	1002	1161	1262	1128	1169	1133	1250	1137	1231	1184
Mean	1296	987	825	1022	1080	1007	1032	978	1098	994	1078	1036
P <sub>0</sub>	1263	912	806	955	1055	973	980	929	1073			
P <sub>1</sub>	1328	1063	844	1088	1105	1041	1084	1028	1123			
S <sub>1</sub>	1216	1051	828	979	1186	931						
S <sub>2</sub>	1293	845	796	921	985	1028						
S <sub>3</sub>	1376	1067	851	1165	1067	1061						
R <sub>1</sub>	1273	833	959									
R <sub>2</sub>	1366	972	901									
R <sub>3</sub>	1248	1160	614									

C.D. for D marginal means = 201.6 Kg/ha.

C.D. for N or P marginal means = 76.6 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62(230), 63(257), 64(275), 65(43).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'CM'.**

Object :- To study the effect of local vs. Departmental method of Paddy cultivation with a fixed rotation of Paddy-Wheat-Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Wheat (M<sub>2</sub>), Paddy-Paddy. (b) Paddy and Wheat. (c) Nil. (ii) Medium black soil. (iii) 7.7.62/1.8.62, 10.7.63/1.8.63, 8.7.64/8.8.64, 13.7.65/12.8.65. (iv) (a) 2 ploughings, 1 puddling. (b) Transplanting. (c) 123 Kg/ha. in nursery bed. (d) 30 cm. × 15 cm. in Departmental method only. (e) 1. (v) Nil. (vi) J-280 (late). (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 95 cm., 88 cm., 56 cm., 40 cm. (x) 20.11.62, 21.11.63, 19.11.64, 19.11.65.

**2. TREATMENTS :**

2 methods of Paddy cultivation : M<sub>1</sub> = Local method : 24.7 C.L./ha. of F.Y.M. and M<sub>2</sub> = Departmental method : 12.4 C.L./ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N applied in two equal doses 1st at transplanting, 2nd at tillering. P<sub>2</sub>O<sub>5</sub> at transplanting by broadcast.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 2. (iv) (a) 34.7 m. × 11.6 m. (b) 32.9 m. × 9.1 m. (v) 91 cm. × 122 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962-contd. (b) Yes. (c) Nil. (v) Nil. (vi) Stray storms in 63(257). (vii) Plot wise data N.A. in 62(230). Expt. continued beyond 1965.

**5. RESULTS :**

**62(230)**

(i) 4382 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	3582	5182

**63(257)**

(i) 3671 Kg/ha. (ii) 33.2 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	3833	3510

## 64(275)

(i) 3592 Kg/ha. (ii) 191.0 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	3455	3729

## 65(43)

(i) 4218 Kg/ha. (ii) 20.9 Kg/ha. (iii) Treatment difference is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	4352	4085

C.D. = 265.9 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 60(107).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'CM'.**

**Object :-** To find out suitable dates of sowing, spacing, seed rate and doses of N and P for Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar. (c) Nil. (ii) Medium black. (iii) As per treatments. (iv) (a) Nil. (b) Hand sowing. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) Kamod-B.S.-38. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 26, 27.10.1960.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 dates of sowing : D<sub>1</sub>=20.6.1960, D<sub>2</sub>=27.6.1960 and D<sub>3</sub>=6.7.1960.

(2) 3 seed rates : R<sub>1</sub>=22.4, R<sub>2</sub>=33.6 and R<sub>3</sub>=44.8 Kg/ha.

(3) 3 spacing between rows : S<sub>1</sub>=22.9, S<sub>2</sub>=30.5 and S<sub>3</sub>=45.7 cm.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=44.8 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=33.6 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 27 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 5.5m. × 7.3 m. (b) 3.7m. × 5.5m. (v) 91.5 cm. × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1958—1961 (Not conducted in 1959). (b) No. (c) Nil. (v) 734 Kg/ha. (vi) Chikhli. (vii) Nil.

## 5. RESULTS :

(i) 734 Kg/ha. (ii) (a) 331.1 Kg/ha. (b) 255.2 Kg/ha. (iii) Main effects of D, N and interaction D×N×P are highly significant. Main effect of S and interaction D×R are significant. (iv) Av. yield of grain in Kg/ha.



	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	823	754	332	758	547	603	565	621	722	651	621	636
N <sub>1</sub>	1047	1057	395	973	729	796	679	854	966	854	811	833
Mean	935	908	363	865	638	699	622	737	844	752	716	734
P <sub>0</sub>	956	947	354	892	670	696	629	708	921			
P <sub>1</sub>	913	864	372	838	605	703	615	767	767			
R <sub>1</sub>	667	801	402	767	506	591						
R <sub>2</sub>	1054	1035	123	717	749	745						
R <sub>3</sub>	1087	880	565	1109	660	762						
S <sub>1</sub>	994	1041	560									
S <sub>2</sub>	971	615	328									
S <sub>3</sub>	838	1059	202									

C.D. for D or S marginal means=190.9 Kg/ha.

C.D. for N marginal means=99.7 Kg/ha.

C.D. for means in the body of D×R table=330.6 Kg/ha.

**Crop :- Paddy (Kharif).**

**Site :- Irrigation-cum-Demons. Farm, Umrjala.**

**Ref :- Gj. 61(151).**

**Type :- 'CM'.**

Object :—To find out suitable dates of sowing, spacing, seed rate and optimum dose of N and P for Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) As per treatments. (iv) (a) 2 ploughings, one harrowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 7.4 C.L./ha. of F.Y.M. (vi) B.S.—38. (vii) Irrigated. (viii) 5 Interculturings including weeding. (ix) N.A. (x) 10.11.61.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 dates of sowing : D<sub>1</sub>=27.6.1961, D<sub>2</sub>=5.7.1961 and D<sub>3</sub>=12.7.1961.

(2) 3 seed rates : R<sub>1</sub>=22.4, R<sub>2</sub>=33.6 and R<sub>3</sub>=44.8 Kg/ha.

(3) 3 spacings between rows : S<sub>1</sub>=22.9, S<sub>2</sub>=30.5 and S<sub>3</sub>=45.7 cm.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=44.8 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=33.6 Kg/ha.

**3. DESIGN and 4. GENERAL**

Same as in expt. no. 60(107) on page 49

**5. RESULTS :**

(i) 1536 Kg/ha. (ii) (a) 575.1 Kg/ha. (b) 394.7 Kg/ha. (iii) Main effect of D is highly significant. Interactions D×R and R×S×P are significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	1265	1708	1574	1484	1557	1506	1642	1517	1388	1504	1527	1516
N <sub>1</sub>	1243	1949	1477	1524	1730	1415	1624	1471	1574	1560	1552	1556
Mean	1254	1828	1525	1504	1643	1460	1632	1494	1481	1532	1540	1536
P <sub>0</sub>	1273	1825	1498	1513	1547	1536	1684	1465	1446			
P <sub>1</sub>	1235	1831	1553	1495	1740	1384	1581	1523	1516			
R <sub>1</sub>	1046	2201	1651	1509	1752	1636						
R <sub>2</sub>	1115	1519	1848	1433	1569	1480						
R <sub>3</sub>	1601	1765	1077	1570	1609	1264						
S <sub>1</sub>	1229	1779	1503									
S <sub>2</sub>	1480	1943	1507									
S <sub>3</sub>	1053	1763	1565									

C.D. for D marginal means=331.8 Kg/ha.

C.D. for means in the body of D×R table=574.3 Kg/ha.

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62(67), 63(60).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'D'.**

Object :—To study the effect of different proprietary fungicides for control of blast on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 62(67); Cotton for 63(60). (c) N.A. for 62(67); 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 8.7.1962, 30.6.1963. (iv) (a) 1 harrowing for 62(67); 1 ploughing+1 harrowing for 63(60). (b) Hand sowing. (c) 22 Kg/ha. (d) 46 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. for 62(67); 24.7 C.L./ha. of F.Y.M. for 63(60). (v) K.S.-584. (vii) Irrigated. (viii) 1 inter-culturing. (ix) 60 cm., 57 cm. (x) 31.10.1962; 24.10.1963.

2. TREATMENTS :

4 fungicidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Bordeaux mixture, T<sub>2</sub>=Dithane and T<sub>3</sub>=Agrosone.

3. DESIGN :

(i) R.B.D (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 10.1 m.×5.5 m. (b) 8.2 m.×3.7 m. (v) 91 cm.×91 cm. (iv) Yes.

4. GENERAL :

(i) Normal. (ii) Slight attack of blast on leaves. (iii) Yield of grain. (iv) (a) 1961—1963 (modified in 1962). (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

5. RESULTS :

(i) 1976 Kg/ha. (ii) 246.8 Kg/ha. (21 d.f. made up of pooled error and Treatments×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	1907	2003	1970	2026

**Crop :- Paddy (Kharif).****Ref :- Gj. 61(135).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'D'.**

Object :-To study the effect of different proprietary Fungicides for control of blast on Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra and Paddy. (c) 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 30.6.61.  
 (iv) (a) 1 ploughing. (b) Hand sowing. (c) 22.4 Kg/ha. (d) 45.7 cm. between rows. (e) N.A.  
 (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/h.a of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) K.S.-584. (vii) Irrigated.  
 (viii) 2 interculturings. (ix) 58.8 cm. (x) 25.10.61.

**2. TREATMENTS :**

12 fungicidal treatments :  $T_0$ =Control (2 plots),  $T_1$ =Hexasan,  $T_2$ =Blitox,  $T_3$ =Shell copper,  $T_4$ =Aretan,  
 $T_5$ =Blue copper,  $T_6$ =Bordeaux mixture,  $T_7$ =De thine,  $T_8$ =Fytomex,  
 $T_9$ =Agrosan lime dust and  $T_{10}$ =Seed treatment only.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 12. (b) 30.2 m. × 21.9 m. (iii) 4. (iv) (a) 10.1 m. × 5.5 m. (b) 8.2 m. × 3.7 m. (v) 91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Blast infection, (iii) Yield of grain. (iv) (a) and (b) No. (c) Nil. (v) and (vi) Nil.  
 (vii) Raw data for infection N.A.

**5. RESULTS :**

(i) 2330 Kg/ha. (ii) 220.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$	$T_{10}$
Av. yield	2284	2334	2301	2317	2259	2276	2375	2433	2367	2367	2359

**Crop :- Paddy (Kharif).****Ref :- Gj. 64(251).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'D'.**

Object :-To study the effect of different fungicides for control of blast on Paddy.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black soil. (iii) 3.7.64.  
 (iv) (a) 1 ploughing and 1 harrowing. (b) Hand sowing. (c) 22 Kg/ha. (d) 46 cm. row to row.  
 (e) Nil. (v) 24.7 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) K.S.—584. (vii) Irriga-  
 ted. (viii) 2 interculturings. (ix) 137 cm. (x) 23.10.64.

**2. TREATMENTS :**

5 fungicidal treatments :  $T_0$ =Control (water spray),  $T_1$ =Cuman powder was diluted at the rate of 100 gms.  
 in 454 litres of water and sprayed at 842 litres/ha.  $T_2$ =Agrozone and lime dust :  
 proportion 1 : 8 dusting was done twice at 22.4 to 33.6 Kg/ha.  $T_3$ =Diathane 3%  
 concentration diluted with water and spread at 1123 to 1348 litres/ha. and  
 $T_4$ =Bordeaux mixture 3 : 3 : 50 applied at 1123 litres/ha.

Fungicides sprayed thrice in equal doses on 12/7, 3/8 and 16/9/1964.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) Nil. (iii) 4. (iv) (a) 10.1 m. × 5.5 m. (b) 8.2 m. × 3.7 m. (v) 91 cm. × 91 cm.  
 (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Blast on leaves was observed. (iii) Grain and fodder yield. (iv) (a) 1961—contd. (Modi-  
 fied in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 3102 Kg/ha. (ii) 313.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	3239	3222	2791	3260	2998

**Crop :- Paddy (Kharif)**

**Ref :- Gj. 65(40).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'D'.**

Object :—To find out effective control measure for blast on Paddy variety Pankhali—203.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Paddy. (b) Paddy. (c) 44.8 Kg. of N+22.4 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. (ii) Medium black soil. (iii) N.A. (iv) (a) 2 Ploughings. (b) Transplanting. (c) 123.3 Kg/ha. in Nursery bed. (d) 30.5 cm. × 20.4 cm. (e) 1 plant/hill. (v) 12.4 C.L. of F.Y.M.+44.8 Kg. of N+11.2 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. (vi) Pankhali-203 (vii) Irrigated. (viii) 2 weedings, 1 interculturing. (ix) 40.5 cm. (x) 13.11.65.

## 2. TREATMENTS :

3 insecticidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=B/a-S and T<sub>2</sub>=Aureofungine.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) Nil. (iii) 5. (iv) (a) 10.4 m. × 4.9 m. (b) 9.1 m. × 3.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Blast was observed in all plots. (iii) Grain and fodder yield. (iv) (a) 1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the treatment T<sub>2</sub> could not be applied those plots also are added up to control for analysis purpose.

## 5. RESULTS :

(i) 3692 Kg/ha. (ii) 5804 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>
Av. yield	3229	4156

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 63(254), 64(272).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'D'.**

Object :—To study the effect of different insecticides against root grubs on Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy after Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 10.7.1963/24.8.1963, 8.7.1964/19.8.1964. (iv) (a) 2 ploughings. (b) Transplanting. (c) 123 Kg/ha. in nursery bed. (d) 30 cm. × 20 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of N. (vi) J—280(late). (vii) Irrigated. (viii) 2 weedings and 1 interculturing. (ix) 88 cm, 56 cm. (x) 5.12.63 ; 5.12.64.

## 2. TREATMENTS :

8 Insecticidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=BHC—5% dust at 22.4 Kg/ha., T<sub>2</sub>=Endrin 20 E.C. 1.1 Kg/ha. in 898 litres of water, T<sub>3</sub>=Aldrine 5% dust at 22.4 Kg/ha., T<sub>4</sub>=Aldrine 5% dust at 11.2 Kg/ha., T<sub>5</sub>=Cholorodane 5% dust at 22.4 Kg/ha., T<sub>6</sub>=Telodrin 0.03% spray and T<sub>7</sub>=Heptachlor 20% liquid spray.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 6.1 m. (b) 7.9 m. × 4.9 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962—1964 (modified in 1963). (b) No. (c) Results of combined analysis given under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 3352 Kg/ha. (ii) 300.1 Kg/ha. (Based on 49 d.f. made up of Treatments × years interaction and Pooled error). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	3422	3425	3442	3346	3208	3328	3310	3332

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 61(211), 62(226), 63(243), 64(262).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'D'.**

Object :—To ascertain the superiority of various methods of controlling weeds in Paddy.

## 1. BASAL CONDITIONS :

(i) (a) Paddy after Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium clay soil. (iii) N.A., 7.7.62/17.8.62, 28.6.63/4.8.63, 8.7.64/17.8.64. (iv) (a) 2 ploughings. (b) Transplanting. (c) Nil. (d) 30 cm. × 22 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N. (vi) J—280(late). (vii) Irrigated. (viii) As per treatments. (ix) 76 cm., 95 cm., 88 cm., 56 cm. (x) N.A., 25.11.62, 1.12.63 and 2.12.64.

## 2. TREATMENTS :

7 weedicial treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Hedonal powder 2-4-D, T<sub>2</sub>=Hedonal M liquid M.C.P.A., T<sub>3</sub>=B.I. Hedonal liquid(2-4-D and M.C.P.A.), T<sub>4</sub>=Weedex 2-4-D, T<sub>5</sub>=Hand weeding and T<sub>6</sub>=Interculturing by Karjat Rotary hoe.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 18.3 m. × 3.1 m. (b) 17.1 m. × 2.4 m. (v) 61 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961—1964. (b) No. (c) Results of combined analysis given under 5. Results. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) Plot wise data N.A. for 1961. Error variances are homogeneous and interaction is present.

## 5. RESULTS :

(i) 2432 Kg/ha. (ii) 147.2 Kg/ha. (Treatments × years interaction with 18 d.f.). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	2471	2388	2366	2393	2424	2400	2585

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62(227), 63(247), 64(258).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'D'.**

Object :—To find out the effective control measure of blast on Paddy.

## 1. BASAL CONDITIONS :

- (i) (a) Paddy-Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium clay soil. (iii) 7.7.1962/18.8.1962 ; 3.6.1963/25.8.1963 ; 8.7.1964/18.8.1964. (iv) (a) 2 ploughings. (b) Transplanting. (c) N.A. (d) 30 cm. × 23 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) P-203 (late). (vii) Irrigated. (viii) 2 weedings+1 interculturing. (ix) 95 cm., 88 cm., 56 cm. (x) 27.11.1962 ; 7.12.1963 ; 12.11.1964.

## 2. TREATMENTS :

4 fungicidal treatments :  $T_0$ =Control,  $T_1$ =Dithane M-22,  $T_2$ =Bordeaux mixture 3 : 3 : 50 and  $T_3$ =Agrosan G.N. with lime 1 : 8.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 17.7 m. × 3.7 m. (b) 16.5 m. × 2.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good for 62(227) ; Normal for others. (ii) Attack of neck blast for 63(247) ; No incidence for others. (iii) Yield of grain. (iv) (a) 1962—1964. (b) No (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Strong storm was observed for 63(247). (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

- (i) 2149 Kg/ha. (ii) 263.3 Kg/ha. (51 d.f. made up of Pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$
Av. yield	2025	2205	2109	2255

**Crop :- Paddy (Kharif).**

**Ref :- Gj. 62(229).**

**Site :- Agri. Res. Stn., Nawagam.**

**Type :- 'D'.**

Object :—To study the effect of different insecticides against root grubs on Paddy.

## 1. BASAL CONDITIONS :

- (i) (a) Paddy-Paddy. (b) Paddy. (c) 44.8 Kg. of N+22.4 Kg. of  $P_2O_5$ /ha. (ii) Medium black. (iii) 7.7.62 transplanting on 16/8/62. (iv) (a) 2 Ploughings. (b) Transplanting. (c) 123.3 Kg/ha. in Nursery bed. (d) 30.5 cm. × 24.0 cm. (e) One plant/hill. (v) 12.4 C.L. of F.Y.M.+44.8 Kg. of N+22.4 Kg. of  $P_2O_5$ /ha. (vi) J-280 (late). (vii) Irrigated as and when required. (viii) 2 weedings and 1 interculturing. (ix) 95.4 cm. (x) 24.11.62.

## 2. TREATMENTS :

**Main-plot treatments :**

6 insecticides :  $I_1$ =BHC—5% dust @ 22.4 Kg/ha.,  $I_2$ =Endrin—20 E.C. @ 1.1 Kg/ha. in 898 litres of water,  $I_3$ =Aldrine—5% dust @ 22.4 Kg/ha.,  $I_4$ =Aldrine—5% dust @ 11.2 Kg/ha.,  $I_5$ =Chlorodane—5% dust @ 22.4 Kg/ha.,  $I_6$ =Control.

**Sub-plot treatments :**

2 methods and times of application of Insecticides :  $M_1$ =Applied in furrows before sowing,  $M_2$ =Applied after transplanting.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 6 main-plots/replication, 2 sub-plots/main-plot (b) Nil. (iii) 4. (iv) (a) 9.1 m. × 4.6 m. (b) 6.7 m. × 2.1 m. (v) 122 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962—64 (Modified in 1963-64). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 2972 Kg/ha. (ii) (a) 420.1 Kg/ha. (b) 222.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	Mean
M <sub>1</sub>	2756	2951	2827	3297	3171	3157	3027
M <sub>2</sub>	2937	2687	2922	2972	3065	2925	2918
Mean	2846	2819	2874	3134	3118	3041	2972

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(56).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

Object :- To study the residual effect of N, P, K and F.Y.M. applied to previous *Kharif* crop of Groundnut on the succeeding Wheat crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) As per treatments. (ii) Medium black. (iii) 13.11.62. (iv) (a) Nil. (b) Drilling. (c) 74.1 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) KCN—133. (vii) Irrigated. (viii) Nil. (ix) 29.3 cm. in whole year. (x) 6.3.63.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3).

- (1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.  
 (2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=56.0 and P<sub>2</sub>=112.1 Kg/ha.  
 (3) 3 levels of K<sub>2</sub>O : K<sub>0</sub>=0, K<sub>1</sub>=112.1 and K<sub>2</sub>=224.2 Kg/ha.

**Sub-plot treatments :**

2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 9 main-plots/block ; 3 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91.4 cm. × 91.4 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) to (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 1299 Kg/ha. (ii) (a) 131.4 Kg/ha. (b) 127.0 Kg/ha. (iii) Only interaction N × K is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	1194	1408	1337	1172	1410	1356	1285	1341	1313
N <sub>1</sub>	1179	1317	1441	1400	1345	1192	1290	1334	1312
N <sub>2</sub>	1287	1259	1267	1308	1233	1273	1250	1292	1271
Mean	1220	1328	1348	1293	1329	1274	1275	1322	1299
F <sub>0</sub>	1182	1277	1366	1306	1274	1245			
F <sub>1</sub>	1258	1379	1330	1279	1385	1303			
K <sub>0</sub>	1288	1310	1280						
K <sub>1</sub>	1197	1369	1422						
K <sub>2</sub>	1174	1304	1343						

C.D. for means in the body of N × K table = 185.6 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(212), 62(237), 63(265).****Site :- Agri. College Farm, Anand.****Type :- 'M'.**

Object :—To study the effect of various levels of N, P and K alone and in combination on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Sann-Jowar-Wheat. (b) Jowar (fodder). (c) Nil. (ii) Sandy loam. (iii) N.A. (iv) (a) 2 ploughings and 1 harrowing. (b) Drilling. (c) 89.7 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) N.P. 824. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) N.A.

**2. TREATMENTS :**

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S :  $N_1=67.2$ ,  $N_2=100.9$  and  $N_3=134.5$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=67.2$  Kg/ha.

(3) 2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=67.2$  Kg/ha.

$P_2O_5$  and  $K_2O$  applied in furrows prior to sowing seeds.  $\frac{1}{2}$  dose of N at sowing +  $\frac{1}{2}$  dose of N one month after sowing.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.6 m.  $\times$  6.1 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1961—63. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is present.

**5. RESULTS :**

(i) 3109 Kg/ha. (ii) 147.1 Kg/ha. (based on 18 d.f. made up of various components of Treatments  $\times$  years interactions). (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$K_0$	$K_1$	Mean
$P_0$	2949	3132	3017	3061	3005	3033
$P_1$	3201	3205	3153	3202	3171	3186
Mean	3075	3168	3085	3131	3088	3109
$K_0$	3114	3185	3095			
$K_1$	3036	3152	3075			

C.D. for P marginal means = 103.1 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(213), 62(238), 63(264).****Site :- Agri. College Farm, Anand.****Type :- 'M'.**

Object :—To study the effect of different times of application of N on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Maize-Wheat. (b) Maize. (c) N.A. (ii) Sandy loam. (iii) 2.11.61 ; 19.11.62 ; 28.11.63. (iv) (a) 1 ploughing for 61(213), 1 ploughing, 1 harrowing for others. (b) Drilling. (c) 89.7 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) 33.6 Kg/ha. of  $P_2O_5$ . (vi) N.P. 824. (vii) Irrigated. (viii) One weeding and one interculturing. (ix) Nil. (x) 28.3.62 ; 1.4.63 ; 30.3.1964.

**2. TREATMENTS :**

All combinations of (1) and (2).

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

(2) 4 times of application of N :  $T_1$  = Full dose at sowing,  $T_2$  = Full dose at first irrigation,  $T_3$  =  $\frac{1}{2}$  dose at sowing +  $\frac{1}{2}$  dose at first irrigation and  $T_4$  =  $\frac{1}{2}$  dose at sowing +  $\frac{1}{2}$  dose at 1st irrigation +  $\frac{1}{2}$  dose one week before flowering.



## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 5.8 m. (b) 6.1 m. × 4.6 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Leaf rust, stem borer and termite attack for 61(213); Nil for others. (iii) Grain and fodder yield. (iv) (a) 1961—63. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) Nil. (vii) Errors are homogenous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 2906 Kg/ha. (ii) 561.6 Kg/ha. (22 d.f. made up of Treatments × years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
N <sub>1</sub>	2364	2570	2519	2604	2514
N <sub>2</sub>	2927	3047	2991	3162	3032
N <sub>3</sub>	3109	3094	3171	3313	3172
Mean	2800	2904	2894	3026	2906

C.D. for N marginal means = 237.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 63(10), 64(146), 65(91).**

**Site :- Agri. Res. Stn., Arnej.**

**Type :- 'M'.**

Object :- To find out the time of application of Nitrogen for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) 11.11.1963; 30.10.1964; 20.10.1965. (iv) (a) 5 to 7 harrowings. (b) Drilling. (c) 44.8 Kg/ha. (d) 30.5 cm. between rows. (e) N.A. (v) Nil. (vi) A-206 (medium). (vii) Unirrigated. (viii) 1 to 2 weedings. (ix) 4 cm.; Nil; Nil. (x) 20.3.1964; 24.2.1965; 15.2.1966.

## 2. TREATMENTS :

4 times of application of 11.2 Kg/ha. of N as Urea : T<sub>1</sub> = One week before sowing, T<sub>2</sub> = At sowing, T<sub>3</sub> = One week after germination and T<sub>4</sub> = Half at the time of tillering + half at the time of flag leaf.

N applied at a depth of 15 cm. and T<sub>4</sub> treatment applied as foliar spraying.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) 18.3 m. × 9.1 m. for 63(10); N.A. for others. (iii) 6. (iv) (a) 9.1 m. × 4.6 m. (b) 8.3 m. × 3.6 m. for 63(10); 7.3 m. × 2.7 m. for others. (v) 46 cm. × 46 cm. for 63(10); 91 cm. × 91 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Normal for 63(10), 64(146); Below normal for 65(91). (ii) Nil. (iii) Grain yield. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

## 63(10)

(i) 689 Kg/ha. (ii) 121.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	690	725	734	609

## 64(146)

(i) 708 Kg/ha. (ii) 65.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	743	755	722	612

C.D. = 80.7 kg./ha.

## 65(91)

(i) 446 Kg/ha. (ii) 119.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	470	492	353	468

**Crop :-** Wheat (*Rabi*).

**Ref :-** Gj. 60(6), 61(111), 62(23), 63(9).

**Site :-** Agri. Res. Stn., Arnej.

**Type :-** 'M'.

Object :— To see the effect of Urea spraying on the yield and spottedness of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 60(6), 61(111); Grain for 62(23); *Jowar* for 63(9). (c) Nil. (ii) Medium black. (iii) 26.10.1960; 28.10.1961; 26.10.1962; 30.10.1963. (iv) (a) 4 to 5 harrowings. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (v) Nil. (vi) Arnej-206. (vii) Un-irrigated. (viii) 2 weedings for 63(9) and Nil for other expts. (ix) N.A. for 60(6); Nil for 61(111), 62(23) and 4 cm. for 63(9). (x) 26.2.1961; 3.3.1962; 20.2.1963; 15.3.1964.

## 2. TREATMENTS :

5 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=5.6 Kg/ha. of N as Urea, M<sub>2</sub>=11.2 Kg/ha. of <sup>15</sup>N as Urea, M<sub>3</sub>=11.2 Kg/ha. of N as A/S+5.6 Kg/ha. of N as Urea and M<sub>4</sub>=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of N as Urea.

A/S applied as basal dose and Urea applied by spraying in two equal doses : 1st spraying done at flag-leaf stage and the 2nd spraying at flowering stage.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. for 60(6), 61(111), 62(23); 18.3 m. × 12.2 m. for 63(9) (iii) 4. (iv) (a) 12.2 m. × 3.7 m. (b) 10.4 m. × 1.8 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—1963. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 1059 Kg/ha. (ii) 85.2 Kg/ha. (12 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1062	995	1008	1099	1130

**Crop :-** Wheat (*Rabi*).

**Ref :-** Gj. 60(7), 62(24), 63(8), 64(145).

**Site :-** Agri. Res. Stn., Arnej.

**Type 'M'.**

Object :— To find out the best economic dose of N and P for Wheat under dry conditions.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Gram for 60(7); Nil for 62(24), 63(8), 64(145). (b) Gram; Wheat; *Jowar*; Wheat. (c) 12.4 C.L./ha. of F.Y.M. for 60(7); Nil for 62(24), 63(8), 64(145). (ii) Medium black to deep black. (iii) 25.10.1960; 25.10.1962; 30.10.1963; 24.10.1964. (iv) (a) 5 to 7 harrowings. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) A—206 (medium). (vii) Un-irrigated. (viii) Nil for 60(7), 62(24); 1 to 2 weedings for 63(8), 64(145). (ix) N.A.; Nil; 4 cm; Nil. (x) 25.2.1961; 22.2.1963; 15.3.1964; 23.2.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)+one extra treatment

(1) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$ ,  $N_2=22.4$  and  $N_3=33.6$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=22.4$  Kg/ha.

Extra treatment E=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of N as G.N.C.+22.4 Kg/ha. of  $P_2O_5$  as Super.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. for 60(7), 62(24), 64(145) ; 19.2 m. × 34.8 m. for 63(8). (iii) 4. (iv) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959—1964. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Expt. 59(46) has also been included for pooled analysis. Expt. conducted in 1961 vitiated completely. Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

(i) 740 Kg/ha. (iii) 136.7 Kg/ha. (32 d.f. made up of various components of Treatments × years interaction). (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

E=709 Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	Mean
$P_0$	646	742	779	740	727
$P_1$	614	744	847	841	761
Mean	630	743	813	790	744

C.D. for N marginal means=124.5 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(148), 65(90).**

**Site :- Agri. Res. Stn., Arnej.**

**Type :- 'M'.**

Object :- To study the effect of different fertilizers on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) 30.10.64, 20.10.65. (iv) (a) 7 harrowings. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) A—206 (medium). (vii) Un-irrigated. (viii) 1 weeding. (ix) Nil. (x) 25.2.65, 15.2.66.

## 2. TREATMENTS :

2 manurial treatments :  $M_0$ =Control, and  $M_1=24.7$  C.L./ha. of F.Y.M.+44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super+44.8 Kg/ha. of  $K_2O$  as Pot. Sul.

Note :- F.Y.M. applied by broadcast after the monsoon is over and N, P and K were applied 8 days before sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 12. (iv) (a) 6.4 m. × 10.4 m. (b) 5.2 m. × 9.8 m. (v) 61 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 64(148), below normal for 65(90). (ii) Nil. (iii) Grain yield. (iv) (a) 1964—contd. (b) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

64(148)

(i) 681 Kg/ha. (ii) 81.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>
Av. yield	435	927

C.D.=73.4 Kg/ha.

65(90)

(i) 203 Kg/ha. (ii) 30.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>
Av. yield	218	189

C.D.=27.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 64(144), 65(92).****Site : Agri. Res. Stn., Arnej.****Type :- 'M'.**

Object :—To study the effect of Urea and micronutrients on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) 27.10.64, 18.10.65. (iv) (a) 7 harrowings (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) 11.2 Kg. of N and P<sub>2</sub>O<sub>5</sub>/ha. each. (vi) A—206. (vii) Un-irrigated. (viii) 1 weeding. (ix) Nil. (x) 25.2.65, 14.2.66.

## 2. TREATMENTS :

All combinations of (1) and (2).

(1) 2 micronutrient treatments : M<sub>0</sub>=Control and M<sub>1</sub>=Zinc+Copper.(2) 7 concentrations of Urea : C<sub>0</sub>=Absolute, C<sub>1</sub>=Water spray (control),C<sub>2</sub>=1%, C<sub>3</sub>=2%, C<sub>4</sub>=3%, C<sub>5</sub>=4% and C<sub>6</sub>=5% Urea solution.

Note : Micronutrients and Urea applied by spraying before sowing.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 14. (b) N.A. (iii) 4. (iv) (a) 3.7 m. × 11.0 m. (b) 1.8 m. × 9.1 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 64(144), below normal for 65(92). (ii) Nil. (iii) Grain yield (iv) (a) 1964—contd. (b) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

64(144)

(i) 697 Kg/ha. (ii) 76.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>0</sub>	649	710	729	779	652	718	695	705
M <sub>1</sub>	665	664	706	653	665	774	703	690
Mean	657	687	717	716	658	746	699	697

65(92)

(i) 424 Kg/ha. (ii) 74.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>0</sub>	393	456	435	375	402	392	456	416
M <sub>1</sub>	546	408	401	460	441	374	396	432
Mean	469	432	418	418	421	383	426	424

**Crop :- Wheat (Rabi).**

**Ref. :- Gj. 64(149).**

**Site :- Agri. Res. Stn., Arnej.**

**Type :- 'M'.**

**Object :-**To study the effect of different levels of Potash and Nitrogen on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Medium black. (iii) 31.10.64. (iv) (a) 7 harrowings. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) A-206. (vii) Un-irrigated. (viii) 1 weeding. (ix) Nil. (x) 25.2.65.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 4 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0, K<sub>1</sub>=22.4, K<sub>2</sub>=44.8 and K<sub>3</sub>=67.2 Kg/ha.

(2) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=22.4 Kg/ha.

Fertilizers were mixed and applied before sowing of seed.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 2. (iv) (a) 2.7 m. × 6.1 m. (b) 1.5 m × 4.3 m. (v) 61 cm. × 92 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain Yield. (iv) (a) 1964—contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 730 Kg/ha. (ii) 71.2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	Mean
N <sub>0</sub>	676	738	676	561	663
N <sub>1</sub>	738	814	792	845	797
Mean	707	776	734	703	730

C.D. for N marginal means = 84.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref. :- Gj. 65(89).**

**Site :- Agri. Res. Stn., Arnej.**

**Type :- 'M'.**

**Object :-**To study the effect of different ratios of Potash to Nitrogen on spottedness and yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) 20.10.65. (iv) (a) 7 harrowings. (b) Drilling. (c) 44.8 Kg/ha. (d) 30.5 cm. row to row. (e) Nil. (v) 12.4 C.L. of F.Y.M. + 22.4 Kg. P<sub>2</sub>O<sub>5</sub>/ha. (vi) A-206 (medium). (vii) Unirrigated. (viii) 1 weeding. (ix) Nil. (x) 15.2.66.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=33.6$  Kg/ha.

(2) 4 levels of  $K_2O$  as Sulphate of Potash :  $K_0=0$ ,  $K_1=22.4$ ,  $K_2=44.8$  and  $K_3=67.2$  Kg/ha  
N and  $K_2O$  drilled with seed.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N A. (iii) 2. (iv) (a) 3.7 m.  $\times$  7.3 m. (b) 3.0 m.  $\times$  6.1 m. (v) 30.5 cm. 61.0 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) N.A. (vi) Uneven distribution of rain. (vii) Nil.

## 5. RESULTS :

(i) 434 Kg/ha. (ii) 133.1 Kg/ha. (iii) None of the effects is significant. (vi) Av. yield of grain in Kg/ha.

	$K_0$	$K_1$	$K_2$	$K_3$	Mean
$N_0$	412	358	344	393	377
$N_1$	355	581	498	519	488
$N_2$	441	605	361	342	437
Mean	403	515	401	418	434

**Crop :- Wheat (Rabi).**

**Ref :- GJ. 64(147).**

**Site :- Agri. Res. Stn., Arnej.**

**Type :- 'M'.**

Object :- To study the effect of F.Y.M. on the yield of dry Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram. (c) Nil. (ii) Medium black. (iii) 26.11.64. (iv) (a) Harrowing. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) A-206 (medium). (vii) Unirrigated. (viii) 1 weeding. (ix) Nil. (x) 24.2.65.

## 2. TREATMENTS :

4 times of broadcasting F.Y.M. at 12.4 C.L./ha. :  $T_0$ =Control (no F.Y.M.),  $T_1$ =Before monsoon,  $T_2$ =1½ months after set of monsoon and  $T_3$ =Just before sowing.

## 3. DESIGN :

(i) R.B.D. (a) 4. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  14.0 m. (b) 6.7 m.  $\times$  12.8 m. (v) 30 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) No. (ii) Nil. (iii) Grain yield. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 493 Kg/ha. (ii) 46.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$
Av. yield	478	521	526	448

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(40), 63(221), 64(194).**

**Site :- Trial-cum-Demons. Farm, Chanasura. Type :- 'M'.**

**Object :-** To study the optimum dose and time of application of N for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajri. (c) Nil. (ii) Sandy loam. (iii) 4.11.1962 ; 14.11.1963 ; 26.11.1964. (iv) (a) 1 to 3 ploughings and 2 to 5 harrowings. (b) Drilling. (c) 89 to 99 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 89.7 Kg/ha. of  $P_2O_5$  for 62(40), 63(221) ; 12.4 C.L./ha. of F.Y.M.+89.7 Kg/ha. of  $P_2O_5$  for 64(194). (vi) N.P.—710 for 62(40), 63(221) ; N.P.—810 for 64(194). (vii) Irrigated. (viii) One interculturing. (ix) 33 cm. for 62(40) ; Nil for others. (x) 13.3.1963 ; 23.3.1964 ; 29.3.1965.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

(2) 4 times of application of N :  $T_1=At$  sowing,  $T_2=At$  1st irrigation,  $T_3=At$  at sowing+ $\frac{1}{2}$  at 1st irrigation and  $T_4=At$  at sowing+ $\frac{1}{2}$  at 1st irrigation+ $\frac{1}{2}$  at flowering.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 7.3 m.  $\times$  5.8 m. (b) 6.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

**4. GENERAL :**

(i) Good for 62(40) ; Normal for others. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) 1962 to 1964. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and interaction of Treatments  $\times$  years is absent.

**5. RESULTS :**

(i) 2112 Kg/ha. (ii) 479.6 Kg/ha. (121 d.f. made up of interaction of treatments with years and pooled error). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$N_1$	1949	1879	1935	1917	1920
$N_2$	1987	2159	2140	2201	2122
$N_3$	2299	2431	2324	2122	2294
Mean	2078	2156	2133	2080	2112

C.D. for N marginal means=193.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(77) ; 63(220).**

**Site :- Trial-cum-Demons. Farm, Chanasura.**

**Type :- 'M'.**

**Object :-** To study the effect of micronutrients on irrigated Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar and Bajra for 62(77) and Bajra for 63(220). (c) Nil. (ii) Sandy soil. (iii) 10.11.62 ; 14.11.62. (iv) (a) 2 ploughings and 2 harrowings. (b) Drilling. (c) 90 Kg/ha. for 62(77) ; 99 Kg/ha. for 63(220). (d) 30 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) NP-710. (vii) Irrigated. (viii) 1 interculturing. (ix) 33 cm. for whole year for 62(77) and Nil for 63(220). (x) 16.3.63 ; 24.3.64.

**2. TREATMENTS :**

6 Micronutrients :  $M_0=Control$ ,  $M_1=Zinc$  at 33.6 Kg/ha. of Zn. Sul.,  $M_2=Molybdenum$  at 140 gm./ha. of Sodium Molybdate,  $M_3=B$  at 2.2 Kg/ha. of Borax,  $M_4=Copper$  at 9.0 Kg/ha. of Cu. Sul. and  $M_5=Manganese$  at 3.4 Kg/ha. of Mn. Sul.

Micronutrients applied through foliar application.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 20.1 m. × 10.1 m.; 20.4 m. × 7.6 m. (b) 18.3 m. × 8.2 m.; 19.8 m. × 7.0 m. (v) 91.4 cm. × 91.4 cm. 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1962-1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (b) Nil. (vi) N.A. (vii) Errors are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 1439 Kg/ha. (ii) 171.7 Kg/ha. (15 d.f. made up of Interaction of years × treatments and pooled error). (iii) The different in treatment effects are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	1393	1442	1581	1460	1417	1348

C.D. 5% = 258.6 kg./ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(64), 65(141).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type :- 'M'.**

Object :—To study the cumulative effect of different nitrogenous fertilizers on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat. (b) Paddy. (c) As per treatments. (ii) Medium black. (iii) 26.11.1964/1.12.1965. (iv) (a) Nil for 64 : 1 ploughing and 1 planting for 65(141). (b) Drilling. (c) 44.8 Kg/ha. for 64 ; 98.8 Kg/ha. for 65. (d) 46 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. applied to one replicate only. (vi) NP—824 (medium). (vii) Irrigated. (viii) 1 interculturing for 64 ; N.A. for other. (ix) 84 cm ; Nil (x) 27.3.65 ; 22.3.66.

## 2. TREATMENTS :

7 sources of N at 44.8 Kg/ha. : S<sub>0</sub>=Control 2 plots, S<sub>1</sub>=A/S, S<sub>2</sub>=Urea, S<sub>3</sub>=A/S/N, S<sub>4</sub>=C/A/N, S<sub>5</sub>=Nitro. Phos. and S<sub>6</sub>=Ammo. Sul. phosphate.

Treatments S<sub>0</sub> to S<sub>4</sub> were given a dose of 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as super. N broadcast on 26.11.64 for 64, and N applied in two equal doses 1st dose at sowing and 2nd dose one month after sowing for 65.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 2 (one with F.Y.M. and other replicate is without F.Y.M.) (iv) (a) 18.3 m. × 10.1 m. (b) 16.5 m. × 8.2 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963—1965 (modified in 64) (b) Yes. (c) Results of combined analysis are presented under 5 Results. (v) Nawagam. (vi) Nil. Errors are heterogenous and (Treatments × years) interaction is present.

## 5. RESULTS :

(i) 1325 Kg/ha. (ii) 351.2 Kg/ha. [6 d.f. made up of interaction of treatments with years]. (iii) Control vs. others alone is significant.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
Av. yield	932	1168	1676	1454	1382	1176	1883

C.D. for control vs. others = 350 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(121), 62(119), 63(131), 64 (65).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type 'M'.**

Object :—To study the effect of foliar application of Urea on wheat.



## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 61(121) ; Paddy for 62(119), 63(131) and 64(65). (c) 33.6 Kg/ha. of N as A/S+47.1 Kg/ha. of  $P_2O_5$  as super for 61(121) ; 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for others. (ii) Medium black to black. (iii) 6.11.1961 ; 6.11.1962 ; 23.12.1963 ; 23.11.1964. (iv) (a) One ploughing+1 to 2 harrowings for 61(121) ; 62(119) ; Nil for. 63(131) and 64(65). (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows for 61(121), 62(119), 64(65) and 46 cm. between rows for 63(131). (e) Nil. (iv) Nil. (v) A—206. (vi) Un-irrigated. (vii) Nil for 61(121), 62(119), 63(131) ; 1 interculturing for 64(65). (viii) 105 cm ; 90 cm ; 101 cm ; 84 cm. in respective years. (ix) 3.3.1962 ; 3.3.1963 ; 23.4.1964 ; 4.3.1965.

## 2. TREATMENTS :

5 manurial treatments :  $M_0$ =Control,  $M_1$ =5.6 Kg/ha. of N as Urea,  $M_2$ =11.2 Kg/ha. of N as Urea,  $M_3$ =11.2 Kg/ha. of N as A/S+5.6 Kg/ha. of N as Urea and  $M_4$ =11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of N as Urea.

A/S applied as basal dose and Urea applied by spraying in two equal doses : 1st spraying done at flag leaf stage and the 2nd spraying at flowering stage.

## 3. DESIGN :

(i) R.B.D. (ii) 5. (b) N.A. (iii) 4. (iv) 12.2×3.1 m. (b) 10.36×1.83 m. (v) 91×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—1964. (b) No. (c) Results of combined analysis given under 5. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) The expt. conducted in 1960 failed completely due to shortage of rains. Error variances are homogenous and treatment×year interaction is present.

## 5. RESULTS :

(i) 811 Kg/ha. (ii) 121.1 Kg/ha. (12 d.f. made up treatment×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	742	808	784	841	880

C.D. = 186.7 Kg/ha.

**Crop :- Wheat (Rabi).**  
**Site :- Agri. Res. Stn., Dabhoi.**

**Ref :- Gj. 63(130).**  
**Type :- M.**

Object :—To study the cumulative effect of different Nitrogenous fertilizers on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Wheat. (b) Paddy. (c) As per treatments. (ii) Medium black. (iii) 6.12.63. (iv) (a) Nil. (b) Drilling. (c) 67.3 Kg/ha. (d) 30.5 m. Row to Row. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. applied to one replication only. (vi) N.P. 710. (vii) Irrigated. (viii) Nil. (ix) 101 cm. in whole year. (x) 17.4.64.

## 2. TREATMENTS :

6 sources of N at 44.8 Kg/ha. :  $S_0$ =control  $S_1$ =A/S,  $S_2$ =Urea,  $S_3$ =A/S/N,  $S_4$ =C/A/N and  $S_5$ =Nitro phosphate.

Treatments  $S_0$  to  $S_4$  were given a dose of 22.4 Kg/ha. of  $P_2O_5$  as super. N applied on 16.11.1963 by drillings.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 18.3 m.×10.1 m. (b) 16.4m.×8.2 m. (v) 91.5 m.×91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963 contd. (b) Yes. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) Rains were received at the time of germination and farrows were flooded with water, which had adverse effect on crop : Hence resolving was done which was late.

## 5. RESULTS :

(i) 1031 Kg/ha (ii) 1096 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>
Av. yield	705	952	886	1296	1218	1129

C.D.=281.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(178), 61(208), 62(202).**

**Site :- Dry Farming Res. Stn., Dhandhuka. Type :- 'M'.**

Object :-To study the effect of Urea on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Wheat. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 25.10.1960 ; 29.10.1961 ; 30.10.1962. (iv) (a) 1 ploughing, 4 to 5 harrowings. (b) Drilling. (c) 49 Kg/ha. (d) 38 cm. between rows. (e) Nil. (v) Nil. (vi) Arnej—206 (medium). (vii) unirrigated. (viii) Nil. (ix) Nil for 60(178) and 61(208) ; 1.6 cm. for 62(202). (x) 4.3.61 ; 22.2.1962 ; 23.2.1963.

## 2. TREATMENTS :

5 manurial treatments : T<sub>0</sub>=Control T<sub>1</sub>=5.6 Kg/ha of N as Urea, T<sub>2</sub>=11.2 Kg/ha of N as urea, T<sub>3</sub>=11.2 Kg/ha of N as A/S at sowing+5.6 Kg/ha of N as urea and T<sub>4</sub>=11.2 Kg/ha of N as A/S at sowing+11.2 Kg/ha of N as Urea.

Urea applied in 2 equal doses ; 1st dose at flags leaf stage and 2nd dose at flowering.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 15.2 m. × 12.2 m. (iii) 6. (iv) (a) 12.2 m. × 3.1 m. (b) 10.4 m. × 1.5 m. (v) 91 × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—62. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Errors are homogeneous and Treat × years interaction is absent.

## 5. RESULTS :

(i) 895 Kg/ha. (ii) 97.2 Kg/ha (68 d.f. made up of pooled error and interaction of treatments with years). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	907	907	933	849	880

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(174), 65(99).**

**Site :- Dry Farming Res. stn., Dhandhuka.**

**Type :- 'M'.**

Object :-To study the effect of different micronutrients through soil application on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Wheat. (b) Cotton. (c) Nil. (ii) Medium black soil. (iii) 26.10.1964 ; 20.10.1965. (iv) (a) 4 to 6 harrowings (b) Drilling. (c) 49 Kg/ha. (d) 30 cm. between rows. (v) Nil. (vi) Arnej—206 (medium). (vii) Unirrigated. (viii) Nil. (ix) Nil ; 33.3 cm. in the whole year, (x) 22.3.65 ; 25.3.1966.

## 2. TREATMENTS :

8 micronutrients treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Boron as 11.2 kg./ha. of Borax, T<sub>2</sub>=Copper as 28.0 Kg/ha. of copper sulphate, T<sub>3</sub>=Zinc as 28.0 Kg/ha. of zinc sulphate, T<sub>4</sub>=Manganese as 56.0 Kg/ha. of manganese sulphate, T<sub>5</sub>=Ferrous as 56.0 Kg/ha. of ferrous sulphate, T<sub>6</sub>=Molybdenum as 1.1 Kg/ha. of sodium molybdate and T<sub>7</sub>=Mixture of above all micronutrients applied through soil.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) 39.0×9.1 m' for 64(174); N.A. for other. (iii) 4. (iv) (a) 9.1×4.9 m. (b) 7.3×3.7 m. (v) 91×61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 64(174) ; Not good for other. (ii) Nil. (iii) Grain yield. (vi) (a) 1964—65. (b) No. (c) Nil. (v) (a) Vallabhipur. (b) N.A. (iv) Nil. (vii) Errors are heterogenous and treat×year interaction is about.

## 5. RESULES :

## 64(174)

(i) 649 Kg/ha. (ii) 53.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	645	668	649	691	598	663	659	621

## 65(99)

(i) 283 Kg/ha. (ii) 102.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	282	357	283	310	228	198	334	273

**Crop :- Wheat (Rabi).**

**Ref :-Gj. 62(204), 63(209).**

**Site :- Dry Farming Res. Stn., Dhandhuka.**

**Type :- 'M'.**

Object :-To study the effect of different micronutrients through foliar application on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Wheat. (b) Cotton. (c) 11.2 Kg/ha. of N for 62(204); Nil for 63(209). (ii) Medium black. (iii) 23.10.1962 ; 23.10.1963. (iv) (a) 4 to 5 harrowings. (b) Drilling. (c) 49 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) Arnej—236 (medium). (vii) Un-irrigated. (viii) Nil. (ix) 2 cm ; 4 cm. (x) 9.3.1963 ; 10.3.1964.

## 2. TREATMENTS :

6 micronutrients treatments : T<sub>0</sub>=Control, T<sub>1</sub>=2.2 Kg/ha. of Borax+0.6 Kg/ha. of Bentonite, T<sub>2</sub>=9.0 Kg/ha. of C/S+9.0 Kg/ha. of lime, T<sub>3</sub>=3.4 Kg/ha. of manganese sulphate+2.2 Kg/ha. of lime, T<sub>4</sub>=3.4 Kg/ha. of zinc sulphate+2.2 Kg/ha. of lime and T<sub>5</sub>=210 gm./ha. of sodium molybdate.

Micronutrients dissolved in 1123 litres of water and applied as foliar spray.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) 60.4×20.1 m. (iii) 2. (iv) (a) 10.1×20.1 m. (b) 7.6×18.3 m. (v) 122 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—1963. (b) No. (c) Results of combined analysis given under 5. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) Errors are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 1047 Kg/ha. (ii) 120.1 Kg/ha. (15 d.f. made up of pooled error and treatment×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	984	1019	1107	1048	1070	1056

**Crop :- Wheat (Rabi).****Ref :- 63(37), 64(172).****Site :- Dry Farming Res. Stn., Dhandhuka.****Type :- 'M'.**

Object :- To find out the optimum placement of N in the form of Urea for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 63(37) ; Cotton—Wheat for 64(172). (b) Cotton. (c) 22.4 kg/ha of N for 63(37) ; 11.2 kg/ha. of N for 64(172). (ii) Medium black soil. (iii) 31.10.1963 ; 30.10.1964. (iv) (a) 1 ploughing and 4 harrowings for 63(37) ; 5 harrowings for 64(172). (b) Drilling. (c) 45 to 49 Kg/ha. (d) 46 cm between rows for 63(37) ; 38 cm between rows for 64(172). (e) N.A. (v) Nil. (vi) A-206. (vii) Unirrigated. (viii) Nil. (ix) 66 cm ; Nil. (x) 13.3.1964 ; 21.3.1965.

**2. TREATMENTS :**

4 times of application of 11.2 kg/ha of N as Urea :  $T_1$  = One week before sowing,  $T_2$  = At sowing,  $T_3$  = One week after germination and  $T_4$  = In two split doses by foliar spraying 1st at tillering and 2nd at the time of heading.

N applied at a depth of 15 cm for  $T_1$  to  $T_3$  treatments.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) 18.3m × 9.1 m. (iii) 6. (iv) (a) 9.1m × 4.5m. (b) 7.6 cm × 3.1 cm. (v) 76 cm. × 76 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1963—contd. upto 66 (1965 not conducted). (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :****63(37)**

(i) 1151 kg/ha. (ii) 155.6 kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in kg/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$
Av. yield	1150	1104	1165	1187

**64(172)**

(i) 647 kg/ha. (ii) 65.9 kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in kg/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$
Av. yield	642	671	603	674

**Crop :- Wheat (Rabi).****Ref :- G. 64(173), 65(100).****Site :- Dry Farming Res. Stn., Dhandhuka.****Type :- 'M'.**

Object :- To study the effect of different micronutrients by foliar application on Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Wheat. (b) Cotton. (c) 11.2 Kg/ha. of N for 64(173), 22.4 Kg/ha. of N+11.2 Kg. of P/ha. for 65(100). (ii) Medium black. (iii) 25.10.64, 20.10.65. (iv) (a) 5 Harrowings. (b) Drilling. (c) 49 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) Arnej—206 (Medium). (vii) Un-irrigated. (viii) and (ix) Nil. (x) 20.3.65, 25.3.66.

**2. TREATMENTS :**

8 micronutrients treatments :  $T_0$  = control (water spray),  $T_1$  Boron as 2.2 Kg/ha. of Borex,  $T_2$  = Copper 9.0 Kg/ha. of copper sulphate+9.0 Kg/ha. of lime,  $T_3$  = Zinc as 3.4 Kg/ha. of zinc sulphate+2.2 Kg/ha. of lime,  $T_4$  = Manganese as 3.4 Kg/ha. of manganese sulphate+2.2 Kg/ha. of lime,  $T_5$  = Ferrous as 12.2 Kg/ha. of Ferrous sulphate+11.2 Kg/ha. of lime,  $T_6$  = Molybdenum as 2.1 Kg/ha. as sodium molybdate, and  $T_7$  = Mixture of all above micronutrients.

**Note :-** Micronutrients were dissolved in 1123 litres of water and sprayed.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 8. (b) 39.1 m. × 9.1 m. for 64(173), N.A. for 65(100). (iii) 4. (iv) (a) 4.2 m. × 9.1 m. (b) 3.7 m. × 7.3 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good for 64(173), not good for 65(100). (ii) Nil. (iii) Grain yield. (iv) (a) 1964—contd. (b) No. (v) Arnej, Vallabhipur for 64(173); N.A. for 65(100).

## 5. RESULTS :

## 64(171)

- (i) 748 Kg/ha. (ii) 67.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	738	696	771	766	780	747	747	743

## 65(100)

- (i) 426 Kg/ha. (ii) 96.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	516	389	434	424	331	439	390	483

**Crop :- Wheat (Rabi).**

**Ref :- 62(88), 63(89), 64(269).**

**Site :- Agri. Res. Stn., Dohad.**

**Type :- 'M'.**

**Object :-** To study the effect of foliar spraying of Urea on the yield of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Paddy—Wheat for 62(88); Maize—Wheat for 63(89); Nil for 64(269). (b) Paddy for 62(88); Maize for 63(89) and 64(269). (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super. (ii) Medium black. (iii) 11.12.1962; 1.11.1963; 1.12.1964. (iv) (a) 3 to 4 ploughings. (b) Drilling. (c) 44.8 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) A-206 (early). (vii) Unirrigated. (viii) Nil. (ix) Nil. (x) 2.4.1963; 20.3.1964; 27.3.1965.

## 2. TREATMENTS :

5 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=5.6 Kg/ha. of N as Urea as foliar spraying, M<sub>2</sub>=11.2 Kg/ha. of N as Urea as foliar spray, M<sub>3</sub>=11.2 Kg/ha. of N as F.Y.M.+5.6 Kg/ha. of N as Urea by foliar spraying and M<sub>4</sub>=11.2 Kg/ha. of N as F.Y.M.+11.2 Kg/ha. of N as Urea as foliar spray.

Foliar spraying done in two equal doses. 1st dose at flag leaf stage and 2nd dose at flowering.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 5. (b) 15.2 m. × 12.2 m. for 62(88), 63(89); N.A. for 64(269). (iii) 6. (iv) (a) 12.2 m. × 3.1 m. (b) 10.4 m. × 1.8 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961 to 1964 (but modified in 62). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) The error variances are heterogeneous and interaction of treatment with years is absent.

## 5. RESULT :

## 62(88)

- (i) 1232 Kg/ha. (ii) 190.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1231	1038	1209	1306	1376

## 63(89)

- (i) 3382 Kg/ha. (ii) 321.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	3148	3306	3641	3579	3236

64(269)

(i) 1246 Kg/ha. (ii) 144.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1204	1215	1221	1237	1354

**Crop :- Wheat (Rabi).**

**Ref :-Gj 61(119).**

**Site :- Agri. Res. Stn., Dohad.**

**Type :- 'M'.**

Object :—To study the effect of foliar spraying of Urea on the yield and quality of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Maize and Wheat (c) 33.6 Kg/ha. of N+16. Kg/ha. of P<sub>2</sub>O<sub>5</sub> for Maize only. (ii) Medium black. (iii) 20.11.61. (iv) (a) 3 ploughings and one harrowing. (b) Drilling. (c) 44.8 Kg/ha. (d) 30.5 cm. between rows. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) A—206. (vii) Unirrigated. (viii) Nil. (ix) 102 cm. (x) 22.3.62.

2. TREATMENTS :

5 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=5.6 Kg/ha. of N as Urea, M<sub>2</sub>=11.2 Kg/ha. of N as Urea, M<sub>3</sub>=11.2 Kg/ha. of N as A/S+5.6 Kg/ha. of N as Urea and M<sub>4</sub>=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of N as Urea.

A/S applied as basal dose and Urea applied by spraying in two equal doses ; 1st spraying done at flag leaf stage and the 2nd spraying at flowering stage.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) 12.2 m. × 3.0 m. (b) 10.4 m. × 1.8 m. (v) 91 cm. × 61 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1961—1964 (modified in 62). (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS

(i) 682 Kg/ha. (ii) 142.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	659	607	651	642	853

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(88), 63(89).**

**Site :- Agri. Res. Stn., Dohad.**

**Type :- 'M'.**

Object :—To study the effect of foliar spraying of Urea on the yield and quality of Wheat.

1. BASAL CONDITIONS :

(i) (a) Paddy-Wheat for 62(88) and Maize-Wheat for 63(89). (b) Paddy for 62(88), Maize for 63(89). (c) 44.8 Kg/ha. of N+22.4 kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super. (ii) Medium black soil. (iii) 11.12.62, 1.11.63. (iv) (a) 3 ploughings and 1 harrowing. (b) Drilling. (c) 44.8 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) A-206 (early). (vii) Unirrigated. (viii) Nil. (ix) Nil (x) 2.4.63, 17 to 20.3.1946.

## 2. TREATMENTS :

5 manurial treatments :  $M_0$ =Control,  $M_1$ =5.6 Kg/ha. of N as Urea,  $M_2$ =11.2 Kg/ha. of N as Urea,  $M_3$ =11.2 Kg/ha. of N as A/S+5.6 Kg/ha. of N as Urea and  $M_4$ =11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of N as Urea.

A/S applied as basal dose and Urea applied by spraying in two equal doses ; 1st spraying done at flag leaf stage and the 2nd spraying at flowering stage.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 15.2 m. × 12.2 m. (iii) 6. (iv) (a) 12.2 m. × 3.1 m. (b) 10.4 m. × 1.8 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961—63. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and treatment × year interaction in absent.

## 5. RESULTS :

62(88)

(i) 1232 Kg/ha. (ii) 190.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	1231	1038	1209	1306	1376

63(89)

(i) 3382 Kg/ha. (ii) 321.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in kg./ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	3148	3306	3641	3579	3236

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(87), 63(90).**

**Site :- Agri. Res. Stn., Dohad.**

**Type :- 'M'.**

Object :—To study the effect of different micronutrients on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Wheat. (b) Paddy. (c) 44.8 kg./ha. of N as A/S+22.4 kg./ha. of  $P_2O_5$  as Super. (ii) Medium black. (iii) 24.11.1962 ; 30.11.1963. (iv) (a) 3 to 4 ploughings. (b) Drilling. (c) 67 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) 33.6 Kg/ha. of N+16.8 Kg/ha. of  $P_2O_5$ . (vi) NP—718(medium). (vii) Irrigated. (viii) 2 interculturings for 62(87) ; 3 weedings for 63(90). (ix) Nil. (x) 20.4.1963 ; 22 to 24.4.1964.

## 2. TREATMENTS :

6 micronutrient treatments :  $M_0$ =Control,  $M_1$ =3.4 Kg/ha. of Zinc sulphate,  $M_2$ =140 gm./ha. of sodium molybdate,  $M_3$ =2.2 Kg/ha. of Borax,  $M_4$ =10.0 Kg/ha. of C/S and  $M_5$ =3.4 Kg/ha. of Manganese sulphate.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) 32.6 m. × 41.5 m. (iii) 2. (iv) (a) 10.1 m. × 20.1 m. (b) 9.5 m. × 19.5 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-1963. (b) No. (c) Results of combined analysis given under 5. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) Error variances are homogeneous and treatment × year interaction is absent.

## 5. RESULTS :

(i) 1467 Kg/ha. (ii) 121.2 Kg/ha. (15 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	1430	1540	1588	1450	1358	1438

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(47), 62(94), 63(100).**

**Site :- Irrigation-cum-Demons. Farm, Halvad. Type :- 'M'.**

**Object :-** To find out the optimum dose and time of application of N to Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Sann* (G.M.) for 61(47), 62(94); *Maize* for 63(100). (c) Nil. (ii) Medium black. (iii) 24.11.1961; 12.11.1962; 14.11.1963. (iv) (a) Nil for 61(47); 1 ploughing+1 harrowing for 62(94), 63(100). (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) N.P.—824. (vii) Irrigated. (viii) Nil. (ix) Nil for 61(47); 35 cm. and 26 cm. for the years 62 and 63 respectively. (x) 24.3.1962; 11.3.1963; 18.3.1964.

**2. TREATMENTS :**

All combinations of (1) and (2).

(1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 4 times of application : T<sub>1</sub>=At sowing, T<sub>2</sub>=At 1st irrigation, T<sub>3</sub>=½ at sowing+½ at 1st irrigation and T<sub>4</sub>=½ at sowing+½ at 1st irrigation+½ one week before flowering.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. for 61(47); 22.9 m.×23.2 m. for 62(94) and 63(100). (iii) 4. (iv) (a) 7.3 m.×5.5 m. (b) 6.1 m.×4.6 m. (v) 61 cm.×46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961—1963. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Heavy winds during the period of harvest for 62(94). (vii) Error variances are homogeneous and Treatments×years interaction is absent.

**5. RESULTS :**

(i) 1401 Kg/ha. (ii) 218.8 Kg/ha. (121 d.f. made up of pooled error and Treatments×years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
N <sub>1</sub>	1356	1379	1339	1391	1366
N <sub>2</sub>	1515	1438	1369	1297	1405
N <sub>3</sub>	1525	1462	1435	1305	1432
Mean	1465	1426	1381	1331	1401

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(197), 63(197).**

**Site :- Irrigation-cum-Demons. Farm, Halvad.**

**Type :- 'M'.**

**Object :-** To study the effect of different micronutrients on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Sannhemp* for 62(197); *Bajra* for 63(197). (c) Nil. (ii) Medium black. (iii) 13.11.1962; 11.11.1963. (iv) (a) 1 ploughing and 1 to 2 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) 22.4 Kg/ha. of N for 62(197); 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(193). (vi) NP-710. (vii) Irrigated. (viii) Nil. (ix) Nil; 3 cm. (x) 14.3.1963; 15.3.1964.



## 2. TREATMENTS :

6 micronutrient treatments :  $M_0$ =Control,  $M_1$ =3.4 Kg/ha. of Zn. Sul.,  $M_2$ =2.2 Kg/ha. of Borax,  $M_3$ =9.0 Kg/ha. of C/S,  $M_4$ =3.4 Kg/ha. of Mn. Sul. and  $M_5$ =70 Kg/ha. of Sodium molybdate.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 10.1 m. × 20.1 m. (b) 8.2 m. × 18.3 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-1963. (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 766 Kg/ha. (ii) 112.2 Kg/ha. (15 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
Av. yield	755	721	827	760	746	786

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(152), 65(66).**

**Site :- Irrigation-cum-Demons. Farm, Halvad.**

**Type :- 'M'.**

Object :- To study the residual effect of  $P_2O_5$  applied to previous crop of Groundnut on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut—Wheat. (b) Groundnut. (c) As per treatments. (ii) Medium black. (ii) 8.11.1964; 29.11.1965. (iv) (a) One harrowing. (b) Drilling. (c) 74 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of N on 22.11.64 for 64(152); Nil. for 65(66). (vi) NP—824. (vii) Irrigated. (viii) Nil. (ix) Nil. (x) 8.3.1965; 25.3.1966.

## 2. TREATMENTS :

8 manurial treatments :  $M_0$ =Control (no manure),  $M_1$ =22.4 Kg/ha. of  $P_2O_5$  every year,  $M_2$ =22.4 Kg/ha. of  $P_2O_5$  every alternate years  $M_3$ =44.8 Kg/ha. of  $P_2O_5$  every year,  $M_4$ =44.8 Kg/ha. of  $P_2O_5$  every alternate year,  $M_5$ =67.2 Kg/ha. of  $P_2O_5$  every year,  $M_6$ =67.2 Kg/ha. of  $P_2O_5$  every alternate year, and  $M_7$ =67.2 Kg/ha. of  $P_2O_5$  every third year.

The above treatments were applied to previous groundnut crop.  $P_2O_5$  as Super broadcast on 29.6.65 for 65(66).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 5.5 m. (b) 9.1 m. × 4.6 m. (v) 61 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 64(152); Not satisfactory for 65(66). (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964 to 1965. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) High temperature in January was unfavourable to Wheat. Error variances are heterogeneous and interaction is absent.

## 5. RESULTS :

64(152)

(i) 797 Kg/ha. (ii) 206.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0 + M_2 + M_4 + M_6 + M_7$	$M_1$	$M_3$	$M_5$
Av. yield	784	903	822	730

65(66)

(i) 302 Kg/ha. (ii) 91.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>
Av. yield	300	313	258	245	351	359	302	291

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(68).**

**Site :- Irrigation-cum-Demons Farm, Jamnagar.**

**Type :- 'M'.**

Object :—To find out the effect of placement of N on Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra*. (c) Nil. (ii) Medium black. (iii) 29.11.61. (iv) (a) 1 ploughing and two harrowing. (b) Drilling. (c) 89.6 Kg/ha. (d) 22.9 cm. between rows. (e) N.A. (v) Nil. (vi) NP—824 (vii) Irrigated. (viii) One weeding. (ix) Nil. (x) 31.3.62.

2. TREATMENTS :

5 manurial treatments : M<sub>1</sub>=33.6 Kg/ha. of N as A/S broadcasted at sowing, M<sub>2</sub>=33.6 Kg/ha. of N as A/S drilled at sowing, M<sub>3</sub>=33.63 Kg/ha. of N as A/S placed 5.1 cm. on one side, M<sub>4</sub>=33.6 Kg/ha. of N as A/S placed 5.1 cm. on either side and M<sub>5</sub>=67.3 Kg/ha. of N as A/S placed 5.1 cm. on either side

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 6.7 m. × 4.2 m. (b) 5.5 m. × 3.7 m. (v) 61.0 cm. × 61.0 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Slight attack of top shoot borer and rust. (iii) Grain yield. (iv) (a) 1961 (modified in 1962)—1964. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

(i) 538 Kg/ha. (ii) 69.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	511	573	523	561	523

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(210), 63(217), 64(178).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar. Type :- 'M'.**

Object :—To find out the best method of placement of N for Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 62(210); Groundnut for 63(217) and 64(178). (c) N.A. for 62(210); Nil for 63(217) and 64(178). (ii) Medium black. (iii) 25.11.1962; 9.11.1963; 21.11.1964. (iv) (a) 1 ploughing + 1 to 2 harrowings. (b) Drilling. (c) 90 Kg/ha. for 62(210); 79 Kg/ha. for 63(217) and 64(178). (d) 23 cm. between rows. (e) Nil. (v) Nil for 62(210); 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(217); 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(178). (vi) NP-824. (vii) Irrigated. (viii) 1 weeding for 62(210); 4 weedings for 63(217); Nil for 64(178). (ix) Nil; 15 cm.; 2 cm. (x) 29.3.1963; 18.3.1964; 8.4.1965.

## 2. TREATMENTS :

All combinations of (1) and (2).

(1) 2 levels of N as A/S :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 4 methods of application of N :  $M_1$ =Broadcast,  $M_2$ =Drilling,  $M_3$ =Side placement at 5 cm. on one side of row and  $M_4$ =Side placement at 5 cm. on either side of row.

N applied at planting.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 6.7 m.  $\times$  4.6m. (b) 5.5m.  $\times$  3.7 m. (v) 61 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of top shoot borers for 62(210); Attack of top shoot borers and white fly for 63(217); Attack of white fly and rust for 64(178). Aldrin was dusted for 64(178) only. (iii) Yield of grain. (iv) (a) 1961—1964 (modified in 1962). (b) No. (c) Results of combined analysis given under 5. Results. (v) N.A. (vi) Due to abrupt stoppage of canal water, last irrigation could not be given for 62(210); Severe cold for 63(217) and 64(178). (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 1689 Kg/ha. (ii) 152.0 Kg/ha. (14 d.f. made up of Treatments  $\times$  years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	Mean
$N_1$	1682	1719	1489	1607	1624
$N_2$	1831	1778	1699	1709	1754
Mean	1756	1748	1594	1658	1689

**Crop :-** Wheat (*Rabi*).

**Ref :-** Gj. 61(130), 62(62), 64(256).

**Site :-** Central Exptl. Stn., Junagadh.

**Type :-** 'M'.

**Object :-** To find out the best method of application of N for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61(130), 62(62); Cotton-Groundnut-Wheat for 64(256). (b) Wheat for 61(130); Groundnut for others. (c) 44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$  for 61(130); 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 62(62); Nil for 64(256). (ii) Medium black. (iii) 19.11.61 : 9.11.62; 12.11.64. (iv) (a) Nil for 61(130), 62(62); 1 ploughing and 3 harrowings for 64(256). (b) Hand sowing for 61(130), 62(62); Drilling for 64(256). (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 33.6 Kg./ha. of  $P_2O_5$  as Super for 61(130), 62(62), 22.4 Kg/ha. of  $P_2O_5$  as Super+24.7 C.L./ha. of F.Y.M. for 64(256). (vi) NP—824. (vii) Irrigated. (viii) Nil. (ix) 60 cm. for 62(62); Nil for others. (x) 13.3.1962; 26.2.1963; 6.3.1965.

## 2. TREATMENTS :

All combinations of (1) and (2).

(1) 2 levels of N as A/S :  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 4 methods of application :  $M_1$ =Broadcasting at sowing,  $M_2$ =Drilling 6.4 cm. below seed,  $M_3$ =Side placement at 5.1 cm. on one side and  $M_4$ =Side placement at 5.1 cm. on either side.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii)(a) 8. (b) 21.0m.  $\times$  13.4 m. for 61(130), 62(62); N.A. for 64(256). (iii) 4. (iv) (a) 6.7 m.  $\times$  4.9 cm. for 61(130); 6.7 m.  $\times$  4.6 m. for others. (b) 5.5 m.  $\times$  3.7 m. (v) 61 cm.  $\times$  61 cm. for 61(130), 61 cm.  $\times$  46 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961 to 1964(1963 not conducted). (b) No. (c) Results of combined analysis given under 5. Result (v) (a) Thasra. (vi) Nil. (vii) Errors are homogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 1977 Kg/ha. (ii) 416.6 Kg/ha. (14 d.f. made up of interaction of treatment with years). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
N <sub>1</sub>	1790	1865	1791	1849	1824
N <sub>2</sub>	2161	2183	2099	2079	2130
Mean	1975	2024	1945	1964	1977

C.D. for N marginal means=182.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- 61(132), 62(61), 64(257).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To find out the optimum time of application of N for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61(132), 62(61); Cotton-Groundnut-Wheat. (b) Wheat for 61(132); Paddy for 62(61); Groundnut for 64(257). (c) 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(132); 12.4 C.L./ha. of F.Y.M.+ 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 21.11.1961; 8.11.1962; 11.11.1964. (iv) (a) Nil for 61(132), 62(61); 1 ploughing and 3 harrowings for 64(257). (b) Hand sowing for 61(132), 62(61); Drilling for 64(257). (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(132), 62(61); 24.7 C.L./ha. of F.Y.M.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(257). (vi) NP—824. (vii) Irrigated. (viii) Nil. (ix) Nil for 61(132), 64(257); 60 cm. for 62(61). (x) 14.3.62; 27.2.63; 5.3.1965.

## 2. TREATMENTS :

All combinations of (1) and (2).

(1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 4 times of application : T<sub>1</sub>=At sowing, T<sub>2</sub>=At 1st irrigation, T<sub>3</sub>= $\frac{1}{2}$  at sowing+ $\frac{1}{2}$  at first irrigation and T<sub>4</sub>= $\frac{1}{2}$  at sowing+ $\frac{1}{2}$  at first irrigation+ $\frac{1}{2}$  one week before flowering.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 23.8 cm.  $\times$  28.4 cm. for 61(132); N.A. for others. (iii) 4. (iv) (a) 7.3 cm.  $\times$  5.7 cm. for 61(132); 7.3 cm.  $\times$  5.5 cm. (b) 6.1 cm.  $\times$  4.6 cm. for others. (v) 61 cm.  $\times$  61 cm. for 61(132); 61cm.  $\times$  46cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Good for 61(132), 64(257); Normal for 62(61). (ii) Nil. (iii) Grain yield. (iv)(a) 1961—1964 (not conducted in 63). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Kholwad. (vi) Nil. (vii) Errors are homogeneous and treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 2104 Kg/ha. (ii) 490.4 Kg/ha. (22 d.f. made up of interaction of treatment with years). (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
N <sub>1</sub>	1965	1867	2036	1860	1932
N <sub>2</sub>	2191	2040	2112	2237	2145
N <sub>3</sub>	2500	2168	2351	1925	2235
Mean	2219	2025	2166	2007	2104

C.D. for N marginal means=207.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(253).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of different Micronutrients on Wheat by soil application.

1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut-Wheat. (b) Groundnut. (c) Nil. (ii) Medium black soil. (iii) 24.11.64.  
(iv) (a) 1 ploughing and 3 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A.  
(v) 24.7 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) NP-824. (vii) Irrigated.  
(viii) and (ix) Nil. (x) 11.3.65.

2. TREATMENTS :

8 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Boron as 11.3 Kg/ha. of Borax, T<sub>2</sub>=Copper as 28.0 Kg/ha. of Cu. Sul., T<sub>3</sub>=Zinc as 28.0 Kg/ha. of Zn. Sul., T<sub>4</sub>=Manganese as 56.0 Kg/ha. Mn. Sul/ha. T<sub>5</sub>=Ferrous as 56.0 Kg/ha. of Fe. Sul., T<sub>6</sub>=Molybdeum as 1.1 Kg/ha. of Sodium Molybdate and T<sub>7</sub>=Mixture of above all together.

Micronutrients were applied in soil at sowings.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.1 m.×4.6 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×46 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2791 Kg/ha. (ii) 146.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	2864	2920	2752	2766	2812	2733	2854	2625

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(254)**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of different micronutrients on Wheat by foliar application.

1. BASAL CONDITIONS :

(i) (a) Cotton—Groundnut—Wheat. (b) Groundnut. (c) Nil. (ii) Medium black soil. (iii) 21.11.64.  
(iv) (a) 1 ploughing and 3 harrowing. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (v) 24.7 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) NP-824. (vii) Irrigated. (viii) Nil.  
(ix) Nil. (x) 7.3.65.

## 2. TREATMENTS :

8 micronutrients treatments :  $T_0$ =Control.  $T_1$ =Boron as 2.2 Kg/ha. of Borax,  $T_2$ =Copper as 8.9 Kg/ha. of Cu. Sul. + 8.9 Kg/ha. of lime,  $T_3$ =Zinc as 3.3 Kg/ha. Zn. Sul. + 2.2 Kg/ha. of lime,  $T_4$ =Manganese as 3.4 Kg/ha. of Mg. Sul. + 2.2 Kg/ha. of lime,  $T_5$ =Ferrous as 11.3 Kg/ha. of Fe. Sul. + 11.2 Kg/ha. of lime,  $T_6$ =Molybdenum as 0.2 Kg/ha. of Na. Molybd.,  $T_7$ =Mixture of above all together.

Above nutrients dissolved in 1123 litres of water and solution sprayed by foliar application in 2 stages. (1st spray after one month from germination and 2nd spray at following).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N A. (iii) 4. (iv) (a) 9.1 m. × 4.6 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2184 Kg/ha. (ii) 255.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	2322	2009	2051	2107	2312	2461	2401	2013

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(255), 65(203).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object : To study the effect of Urea spraying on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Groundnut—Wheat for 64(255), Nil for 65(203). (b) Groundnut. (c) Nil for 64(255), 11.2 Kg. of N + 22.4 Kg. of  $P_2O_5$ /ha. for 65(203). (iii) Medium black soil. (iii) 24.12.64, 8.11.65. (iv) (a) 1 ploughing + 3 harrowings for 64(255), 1 ploughing, 2 harrowings for 65(203). (b) Drilling. (c) 90 Kg/ha. for 64(255), 100 Kg/ha. for 65(203). (d) 23 cm. between rows. (e) Nil. (v) 24.7 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of  $P_2O_5$  for 64(255), Nil for 65(203). (vi) NP—824 (medium) (vii) Irrigated. (viii) Nil for 64(255), 3 weedings for 65(203). (ix) Nil for 64(255), 1.3 cm. for 65(203). (x) 5.4.65, 10.3.66.

## 2. TREATMENTS :

$T_0$ =Control,

$T_1$ =22.4 Kg/ha. of N as Urea to soil,

$T_2$ =22.4 Kg/ha. of N as Urea spraying to standing crop only once,

$T_3$ =Urea spraying in two doses as 22.4 Kg/ha. of N during growth period and 22.4 Kg/ha. of N at flag leaf stage.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4 for 64(255), 6 for 65(203). (iv) (a) 10.7 m. × 4.6 m. for 64(255); 9.1 m. × 2.8 m. for 65(203). (b) 10.1 m. × 3.7 m. for 64(255); 7.3 m. × 1.8 m. for 65(203) (v) 30 cm. × 46 cm. for 64(255), 92 cm. × 46 cm. for 65(203). (vi) Yes.

## 4. GENERAL :

(i) Below normal for 64(255), good for 65(203). (ii) Nil. (iii) Grain yield. (iv) (a) 1964 to 67. (b) No. (v) to (vii) Nil.

## 5. RESULTS :

**64(255)**

(i) 746 Kg/ha. (ii) 142.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	752	633	793	804

65(203)

(i) 16.39 Kg/ha. (ii) 265.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	978	1875	1820	1883

C.D. = 326.6 Kg/ha.

**Crop :- Wheat (Rabi)****Ref :- Gj. 62(81).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'M'.**

Object :- To assess the effects of different Micronutrients on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. + 11.2 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 21.11.62. (iv) (a) One ploughing and 3 harrowings. (b) Hand sowing by opening the furrows. (c) 89.7 Kg/ha. (d) 22.9 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of N + 22.5 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) NP-824. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 16.3.63.

**2. TREATMENTS :**

6 micronutrients : M<sub>0</sub> = Control, M<sub>1</sub> = 3.4 Kg/ha. of Manganese as Mn. Sul., M<sub>2</sub> = 9.0 Kg/ha. of Copper as C/S, M<sub>3</sub> = 2.2 Kg/ha. of Boron as Borax, M<sub>4</sub> = .14 Kg/ha. of Molybdenum as Sodium Molybdate and M<sub>5</sub> = 3.4 Kg/ha. of Zn. as Zn. Sul.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 20.1 m. × 10.1 m. (b) 19.2 m. × 9.1 m. (v) 45.7 cm. × 45.7 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) and (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 2413 Kg/ha. (ii) 412.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	2381	2306	2309	2314	2856	2313

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(136), 62(161), 63(164), 64(97).****Site :- Trial-Cum-Demons. Farm, Kholwad. Type :- 'M'.**

Object :- To find out the suitable time of application of different doses of N to Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. for 62(161); Nil for 61(136), 63(164) and 64(97). (ii) Medium black. (iii) 1.12.1961; 7.12.1962; 9.12.1963; 21.12.1964. (iv) (a) 1 to 2 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(136) and 62(161); 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(164) and 64(97). (vi) NP-824. (vii) Irrigated. (viii) Nil. (ix) 145 cm., 84 cm., 124 cm., 191 cm. (x) 7.4.1962; 1.4.1963; 17.4.1964, 25.3.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

(2) 4 times of application of N :  $T_1=$ At sowing,  $T_2=$ At 1st irrigation,  $T_3=$  at sowing+ $\frac{1}{2}$  at 1st irrigation and  $T_4=$  at sowing+ $\frac{1}{2}$  at 1st irrigation+ $\frac{1}{2}$  one week before flowering.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 7.3 m.  $\times$  5.8 m. (b) 6.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil for 61(136); Attack of wheat rust for 62(161), 63(164) and 64(97). (iii) Yield of grain. (iv) (a) 1961—1964. (b) No. (c) Results of combined analysis given under 5. (v) Junagadh. (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 1351 Kg/ha. (ii) 150.1 Kg/ha. (33 d.f. made up of Treatments  $\times$  years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$N_1$	1159	1237	1314	1204	1228
$N_2$	1476	1372	1301	1531	1420
$N_3$	1478	1290	1444	1407	1405
Mean	1371	1300	1353	1381	1351

C.D. for N marginal means = 108.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(98), 65(242).**

**Site :- Trial-cum-Demonstration Farm, Kholwad.**

**Type :- 'M'.**

Object :—To study the effect of direct effect of  $P_2O_5$  on Groundnut and its residual effect on succeeding Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Wheat. (b) Groundnut. (c) As per treatments. (ii) Medium black for 64(98), Black for 63(242). (iii) 19.11.64, 23.11.65. (iv) (a) 1 ploughing+1 harrowing for 64(98), 2 ploughings+1 harrowing for 65(242). (b) Drilling. (c) 90 Kg/ha. for 64(98), 99 Kg/ha. for 65(242). (d) 30 cm. between rows. (e) Nil. (v) 22.4 Kg/ha. of N for 64(98), 49.4 Kg/ha. for 65(242). (vi) NP-718. (vii) Irrigated. (viii) Nil for 64(98); 2 weedings for 65(242). (ix) Nil. (x) 12.3.65; 16.3.66.

## 2. TREATMENTS :

8 manurial treatments :  $P_0=$ Control,  $P_1=22.4$  Kg/ha. of  $P_2O_5$  every year,  $P_2=22.4$  Kg/ha. of  $P_2O_5$  every 2nd year,  $P_3=44.8$  Kg/ha. of  $P_2O_5$  every year,  $P_4=44.8$  Kg/ha. of  $P_2O_5$  every 2nd year,  $P_5=67.3$  Kg/ha. of  $P_2O_5$  every year,  $P_6=67.3$  Kg/ha. of  $P_2O_5$  every 2nd year and  $P_7=67.3$  Kg/ha. of  $P_2O_5$  every 3rd year.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  5.8 m. (b) 9.8 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 64(98), good for 65(242). (ii) Attack of wheat rust for 64(98), Nil for 65(242). (iii) Grain yield. (iv) (a) 1964 to 68. (b) Yes. (v) to (vii) N.A.



## 5. RESULTS :

64(98)

(i) 1373 Kg/ha. (ii) 209.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg./ha.

Treatment	P <sub>0</sub>	(P <sub>1</sub> +P <sub>2</sub> )	(P <sub>3</sub> +P <sub>4</sub> )	(P <sub>5</sub> +P <sub>6</sub> +P <sub>7</sub> )
Av. yield	1113	1163	1537	1491

C.D.=308.4 Kg/ha.

65(242)

(i) 652 Kg/ha. (ii) 111.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatments	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	P <sub>4</sub>	P <sub>5</sub>	P <sub>6</sub>	P <sub>7</sub>
Av. yield	748	715	628	617	583	701	729	499

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(161), 62(172), 63(185).****Site :- Trial-cum-Demons. Farm, Kim.****Type :- 'M'.**

Object :-To find out the suitable time of application of different doses of N for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow for 61(161); Cotton for 62(172) and 63(185). (c) Nil for 61(161); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(172); 67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. for 63(185). (ii) Medium black. (iii) 17.11.1961; 14.11.1962; 20.12.1963, (iv) (a) 1 to 2 ploughings +1 to 2 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) NP-824. (vii) Irrigated. (viii) 6 interculturings for 61(161); Nil for 62(172); 1 inter-culturing for 63(185). (ix) Nil for 61(161); N.A. for 62(172) and 63(185). (x) 29.3.1962; 27.3.1963; 14.4.1964.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.(2) 4 times of application of N : T<sub>1</sub>=At sowing, T<sub>2</sub>=At 1st irrigation, T<sub>3</sub>=½ at sowing+½ at 1st irrigation and T<sub>4</sub>=½ at sowing+½ at 1st irrigation+½ at one week before flowering.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) 7.3 m.×5.8 m. (b) 6.1 m.×4.6 m. (v) 61 cm.×61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids and rust. Applied endrin and dusting of sulphur for 62(172). No incidence for 61(161) and 63(185). (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Results of combined analysis given under 5. (v) Junagadh and Kholwad. (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is present.

## 5. RESULTS :

(i) 1500 Kg/ha. (ii) 199.9 Kg/ha. (22 d.f. made up of Treatments×years interaction). (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
N <sub>1</sub>	1504	1190	1354	1374	1356
N <sub>2</sub>	1568	1380	1625	1597	1542
N <sub>3</sub>	1689	1519	1710	1495	1603
Mean	1587	1363	1563	1489	1500

C.D. for N marginal means=169.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(217), 63(230), 64(210).**

**Site :- Trial-cum-Demons. Farm, Pilvai.**

**Type :- 'M'.**

**Object :—**To find out the optimum dose and time of application of N for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) *Bajri*—Wheat—Tobacco. (b) *Bajri*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 8.11.62; 8.11.63; 15.11.64. (iv) (a) 2 ploughings and 1 harrowing. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) NP—824. (vii) Irrigated. (viii) 1 to 2 weedings and 1 interculturing. (ix) 4 cm. for 63; Nil for others. (x) 27.3.63; 23.3.64; 26.3.65.

**2. TREATMENTS :**

All combinations of (1) and (2),

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

(2) 4 times of application of N :  $T_1=$ At sowing,  $T_2=$ At first irrigation,  $T_3=$  at sowing +  $\frac{1}{2}$  at 1st irrigation and  $T_4=$  at sowing +  $\frac{1}{2}$  at first irrigation and  $\frac{1}{2}$  dose one week before flowering.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 7.3 m.  $\times$  5.8 m. (b) 6.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Slight attack of rust. (iii) Grain and fodder yield. (iv) (a) 1962 to 1964. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and interaction is absent.

**5. RESULTS :**

**62(217)**

(i) 1674 Kg/ha. (ii) 212.8 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$N_1$	1426	1534	1426	1318	1426
$N_2$	1632	1740	1767	1444	1646
$N_3$	2099	1839	2045	1812	1949
Mean	1719	1704	1746	1525	1674

C.D. for N marginal means = 153.1 Kg/ha.

**63(230)**

(i) 2050 Kg/ha. (ii) 421.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$N_1$	2036	1973	2207	1695	1978
$N_2$	1632	2117	1973	2027	1937
$N_3$	2413	2018	2207	2305	2236
Mean	2027	2036	2129	2009	2050

**64(210)**

(i) 2551 Kg/ha. (ii) 315.7 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
N <sub>1</sub>	2422	2440	2233	2260	2339
N <sub>2</sub>	2709	2476	2673	2556	2603
N <sub>3</sub>	2799	2547	2736	2763	2711
Mean	2643	2488	2547	2526	2511

C.D. for N marginal means=227.2 Kg/ha.

**Crop :- Wheat (Rabi).**  
**Site :- T. C.D.F., Pilvai.**

**Ref :- Gj. 65(251).**  
**Type :- 'M'.**

Object :— To study the effect of Urea spraying on Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajri*. (c) 12.4 C.L./ha of F.Y.M. (ii) Sandy loam soil. (iii) 16.11.65. (iv) (a) 5 ploughings. (b) Drilling. (c) 98.8 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) NP-824. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 19.3.66.

2. TREATMENTS :

4 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=22.4 Kg/ha of N as Urea applied to soil on 16.11.65, M<sub>2</sub>=22.4 Kg/ha. of N as foliar spraying of Urea during growth period on 4.1.66 and M<sub>3</sub>=M<sub>2</sub>+22.4 Kg/ha. of N as foliar spraying of Urea at the time of flag leaf stage on 13.1.66.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 m.×2.8 m. (b) 6.1 m.×1.5 m. (v) 150 cm.×60 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Weedicide applied on 15.11.65. (iii) Grain and fodder yield. (iv) (a) 1965—1967. (b) No. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1847 Kg/ha. (ii) 309.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	1726	2103	1887	1672

**Crop :- Wheat (Rabi).**  
**Site :- Agri. Res. Stn., Tancha.**

**Ref :- Gj. 60(151), 61(52), 62(123).**  
**Type :- 'M'.**

Object : To study the effect of foliar spraying of Urea on the yield and spottedness of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sann* for 60(151); *Jowar* for 61(152); *Lang* for 62(123). (c) 44.8 Kg/ha. of Super for 60(151); Nil for 61(152); G.M. for 62(123). (ii) Black cotton soil. (iii) 25.10.1960; 14.11.1961; 16.11.1962. (iv) (a) 3 to 4 harrowings for 60(151) and 61(52); 3 ploughings+7 harrowings for 62(123). (b) Drilling. (c) 45 Kg/ha. (d) 61 cm. between rows. (e) Nil. (iv) *Sann* (G.M.) for 60(151); Nil for 61(152) and 62(123). (vi) A-206. (vii) Unirrigated. (viii) 1 interculturing. (ix) Nil for 60(151) and 61(152); 52 cm. in the year 1962. (x) 2.3.1961; 11.3.1962; 10.3.1963.

## 2. TREATMENTS :

5 manurial treatments :  $M_0$ =Control,  $M_1$ =11.2 Kg/ha. of N as A/S as soil application,  $M_2$ =Spraying with water at 898 litres/ha.  $M_3$ =5.6 Kg/ha. of N as Urea as foliar spray and  $M_4$ =11.2 Kg/ha. of N as Urea as foliar spray.

1st spraying done at flag leaf stage and the 2nd at flowering stage.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 12.2 m.  $\times$  6.1 m. (b) 9.8 m.  $\times$  3.7 m. (v) 122 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory for 60(151); Normal for 61(152) and 62(123). (ii) Moderate attack of stem borers for 60(151); Mild attack of stem borers and white ants for 61(52); No incidence for 62(123). (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Absence of rains, high temperature during winter and stormy weather at the time of maturity affected the crop for 60(151). There was absence of dew at the time of harvest for 61(152). Sowing was late due to cloudy atmosphere and heavy showers on 3.11.1962 and hence the crop was affected due to late sowing and insufficient moisture for 62(123). Error variances are heterogeneous and interaction is absent.

## 5. RESULTS :

## 60(151)

(i) 332 Kg/ha. (ii) 36.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	325	289	359	360	328

C.D. = 44.2 Kg/ha.

## 61(52)

(i) 527 Kg/ha. (ii) 63.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	537	536	533	514	517

## 62(123)

(i) 925 Kg/ha. (ii) 130.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	898	872	939	948	968

**Crop :- Wheat (Rabi).**

**Site :- Agri. Res. Stn., Tancha.**

**Ref :- Gj. 62(124).**

**Type :- 'M'.**

Object :- To Study the effect of different micro-nutrients on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Lang. (c) G.M. (ii) Black Soil. (iii) 18.11.62. (iv) (a) 3 ploughings and 5 harrowings. (b) Drilling. (c) 44.8 Kg/ha. (d) 45.7 cm. between rows. (e) N.A. (v) 12.3 Kg/ha. of N as A/S + 12.3 Kg/ha. of  $P_2O_5$  as Super. (vi) A—206. (vii) Un-Irrigated. (viii) Interculturing (ix) 52 cm. in whole year. (x) 13.3.63.

## 2. TREATMENTS :

6 micronutrients :  $M_0$ =Control,  $M_1$ =3.4 Kg/ha. of Zn as Zn. Sul. + 2.2 Kg/ha. of lime,  $M_2$ =210 gm/ha. of Molybdenum as sodium molybdate,  $M_3$ =2.2 Kg/ha. of Boron as borax + 0.6 Kg/ha. of Bentonite,  $M_4$ =9.0 Kg/ha. of Copper as C/S + 9.0 Kg/ha. of lime and  $M_5$ =3.7 Kg/ha. of Manganese Mn. Sul. + 2.2 Kg/ha. of lime.

Micronutrients dissolved in 1123 litres of water and sprayed.

## 3. DESIGN :

(i) R. B. D. (ii) (a) 6. (b) N. A. (iii) 2. (iv) (a) 18.2 m. × 11.0 m. (b) 17.3 m. × 10.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Due to late sowing and insufficient moisture, crop was slightly affected. (ii) Nil. (iii) Grain and fodder. (iv) (a) to (c) No. (v) and (vi) N. A. (vii) Sowing was late due to cloudy weather and heavy showers on 3.11.62.

## 5. RESULTS :

(i) 574 Kg/ha. (ii) 47.0 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	612	548	600	554	553	577

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(148), 62(150), 63(178).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'M'.**

Object :- To find out the best method of placement of N for irrigated Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut for 61(148); Bajra for 62(150); Jowar for 63(178). (c) 11.2 Kg./ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(148); 22.4 Kg./ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(150); 22.4 Kg/ha. of N as A/S for 63(178). (ii) Sandy loam. (iii) 29.11.1961; 12.11.1962; 19.11.1963. (iv) (a) 1 ploughing+1 harrowing for 61(148); Nil for 62(150); 2 ploughings for 63(178). (b) Drilling. (c) 90 Kg/ha. for 61(148) and 62(150); 99 Kg/ha. for 63(178). (d) 30 cm. between rows. (e) Nil. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(150); Nil for 61(148) and 63(178). (vi) NP-824. (vii) Irrigated. (viii) 1 to 3 weedings+1 to 3 interculturings. (ix) Nil for 61(148); 66 cm. for the year 1962; 102 cm. for the year 1963. (x) 5.4.1962; 20.3.1963; 20.3.1964.

## 2. TREATMENTS :

All combinations of (1) and (2).

(1) 2 levels of N as A/S : N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 4 methods of application of N : M<sub>1</sub>=Broadcasting at sowing, M<sub>2</sub>=Drilling at 6.4 cm. below seed, M<sub>3</sub>=Side placement at 5.1 cm. on one side and M<sub>4</sub>=Side placement at 5.1 cm. on either side.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 6.7 m. × 4.9 m. (b) 5.5 m. × 3.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal; some lodging was observed on 15.2.1963 for 62(150). (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Results of combined analysis given under 5. (v) Junagadh. (vi) Nil. (vii) Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

(i) 2313 Kg/ha. (ii) 223.1 Kg/ha. (14 d.f. made up of Treatments × years interaction). (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	Mean
N <sub>1</sub>	1890	2130	1908	2230	2040
N <sub>2</sub>	2606	2500	2454	2784	2586
Mean	2248	2315	2181	2507	2313

C.D. for N marginal means=195.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(147), 62(149), 63(177).****Site :- Trial-cum-Demons. Farm, Thasra.****Type :- 'M'.**

Object :—To study the response of Wheat to higher doses of N along with P and K.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut for 61(147); *Bajra* for 62(149); *Jowar* for 63(177). (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 62(149); 22.4 Kg/ha. of N as A/S for 63(177). (ii) Sandy loam. (iii) 29.11.1961; 19.11.1963. (iv) (a) 1 to 2 ploughings+1 harrowing. (b) Drilling. (c) 90 Kg/ha. for 61(147) and 62(149); 99 Kg/ha. for 63(177). (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) NP-824. (vii) Irrigated. (viii) 1 interculturing for 61(147); 3 weedings+3 interculturings for 62(149); 2 weedings+1 interculturing for 63(177). (ix) Nil for 61(147); 66 cm. for the year 1962; 102 cm. for the year 1963. (x) 3.4.1962; 20.3.1963; 25.3.1964.

**2. TREATMENTS :**

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S :  $N_1=67.2$ ,  $N_2=100.9$  and  $N_3=134.5$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=67.2$  Kg/ha.(3) 2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=67.2$  Kg/ha.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 7.3 m.×5.8 m. (b) 6.1 m.×4.6 m. (v) 61 cm.×61 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Errors are homogeneous and interaction is present.

**5. RESULTS :**

(i) 2785 Kg/ha. (ii) 198.3 Kg/ha. (18 d.f. made up of various components of Treatments×years interaction). (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$K_0$	$K_1$	Mean
$P_0$	2554	2784	2714	2661	2706	2684
$P_1$	2864	3030	2763	2847	2924	2885
Mean	2709	2907	2738	2754	2815	2785
$K_0$	2574	2939	2749			
$K_1$	2843	2875	2727			

C.D. for P marginal means = 138.8 Kg/ha.

**Crop :- Wheat. (Rabi).****Ref :- Gj. 62(152), 63(176), 64(106).****Site :- Trial-cum-Demons. Farm, Thasra.****Type :- 'M'.**

Object :—To study the effect of composted super on Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut for 62 (152); *Bajri* for 63 (176), 64 (106). (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 62(152); 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63 (176) and 64 (106). (ii) Sandy loam. (iii) 27.11.1962; 22.11.1963; 27.11.1964. (iv) (a) 1 to 3 ploughings+1 to 2 harrowings. (b) Drilling. (c) 90 Kg/ha. for 62 (152) and 64 (106); 99 Kg/ha. for 63 (176). (d) 30 cm. between rows. (e) Nil. (v) 44.8 Kg/ha. of N as A/S for 62 (152) and 63 (176). Nil for 64 (106). (vi) NP-824. (vii) Irrigated (viii) 1 to 2 weedings+1 to 2 interculturings. (ix) 66 cm., 102 cm. and 77 cm. in respective years. (x) 24.3.1963; 28.3.1964; 13.4.1965.

## 2. TREATMENTS :

4 manurial treatments:  $M_1=12.4$  C.L./ha. of F.Y.M.,  $M_2=22.4$  Kg/ha. of  $P_2O_5$  as Super,  $M_3=M_1+M_2$  applied separately and  $M_4=M_1+M_2$  applied as mixture in pits.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 9.1 m.  $\times$  5.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-1964. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are heterogenous and interaction is present.

## 6. RESULTS :

(i) 2006 Kg/ha. (ii) 122.5 Kg/ha. (6 d. f. made up of Treatments  $\times$  years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	1901	1948	2008	2166

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(153), 63(175).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'M'.**

Object :- To study the effect of different micronutrients on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) Nil for 62 (153) and 22.4 Kg/ha. of N as A/S for 63(175). (ii) Sandy loam. (iii) 27.11.62; 15.11.1963. (iv) (a) 1 to 2 ploughings and 1 harrowing. (b) Drilling. (c) 89.7 to 91.8 Kg/ha. (d) 30 cm. between rows. (e) N. A. (v) Nil for 62 (153); 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super. (vi) NP-824. (vii) Irrigated. (viii) 2 to 3 weedings and 1 to 2 interculturings. (ix) 66 cm.; 102 cm. (x) 24.3.1963; 20.3.1964.

## 2. TREATMENTS :

6 Micronutrients :  $M_0$ =Control,  $M_1=2.2$  Kg/ha. of Boron as Borax+0.6 Kg/ha. of Bentonite,  $M_2=9.0$  Kg/ha. of Copper as A/S+9.0 Kg/ha. of lime,  $M_3=3.4$  Kg/ha. of Manganese as Mn. Sul.+2.2 Kg/ha. of lime,  $M_4=3.4$  Kg/ha. of Zinc as Zn Sul.+2.2 Kg/ha. of lime and  $M_5=0.2$  Kg/ha. of Molybdenum as Sodium molybdate.

Solutions of Micronutrients prepared in 1123 liters/ha. of water and sprayed in 2 doses : 1st dose after one month of complete germination and 2nd dose at the time of flowering.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) 1/49.4 ha. for 62(153) and 21.9 m.  $\times$  9.1 m. for other. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962-63. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 2024 Kg/ha. (ii) 126.4 Kg/ha. (15 d.f. made up of Treatments  $\times$  years interaction and pooled error). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
Av. yield	1788	2230	1961	2122	2246	1794

C.D.=190.5 Kg/ha.

**Crop :- Wheat (Rabi).****Ref : Gj. 64(105), 65(270).****Site :- Trial-cum-Demons. Farm, Thasra.****Type - M'.**

Object :—To study the effect of micronutrients on Wheat by foliar application.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 64(105), *Bajra*—Wheat for 65(270). (b) *Jowar* for 64(105), *Bajra* for 65(270). (c) 22.4 Kg/ha. of N as A/S for 64(105), 74.1 Kg/ha. of N+37.1 Kg/ha. of  $P_2O_5$  for 65(270). (ii) Sandy loam for 64(105), Goradu for 65(270). (iii) 24.11.64, 13.11.65. (iv) (a) 3 harrowings for 64(105), 2 ploughings+1 harrowing for 65(270). (b) Drilling. (c) 90 Kg/ha. for 64(105), 99 Kg/ha. for 65(270). (d) 30.5 cm. between rows. (e) Nil. (v) Nil for 64(105), 49.4 Kg/ha. of N+24.7 Kg. of P/ha. for 65(270). (vi) NP.—824. (vii) Irrigated. (viii) 1 weeding+2 interculturings for 64(105), 1 weeding for 65(270). (ix) 77 cm. for 64(105), Nil for 65(270). (x) 3.4.65, 15.3.66.

**2. TREATMENTS :**

8 Micronutrients :  $M_0$ =control (water spraying only),  $M_1$ =2.2 Kg/ha. of Borax,  $M_2$ =9.0 Kg/ha. of C/S,  $M_3$ =3.4 Kg/ha. of Zn. Sul.,  $M_4$ =3.4 Kg/ha. of Mn. Sul.,  $M_5$ =11.2 Kg/ha. of Ferrous Sulphate+11.2 Kg/ha. of lime,  $M_6$ =210 gm/ha. of Sodium Molybdate and  $M_7$ =Mixture of all the above micronutrients.

Note : Above micronutrients were dissolved in 1123 litres of water.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.1 m.×4.9 m. (b) 7.3 m×3.7 m. for 64(105), (a) 9.1 m. ×4.3 m. (b) 7.3 m.×3.7 m. for 65(270). (v) 92 cm.×61 cm. for 64(105), 31 cm.×92 cm. for 65(270). (vi) Yes.

**4. GENERAL :**

(i) Normal for 64(105), good for 65(270). (ii) Nil. (iii) Grain yield. (iv) (a) 1964 to 67. (b) No. (v) N.A. (vi) Nil. (vii) As the experiment is continued beyond 1965 the results of individual expts. are given below :

**5. RESULTS :****64(105)**

(i) 1252 Kg/ha. (ii) 225.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av.yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	1280	1130	1280	1317	1130	1252	1327	1299

**65(270)**

(i) 1417 Kg/ha. (ii) 330.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	1264	1519	1410	1373	1264	1328	1501	1674

**Crop :- Wheat (Rabi).****Ref :- Gj. 64(104), 65(272).****Site :- Trial-cum-Demons. Farm, Thasra.****Type :- 'M'.**

Object :—To study the effect of micronutrients on Wheat by soil application.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 64(140), *Bajra*—Wheat for 65(272). (b) *Jowar* for 64(104), *Bajra* for 65(272). (c) 22.4 Kg/ha. of N as A/S for 64(104), 74.1 Kg/ha. of N+37.0 Kg. of P/ha. for 65(272). (ii) Sandy loam for 64(104), Goradu soil for 65(272). (iii) 24.11.64, 7.11.65. (iv) (a) 3 harrowings for 64(104), 2 ploughings+1 harrowing for 65(272). (b) Drilling. (c) 89.7 Kg/ha. for 64(104), 99 Kg/ha. for 65(270). (d) 30.5 cm. between rows. (e) Nil. (v) Nil for 64(104), 49.4 Kg/ha. of N+25.7 Kg of P/ha. for 65(272). (vi) NP.—824. (vii) Irrigated. (viii) 1 weeding+2 interculturings for 64(104), 2 weedings for 65(272). (ix) 77 cm. for 64(104), Nil for 65(272). (x) 3.4.65, 11.3.66.



## 2. TREATMENTS :

8 micronutrient treatments :  $M_0$ =Control,  $M_1$ =11.2 Kg/ha. of Boron as Borax,  $M_2$ =28.0 Kg/ha. of Copper as C/S,  $M_3$ =28.0 Kg/ha. of Zinc as Zn. Sul.,  $M_4$ =56.0 Kg/ha. of Manganese as Mn.Sul.,  $M_5$ =56.0 Kg/ha. of Iron as Ferrous Sulphate  $M_6$ =1.1 Kg/ha. of molybdenum as Sodium molybdate and  $M_7$ =Mixture of all above micronutrients.

Note : Micronutrients applied to soil on 24.11.64, 7.11.65 respectively.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 4.9 m. (b) 7.3 m. × 3.7 m. for 64(104), (a) 4.3 m. × 9.1 m. (b) 3.7 m. × 7.4 m. for 65. (v) 30 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 64(104), good for 65(272). (ii) Nil. (iii) Grain yield. (iv) (a) 1964 to 67. (b) No. (c) Nil. (v) N.A. (vi) Nil.

## 5. RESULTS :

## 64(104)

(i) 1361 Kg/ha. (ii) 463.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	1159	1383	1476	1523	1299	1215	1560	1271

## 65(272)

(i) 2266 Kg/ha. (ii) 351.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	2183	2383	2219	2074	2429	2119	2465	2256

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(103), 65(271).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'M'.**

Object :—To study the effect of Urea on the yield of Wheat by foliar and soil application.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 64(103), Bajra—Wheat for 65(271). (b) Bajra. (c) 22.4 Kg/ha. of N and  $P_2O_5$  each for 64(103), 74.1 Kg/ha. of N+37.0 Kg/ha. of  $P_2O_5$  for 65(271). (ii) Sandy loam for 64(103), Goradu soil for 65(271). (iii) 27.11.64, 7.11.65. (iv) (a) 3 ploughings+1 harrowing for 64(103), 2 ploughings+1 harrowing for 65(271). (b) Drilling. (c) 90 Kg/ha. for 64(103); 99 Kg/ha. for 65(271). (d) 15 cm. for 64(103); 30 cm. for 65(271) between rows. (e) Nil. (v) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super for 64(103); Nil for 65(271). (vi) NP—824. (vii) Irrigated. (viii) 1 weeding, 1 interculturing for 64(103); 2 weedings for 65(271). (ix) Nil. (x) 17.4.65; 10.3.66.

## 2. TREATMENTS :

4 manurial treatments :  $M_0$ =Control,  $M_1$ =22.4 Kg/ha. of N as Urea applied in soil,  $M_2$ =22.4 Kg/ha. of N as Urea spraying and  $M_3$ =44.8 Kg/ha. of N as Urea sprayed in two stages ( $\frac{1}{2}$  dose at tillering and  $\frac{1}{2}$  dose at flag leaf stage).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 12.2 m. × 3.7 m. for 64(103) and 9.1 m. × 2.7 m. for 65(271). (b) 11.0 m. × 2.7 m. for 64(103); 7.3 m. × 1.5 m. for 65(271). (v) 61 cm. × 46 cm. for 64(103); 92 cm. × 61 cm. for 65(271). (vi) Yes.

## 4. GENERAL :

(i) Normal for 64(103), good for 65(271). (ii) Nil. (iii) Grain yield. (iv) (a) 1964 to 66. (b) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

64(103)

(i) 1210 Kg/ha. (ii) 270.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	947	1262	1118	1512

C.D.=332.8 Kg/ha.

65(271)

(i) 1648 Kg/ha. (ii) 325.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg./ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	1140	1470	1747	2235

C.D.=400.1 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(81), 62(72), 63(78).****Site :- Irrigation-cum-Demons. Farm., Umralla.****Type :- 'M'.**

Object :- To study the response of Wheat to high doses of N in presence and absence of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61(81); Wheat—Groundnut for 62(72), 63(78). (b) Bajra for 61(81); Groundnut for 62(72), 63(78). (c) Nil. (ii) Medium black. (iii) 31.11.1961, 21.11.1962. (iv) (a) 1 to 2 harrowings. (b) Drilling (c) 90 Kg/ha. (d) 24 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. (vi) NP—718 (medium) for 61(81); NP—824 for 62(72), 63(78). (vii) Irrigated. (viii) 1 weeding for 61(81) and 62(72); Nil for 63(78). (ix) Nil for 61(81); 35 cm. in the year 62(72); 46 cm. in the year 1963. (x) 16.3.1962; 8.3.1963; 20.3.1964.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S : N<sub>1</sub>=67.2, N<sub>2</sub>=100.9 and N<sub>3</sub>=134.5 Kg/ha.
- (2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=67.2 Kg/ha.
- (3) 2 levels of K<sub>2</sub>O : K<sub>0</sub>=0 and K<sub>1</sub>=67.2 Kg/ha.

K<sub>2</sub>O applied as Pot. Sul. for 61(81) and as Mur. Pot. for 62(72) and 63(78).

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 351.2 sq. m. for 61(81); N.A. for 62(72) and 63(78). (iii) 3. (iv) (a) 7.3 m. × 5.5 m. (b) 6.4 m. × 4.6 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Slight attack of stem borer for 61(81); No incidence for 62(72) and 63(78). (iii) Yield of grain. (iv) (a) 1961—1963. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Inadequate and irregular supply of irrigation affected the yield for 61(81). (vii) Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

(i) 1322 Kg/ha. (ii) 277.0 Kg/ha. (18 d.f. made up of various components of Treatments × years interaction) (iii) Main effect of P alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean	K <sub>0</sub>	K <sub>1</sub>
P <sub>0</sub>	1103	1126	1077	1102	1060	1144
P <sub>1</sub>	1459	1597	1569	1542	1680	1404
Mean	1281	1362	1323	1322	1370	1274
K <sub>0</sub>	1315	1374	1420			
K <sub>1</sub>	1246	1349	1226			

C.D. for P marginal means=194.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(71), 63(77), 64(24).**

**Site :- Irrigation-cum-Demons. Farm, Umrala. Type :- 'M'.**

**Object :** To study the effect of composted Super on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Wheat—Groundnut for 62(71), 63(77); Nil for 64(24). (b) Groundnut for 62(71), 63(77); *Bajri* for 64(24). (c) Nil for 62(71), 63(77); 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(24). (ii) Medium black. (iii) 20.11.1962; 19.11.1963; 27.11.1964. (iv) 1 ploughing+2 harrowings. (b) Drilling. (c) 90 Kg/ha. for 62(71), 63(77); 99 Kg/ha. for 64(24). (d) 23 cm. between rows. (e) Nil. (iv) 44.8 Kg/ha. of N. (vi) NP—718 for 62(71); NP—824 for 63(77) and 64(24). (vii) Irrigated. (viii) 2 weedings for 62(71); 1 interculturing for 63(77); Nil for 64(24). (ix) 35 cm. for the year 1962; 46 cm. in the year 1963; Nil for 64(24). (x) 6.3.1963; 17.3.1964; 17.3.1965.

**2. TREATMENTS :**

4 manurial treatments : M<sub>1</sub>=24.7 C.L./ha. of F.Y.M., M<sub>2</sub>=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>3</sub>=M<sub>1</sub>+M<sub>2</sub> and M<sub>4</sub>=M<sub>1</sub>+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as composted Super.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) NA. for 62(71), 63(77); 21.9 m.×12.8 m. for 64(24). (iii) 6. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Unsatisfactory for 62(71); Normal for 63(77) and 64(24). (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—1964. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As errors are heterogeneous and Treatments×years interaction is absent, results for individual years are presented.

**5. RESULTS :**

**62(71)**

(i) 755 Kg/ha. (ii) 58.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	666	801	781	773

C.D.=71.7 Kg/ha.

**62(77)**

(i) 1365 Kg/ha. (ii) 234.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1310	1343	1587	1220

64(24)

(i) 1386 Kg/ha. (ii) 258.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1276	1423	1425	1419

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(41).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'M'.**

Object :- To study the direct, residual and cumulative effect of N, P, K and F.Y.M. on Wheat.

#### 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar-Wheat. (b) Jowar. (c) As per treatments. (ii) Medium black. (iii) 28.11.61. (iv) (a) one harrowing. (b) Drilling. (c) 89.7 Kg/ha. (d) 22.9 cm. between rows. (e) N.A. (v) Nil. (vi) NP-718. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 25.2.62.

#### 2. TREATMENTS :

All combinations of (1), (2), (3) and (4)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.

(4) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=5604 Kg/ha.

#### 3. DESIGN :

(i) 3<sup>3</sup> × 2 confd. fact. (ii) (a) 9 plots/block and 6 blocks/replication. (b) 15.5 m. × 27.4 m. (iii) 1. (iv) (a) 4.6 m. × 9.1 m. (b) 3.7 m. × 8.2 m. (v) 46 cm. × 46 cm. (vi) Yes.

#### 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1959-1961. (b) Yes. (c) Nil. (v) to (vii) Nil.

#### 5. RESULTS :

(i) 1194 Kg/ha. (ii) 247.6 Kg/ha. (iii) Main effect of P is highly significant and main effect of N is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1036	1240	1213	1037	1193	1259	1186	1110	1193	1163
F <sub>1</sub>	1078	1269	1328	1024	2121	1430	1274	1229	1172	1225
Mean	1057	1960	2304	1030	1207	1345	1230	1169	1183	1194
K <sub>0</sub>	1115	1254	1321	1115	1181	1395				
K <sub>1</sub>	904	1266	1338	1036	1247	1225				
K <sub>2</sub>	1152	1242	1154	940	1192	1416				
P <sub>0</sub>	921	1092	1078							
P <sub>1</sub>	1178	1132	1311							
P <sub>2</sub>	1072	1539	1424							

C.D. for N or P marginal means=170.5 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 65(158).****Site :- Irrigation-cum-Demons. Farm, Umrالا.****Type :- 'M'.**

Object :-To determine the water requirement of Wheat with different doses of fertilizers.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Sesamum. (c) 22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. (ii) Medium black soil. (iii) 14.11.65. (iv) (a) 1 harrowing. (b) Drilling. (c) 89.7 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) NP-824 (early). (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 11.3.66.

**2. TREATMENTS :****Main-plot treatments :**

4 levels of irrigations :  $I_1$ =4 irrigations of 20% available moisture,  $I_2$ =5 irrigations of 40% available moisture,  $I_3$ =Irrigations of 60% available moisture and  $I_4$ =8 irrigations of 80% available moisture.

**Sub-plot treatments :**

All combinations of (1), (2) and (3).

(1) 4 levels of N as A/S :  $N_1$ =49.4,  $N_2$ =74.1,  $N_3$ =98.4 and  $N_4$ =123.5 Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0$ =0 and  $P_1$ =37.0 Kg/ha.

(3) 2 levels of  $K_2O$  as Pot. Sul. :  $K_0$ =0 and  $K_1$ =37.0 Kg/ha.

N applied in two equal doses 1st at sowing and 2nd one month after sowing.  $P_2O_5$  and  $K_2O$  applied at sowing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 16 sub-plots/main-plots. (b) N.A. (iii) 2. (iv) (a) 7.6 m.×6.4 m. (b) 6.1 m.×4.5 m. (v) 76 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 2329 Kg/ha. (ii) (a) 252.2 Kg/ha. (b) 229.6 Kg/ha. (iii) Main effects of I and P are highly significant. Interaction  $N \times P \times K$  is significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	$I_1$	$I_2$	$I_3$	$I_4$	$K_0$	$K_1$	Mean
$P_0$	2164	2165	2287	2187	1827	2160	2192	2622	2247	2153	2200
$P_1$	2402	2475	2538	2418	2042	2559	2438	2794	2407	2449	2458
Mean	2283	2320	2412	2302	1935	2360	2315	2708	2357	2331	2329
$K_0$	2337	2365	2364	2363	2059	2353	2294	2723			
$K_1$	2229	2275	2460	2241	1810	2366	2335	2693			
$I_1$	1939	1933	1984	1883							
$I_2$	2307	2403	2556	2172							
$I_3$	2220	2262	2347	2430							
$I_4$	2666	2681	2762	2722							

C.D. for I marginal means=200.6 Kg/ha.

C.D. for P marginal means=81.2 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 65(157).****Site :- I.D.F. Umrالا.****Type :- 'M'.**

Object :-To study the effect of composted Super on the yield of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Sesamum. (c) 22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. (ii) Medium black soil. (iii) 15.11.65. (iv) (a) 1 harrowing. (b) Drilling. (c) 89.8 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of N. (vi) NP—824 (early). (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 12.3.66.

## 2. TREATMENTS :

4 manurial treatments :  $M_1$ =Super digested c ompost,  $M_2$ =Super+F.Y.M. separately as usual,  $M_3$ =Super phosphate alone and  $M_4$ =F.Y.M. alone.

Doses of manures N.A.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 2186 Kg/ha. (ii) 244.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	2155	2310	2316	1963

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(155), 61(98), 62(45), 63(42).**

**Site :- Dry Farming Res. Stn., Vallabhipur. Type :- 'M'.**

Object :—To study the effect of spraying Urea on the yield and spottedness of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Nil for 60(155); Wheat for 61(98), 62(45) and 63(42). (c) Nil for 60(155); 11.2 Kg/ha. of N as A/S for 61(98) and 62(45); 12.4 C.L./ha. of F.Y.M. for 63(42). (ii) Medium black. (iii) 26.10.1960; 27.10.1961; 20.10.1962; 1.11.1963. (iv) (a) 8 to 10 harrowings. (b) Drilling. (c) 56 Kg/ha. for 60(155), 61(98); 49 Kg/ha. for 62(45), 63(42). (d) 38 cm. between rows. (e) Nil. (v) Nil for 60(155), 61(98); 12.4 C.L./ha. of F.Y.M. for 62(45), 63(42). (vi) A—206. (vii) Un-irrigated. (viii) 1 hand weeding for 60(155); Nil for 61(98); 1 interculturing for 62(45) and 63(42). (ix) Nil, Nil, 3 cm., 9 cm. (x) 22.2.1961; 11.2.1962; 6.2.1963; 11.3.1964.

## 2. TREATMENTS :

5 manurial treatments :  $M_0$ =Control,  $M_1$ =5.6 Kg/ha. of N as Urea,  $M_2$ =11.2 Kg/ha. of N as Urea.  $M_3$ =11.2 Kg/ha. of N as basal dose+5.6 Kg/ha. of N as Urea and  $M_4$ =11.2 Kg/ha. of N as basal dose+11.2 Kg/ha. of N as Urea.

Urea applied by spraying in two equal doses.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 12.2 m.×3.0 m. (b) 10.4 m.×1.5 m. (v) 91 cm.×76 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal for 60(155), 61(98), 62(45); Good for 63(42). (ii) Nil for 60(155) and 63(42); Attack of white ants for 61(98) and 62(45). (iii) Yield of grain. (iv) (a) 1960—1963. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the errors are heterogeneous and Treatments×years interaction is absent, results for individual years are presented.

## 5. RESULTS :

**60(155)**

- (i) 455 Kg/ha. (ii) 30.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	460	440	432	474	469

61(98)

(i) 612 Kg/ha. (ii) 50.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	575	575	626	627	658

62(45)

(i) 537 Kg/ha. (ii) 77.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	552	552	499	491	593

63(42)

(i) 1192 Kg/ha. (ii) 119.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1194	1189	1165	1157	1257

**Crop :- Wheat (Rabi).**

**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Ref :- Gj. 65(199).**

**Type :- 'M'.**

Object :- To study the effect of F.Y.M. and fertilizer on Wheat.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 11.2 Kg/ha. of N. (ii) Medium black soil. (iii) 19.10.65. (iv) (a) 9 harrowings (b) Drilling. (c) 49.4 Kg/ha. (d) 38 cm. row to row. (e) Nil. (v) Nil. (vi) A 206. (vii) Un-irrigated. (viii) 2 weedings. (ix) Nil. (x) 20.2.66.

#### 2. TREATMENTS :

20 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=12.4 C.L./ha. of F.Y.M., M<sub>2</sub>=24.7 C.L./ha. of F.Y.M., M<sub>3</sub>=11.2 Kg/ha. of N, M<sub>4</sub>=22.4 Kg/ha. of N, M<sub>5</sub>=33.6 Kg/ha. of N, M<sub>6</sub>=44.8 Kg/ha. of N, M<sub>7</sub>=11.2 Kg/ha. of N+44.8 Kg/ha. of K, M<sub>8</sub>=22.4 Kg/ha. of N+44.8 Kg/ha. of K, M<sub>9</sub>=33.6 Kg/ha. of N+44.8 Kg/ha. of K, M<sub>10</sub>=44.8 Kg/ha. of N+44.8 Kg/ha. of K, M<sub>11</sub>=44.8 Kg/ha. of K, M<sub>12</sub>=M<sub>2</sub>+M<sub>3</sub>, M<sub>13</sub>=M<sub>2</sub>+M<sub>4</sub>, M<sub>14</sub>=M<sub>2</sub>+M<sub>5</sub>, M<sub>15</sub>=M<sub>2</sub>+M<sub>6</sub>, M<sub>16</sub>=M<sub>1</sub>+M<sub>3</sub>, M<sub>17</sub>=M<sub>1</sub>+M<sub>4</sub>, M<sub>18</sub>=M<sub>1</sub>+M<sub>5</sub>, and M<sub>19</sub>=M<sub>1</sub>+M<sub>6</sub>.

N as A/S, K<sub>2</sub>O as Pot. Sul. were applied at sowing.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 20. (b) N.A. (iii) 2. (iv) (a) 15.2 m. × 1.5 m. (b) 13.4 m. × 0.8 m. (v) 91 cm. × 38 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) N.A. (vi) to (vii) Nil.

#### 5. RESULTS :

(i) 518 Kg/ha. (ii) 184.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>	M <sub>8</sub>	M <sub>9</sub>
Av. yield	979	490	517	725	447	507	260	522	490	377
Treatment	M <sub>10</sub>	M <sub>11</sub>	M <sub>12</sub>	M <sub>13</sub>	M <sub>14</sub>	M <sub>15</sub>	M <sub>16</sub>	M <sub>17</sub>	M <sub>18</sub>	M <sub>19</sub>
Av. yield	300	577	717	396	320	130	632	658	410	911

C.D.=385.4 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(25), 65(198).**

**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Type :- M.**

**Object :-**To find out the effect of different micronutrients through foliar application on Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) Nil for 64(25), 11.2 Kg/ha. of N for 65(198). (ii) Medium black soil. (iii) 26.10.64, 18.10.65. (iv) (a) 10 harrowings for 64(25), 9 harrowings for 65(198). (b) Drilling. (c) 49.4 Kg/ha. (d) 38 cm. between rows. (e) Nil. (v) Nil for 64(25), 11.2 Kg/ha. of N. (vi) A-206. (vii) Un-irrigated. (viii) 2 weedings. (ix) Nil. (x) 17.2.65, 22.2.66.

**2. TREATMENTS :**

8 micronutrients : M<sub>0</sub>=Control, M<sub>1</sub>=2.2 Kg/ha. of Borax, M<sub>2</sub>=9.0 Kg/ha. of C/S+9.0 Kg/ha. of Lime, M<sub>3</sub>=3.4 Kg/ha. of Zn. Sul.+2.2 Kg/ha. of Lime, M<sub>4</sub>=3.4 Kg/ha. of Mn. Sul.+2.2 Kg/ha. of Lime, M<sub>5</sub>=11.2 Kg/ha. of Ferrous Sul.+11.2 Kg/ha. of Lime, M<sub>6</sub>=210 gm/ha. of Sod. Molybdate and M<sub>7</sub>=Mixture of all above micronutrients.

**Note :** Above micronutrients applied with 1123 litres/ha. of water as foliar spray in two doses, 1st one month after germination and 2nd at the time of flowering.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 9.1 m.×4.6 m. (b) 7.3 m.×3.0 m. (v) 92 cm.×76 cm. (vi) Yes.

**4. GENERAL :**

(i) Good for 64(25), normal for 65(198). (ii) Nil. (iii) Grain yield. (iv) (a) 1964 to 66. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the experiment is continued beyond 65 hence the results of individual expts. is given below.

**5. RESULTS :**

**64(25)**

(i) 1008 Kg/ha. (ii) 152.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg./ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>
Av. yield	969	1025	1108	940	1019	946	1021	1035

**65(198)**

(i) 706 Kg/ha. (ii) 42.3 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>
Av. yield	675	701	718	799	686	571	705	693

C.D. = 62.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64(26), 65(197).**

**Site :- Dry Farming. Res. Stn., Vallabhipur.**

**Type :- M'.**

**Object :** To find out the effect of micronutrients by soil application.



## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil for 64(26), 11.2 Kg/ha. of N for 65(197). (ii) Medium black soil. (iii) 27.10.64, 18.10.65. (iv) (a) 10 harrowings for 64(26), 9 harrowings for 65(197). (b) Drilling. (c) 49.4 Kg/ha. (d) 38 cm. between rows. (e) Nil. (v) Nil for 64(26), 5.6 Kg/ha. of N. (vi) A-206. (vii) Un-irrigated. (viii) 2 weedings. (ix) Nil. (x) 23.2.65, 23.2.66.

## 2. TREATMENTS :

8 Micronutrients treatments :  $M_0$ -Control,  $M_1$ =11.2 Kg/ha. of Borax,  $M_2$ =28.0 Kg/ha. of C/S,  $M_3$ =28.0 Kg/ha. of Zn. Sul.  $M_4$ =56.0 Kg/ha. of Mg. Sul.,  $M_5$ =56.0 Kg/ha. of Ferrous Sul.,  $M_6$ =1.1 Kg/ha. of Sodium molybdate and  $M_7$ =180.4 Kg/ha. of mixture of all above micronutrients.

Note : Above micronutrients were applied through soil at the time of sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) 9.1 m. × 4.6 m. (b) 7.3 m. × 3.0 m. (v) 92 cm. × 76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1964 to 66. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the expt. is continued beyond 1965 so the results of individual expts are given below.

## 5. RESULTS :

## 64(26)

(i) 899 Kg/ha. (ii) 109.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	968	996	880	871	911	798	962	808

## 65(197)

(i) 637 Kg/ha. (ii) 154.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	583	597	543	693	703	657	622	729

**Crop :- Wheat (Rabi).**

**Site :- Agri. Res. Stn., Vijapur.**

**Ref :- Gj. 65(108).**

**Type :- 'M'.**

Object : To study the effect of Urea by foliar spraying on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Bajri—Wheat—Tobacco. (b) Bajri. (c) Nil. (ii) 10.11.65. (iv) (a) 1 ploughing, 1 harrowing. (b) Drilling. (c) 89.7 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Early. (vii) Irrigated. (viii) 2 weedings. (ix) 1.1 cm. (x) 21.3.66.

## 2. TREATMENTS :

4 manurial treatments :  $M_0$ =Control,  $M_1$ =22.4 Kg/ha. of N as urea to be applied to soil at sowing.  $M_2$ =22.4 Kg/ha. of N as Urea applied by foliar spray on standing crop and  $M_3$ =44.8 Kg/ha. N as Urea applied in two doses as foliar spray 1st dose at growth period and 2nd dose at flag leaf stage.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 2.7 m. (b) 8.2 m. × 2.0 m. (v) 46 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) Pilwai, Thasra, Junagadh. (vi) to (vii) Nil.

## 5. RESULTS :

(i) 1530 Kg/ha. (ii) 212.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	925	930	1984	2283

C.D. = 261.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60 and 61(MAE).**

**Site :- M.A.E. Centre, Umrjala.**

**Type :- 'MP'.**

**Object :-**Type II :-To study the residual effect of different levels of N, P, K and FYM on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Jowar—Wheat for 60 ; N.A. for 61. (b) Jowar ; N.A. (c) As per treatments ; N.A. (ii) Medium black. (iii) 9.11.60 ; 28.11.61. (iv) (a) 1 ploughing and 3 harrowings. (b) Drilling. (c) 100.8 Kg/ha., 89.7 Kg/ha. (d) 46 cm. between rows, 23 cm. between rows. (e) Nil. (v) Nil. (vi) NP—718. (vii) Irrigated. (viii) 1—2 weedings. (ix) Nil. (x) 6.3.61 ; 25.3.62.

## 2. TREATMENTS :

All combinations of (1), (2), (3) and (4)

- (1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.
- (3) 3 levels of K<sub>2</sub>O : K<sub>0</sub>=0, K<sub>1</sub>=22.4 and K<sub>2</sub>=44.8 Kg/ha.
- (4) 2 levels of F.Y.M : F<sub>0</sub>=0 and F<sub>1</sub>=5600 Kg/ha.

## 3. DESIGN :

(i) 3<sup>3</sup>×2 Fact. confd. (ii) (a) 9 plots/black ; 6 blocks/replication. (b) Nil. (iii) Nil. (iv) (a) 9.1 m.×4.5 m. (b) 7.3 m.×2.7 m. for 60, 8.2 m.×3.6 m. for 61. (v) 91 cm.×91 cm. for 60, 46 cm.×46 cm. for 61. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and straw yield. (iv) (a) 1960—1961. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1051 Kg/ha. (ii) 224.5 Kg/ha. (48 d.f. made up of pooled error). (iii) Main effects of N and P are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	924	1091	1064	984	1034	1062	1037	977	1065	1026
F <sub>1</sub>	980	1137	1108	945	1078	1203	1074	1097	1055	1075
Mean	952	1114	1086	964	1056	1132	1055	1037	1060	1051
K <sub>0</sub>	960	1054	1152	1033	1036	1097				
K <sub>1</sub>	922	1135	1054	942	1109	1060				
K <sub>2</sub>	973	1154	1053	918	1022	1240				
P <sub>0</sub>	885	980	1029							
P <sub>1</sub>	1030	1100	1037							
P <sub>2</sub>	941	1263	1193							

C.D. for N or P marginal means=130.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 60, 61, 62, 63(MAE).****Site :- M.A.E. Centre, Umrjala.****Type :- 'M'.**

Object :—Type IV—To study the effect of phosphatic manures on legumes and their residual effect on succeeding Wheat manured with N.

**1. BASAL CONDITIONS :**

(i) (a) Legume-Wheat for 60, 61, 62 ; Groundnut and Sesamum-Wheat-Cotton for 63. (b) Legumes for 60, 61, 62 ; Groundnut and sesamum for 63. (c)  $P_2O_5$  applied as per treatments. (ii) Medium black. (iii) 19.11.1960 ; 17.11.1961 ; 6.11.1962 ; 19.10.1963. (iv) (a) 1 to 2 harrowings. (b) Drilling. (c) 67.2 Kg/ha. (d) 46 cm. between rows. (e) Nil. (v) Nil for 60, 61, 63 ; 5 C.L./ha. of F.Y.M. for 62. (vi) NP-718. (vii) Irrigated. (viii) 1 to 2 weedings. (ix) 5 cm. for 62 ; Nil for others. (x) 16.3.1961 ; 10.3.1962 ; 13.2.1963 ; 5.3.1964.

**2. TREATMENTS :****Main-plot treatments :**

All combinations of (1) and (2)+a control (Fallow  $L_0P_0$ )

(1) 2 legumes crops :  $L_1$ =Groundnut and  $L_2$ =Sesamum.

(2) 3 levels of  $P_2O_5$  as Super given to legumes :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.

**Sub-plot treatments :**

3 levels of N as A/S given to wheat crop :  $N_0=0$ ,  $N_1=16.8$  and  $N_2=33.6$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 7 main-plots/replication and 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 11.0 m. × 5.5 m. (b) 10.0 m. × 3.7 m. (v) 46 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1956—63. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Expt. No. 56, 57, 58, 59 have also been included in the pooled results.

**5. RESULTS :**

(i) 1025 Kg/ha. (ii) (a) 306.0 Kg/ha. (96 d.f. made up of pooled error). (b) 210.7 Kg/ha. (224 d.f. made up of pooled error). (iii) All effects are significant. (iv) Av. yield of grain in Kg/ha.

	$L_0 P_0$	$L_1 P_0$	$L_1 P_1$	$L_1 P_2$	$L_2 P_0$	$L_2 P_1$	$L_2 P_2$	Mean
$N_0$	1039	809	1018	1117	901	1008	1096	998
$N_1$	1060	872	1006	1041	963	1038	1221	1029
$N_2$	1149	829	1004	1183	934	1076	1154	1047
Mean	1083	837	1009	1114	933	1041	1157	1025

C.D. for LP marginal means = 101.9 Kg/ha.

C.D. for N marginal means = 45.1 Kg/ha.

C.D. for N means at the same level of LP = 119.2 Kg/ha.

C.D. for LP means at the same level of N = 140.1 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 61(MAE).****Site :- M.A.E. Centre, Umrjala.****Type :- 'M'.**

Object :—Type IX(A)—To compare the effects of Nitrophosphates by ODDA and PEC process at different levels and different methods on Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Groundnut. (c) Nil. (ii) **Medium black.** (iii) 20.11.1961. (iv) (a) 3 harrowings. (b) Line sowing. (c) 89.7 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) N.P.-824. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 23.3.62.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)+4 extra treatments in each block

- (1) 3 types of phosphates :  $P_1$ =Super,  $P_2$ =ODDA (20-20-0),  $P_3$ =PEC (16-14-0).  
 (2) 3 levels of phosphates :  $L_1$ =13.4 Kg/ha of N+14.0 Kg/ha. of P,  $L_2$ =26.9 Kg/ha. of N+23.5 Kg/ha. of P and  $L_3$ =53.8 Kg/ha. of N+47.0 Kg/ha. of P.  
 (3) 3 methods of application :  $M_1$ =Broadcasting,  $M_2$ =6.3 cm. below seed and  $M_3$ =Band placement.

Extra treatments are :  $N_0=0$ ,  $N_1=13.4$ ,  $N_2=26.9$  and  $N_3=53.8$  Kg/ha. of N

## 3. DESIGN :

- (i) 3<sup>3</sup>+4 extra treatments in each block. (ii) (a) 13 plots/block and 3 blocks/replication. (b) 54.9m. × 55.8 m. (iii) 2. (iv) (a) 5.5 m. × 9.1 m. (b) 4' 6 m. × 8' 2 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good ; no lodging. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) to (c) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 1319 Kg/ha. (ii) 354.2 Kg/ha. (iii) Main effect of P is highly significant. "N vs others" is significant. (iv) Av. yield of grain in Kg/ha.

$N_0=1098$ ,  $N_1=1236$ ,  $N_2=1098$  and  $N_3=1236$  Kg/ha.

	$L_1$	$L_2$	$L_3$	Mean	$M_1$	$M_2$	$M_3$
$P_1$	1383	1715	1679	1592	1605	1734	1437
$P_2$	1033	1402	1568	1334	1356	1522	1124
$P_3$	1245	1144	1310	1233	1328	1014	1357
Mean	1220	1420	1519	1386	1430	1423	1306
$M_1$	1300	1632	1358				
$M_2$	1328	1282	1659				
$M_3$	1032	1346	1540				

C.D. for P marginal means=238.4 Kg/ha.

C.D. for N vs. others=71.6 Kg/ha.

**Crop :- Wheat.**

**Site :- M.A.E. Centre, Umralla.**

**Ref :- 64, 65 (MAE).**

**Type :- 'M'.**

Object :-Type X—To study the effect of various levels of N, P and Green manure on the yield of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) *Sann* as a G.M. crop. (c) As per treatments. (ii) Medium black soil. (iii) 6.11.64 ; 26.10.65. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 67 Kg/ha. ; 90 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) NP-824. (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 5.3.65, 25.2.66.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)+one additional (NPK) treatment in each block

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=17.5$  and  $N_2=35.0$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=35.0$  and  $P_2=70.0$  Kg/ha.  
 (3) 3 levels of Green manuring (*Sann*) :  $G_0=0$ ,  $G_1$ =Sann with 35.0 Kg/ha. of  $P_2O_5$  and  $G_2$ =Sann with 70.0 Kg/ha. of  $P_2O_5$ .

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 10 plots/block, 3 blocks/replication. (b) Nil. (iii) 2. (iv) (a) 10.4 m. × 6.8 m. for 64 ; 20.0 m. × 5.0 m. (b) 7.4 m. × 5.4 m. for 64 ; 16.0 m. × 5.0 m. (v) 148 cm. × 68 cm. for 64 ; 200 cm. on either side along length. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-1965. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1567 Kg/ha. (ii) 294.4 Kg/ha. (52 d.f. made up of pooled error). (iii) Main effects of N, P and G are significant. (iv) Av. yield of grain in Kg/ha.

T=1950 Kg/ha.

	$P_0$	$P_1$	$P_2$	$G_0$	$G_1$	$G_2$	Mean
$N_0$	1282	1415	1747	1624	1480	1340	1481
$N_1$	1348	1534	1540	1505	1550	1367	1474
$N_2$	1448	1638	1762	1821	1494	1533	1616
Mean	1359	1529	1683	1650	1508	1413	1413
$G_0$	1543	1717	1690				
$G_1$	1307	1482	1735				
$G_2$	1228	1388	1624				

C.D. for N, P or G marginal means=138.8 Kg/ha.

**Crop :- Wheat (*Rabi*).**

**Ref :- 63, 64(MAE).**

**Site :- M.A.E. Centre, Chalthan.**

**Type :- 'M'.**

Object :-Type XI—To study the effect of different micronutrients with different methods of application on Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Wheat for 63, Nil for 64. (b) Paddy ; *Sann* for green manuring. (c) Nil. (ii) Medium black. (iii) 11.12.63 ; 18.11.64. (iv) (a) 1-2 ploughings and harrowings. (b) Drilling. (c) 86 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) NP-718. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 25, 27.3.64 ; 14.3.65.

## 2. TREATMENTS :

All combinations of (1) and (2)+3 extra treatments

(1) 2 methods of application of micronutrients :  $M_1$ =Soil application and  $M_2$ =Foliar application.

(2) 6 micronutrients :  $S_1$ =Mn as 56.0 Kg/ha. of  $MnSO_4$ ,  $S_2$ =Zn as 28.0 Kg/ha. of Zinc Sulphate,  $S_3$ =Cu as 28.0 Kg/ha. of Copper Sulphate,  $S_4$ =Boron as 16.8 Kg/ha. of

Borax,  $S_5$ =Molybdenum as 1.1 Kg/ha. of Sodium Molybdate and  $S_6$ =All the above five micronutrients.

$T_0$ =Control,  $T_1$ =NPK alone to soil and  $T_2$ =NPK+Spartin at 370.0 Kg/ha.

NPK=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+33.6 Kg/ha. of  $K_2O$  as Mur. Pot. applied to all the treatments except control.

### 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) Nil. (iii) 4. (iv) (a) 9.8 m.×4.9 m. (b) 8.5 m.×3.7 m. (v) 61 cm.×61 cm. (vi) Yes.

### 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962—1966 (65 N.A.). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

### 5. RESULTS :

#### 1963

(i) 1581 Kg/ha. (ii) 115.8 Kg/ha. (iii) Main effect of  $T_0$  vs. others is highly significant. (iv) Av. yield of grain in Kg/ha.

$T_0$ =1089 Kg/ha.,  $T_1$ =1745 Kg/ha. and  $T_2$ =1786 Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$M_1$	1705	1713	1665	1777	1745	1737	1724
$M_2$	1673	1705	1705	1585	1649	1769	1681
Mean	1789	1709	1685	1681	1627	1753	1703

C.D. for control vs. others=121.0 Kg/ha.

#### 1964

(i) 1348 Kg/ha. (ii) 145.1 Kg/ha. (iii) "To vs.  $M \times S$ " and "To vs. T" are highly significant. (iv) Av. yield of grain in Kg/ha.

$T_0$ =773 Kg/ha.,  $T_1$ =1489 Kg/ha. and  $T_2$ =1463 Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$M_1$	1429	1254	1337	1394	1305	1381	1350
$M_2$	1289	1317	1405	1329	1499	1547	1398
Mean	1359	1285	1371	1361	1402	1464	1374

C.D. for  $T_0$  vs T means=179.4 Kg/ha.

C.D. for "To vs. others"=152.5 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- M.A.E. Centre, Umralla.**

**Ref :- Gj. 64(MAE).**

**Type :- M'.**

Object :-Type XI—To study the effect of micronutrients on the yield of Wheat.

### 1. BASAL CONDITION :

(i) (a) Nil. (b) *Jawar* and *Sann* in *Kharif* 64. (c) Nil. (ii) Medium black. (iii) 6.11.1964. (iv) (a)

1 ploughing, 1 harrowing. (b) Drilling. (c) 67 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) *Sann* as green manuring. (vi) NP—824 (120 days). (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 1.3.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)+3 extra treatments

(1) 2 methods of application :  $M_1$ =Soil application and  $M_2$ =Foliar application.

(2) 6 micronutrient treatments :  $S_1$ =Mn as manganese sulphate at 56 Kg/ha.,  $S_2$ =Zn as zinc sulphate at 28 Kg/ha.,  $S_3$ =Cu as copper sulphate at 28 Kg/ha.,  $S_4$ =Boron as borax at 16.8 Kg/ha.,  $S_5$ =Molybdenum as sodium molybdate at 1.1 Kg/ha. and  $S_6$ =Mixture of all above micronutrients.

$T_0$ =Control,  $T_1$ =NPK alone to soil and  $T_3$ =Spartin at 370 Kg/ha. to soil.

NPK=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+33.6 Kg/ha. of  $K_2O$  as Mur. Pot. applied to all treatments except control.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) 12.0 m.×4.0 m. (b) 11.3 m.×3.6 m. (v) 37 cm.×23 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964—1965. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1343 Kg/ha. (ii) 240.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$T_0$ =1135 Kg/ha.,  $T_1$ =1507 Kg/ha.,  $T_3$ =1285 Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$M_1$	1410	1425	1544	1282	1357	1466	1414
$M_2$	1269	1294	1213	1366	1235	1363	1290
Mean	1339	1360	1379	1324	1296	1415	1352

**Crop :- Wheat (Rabi).**

**Site :- M.A.E. Centre, Umralla.**

**Ref :- Gj. 65(MAE).**

**Type :- 'M'.**

Object :-Type XI—To study the effect of micronutrients on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut—Wheat. (b) Groundnut. (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 12.11.65. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) NP—824. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 2nd week of March, 1966.

## 2. TREATMENTS :

15 micronutrients treatments :  $T_0$ =Control,  $T_1$ =NPK to soil,  $T_2$ =Spartin at 370 Kg/ha,  $T_3$ =Mn as Manganese Sul. at 60 Kg/ha. soil application,  $T_4$ =Zn. as Zinc Sul. at 30 Kg/ha. soil application,  $T_5$ =Cu as Copper Sul. at 30 Kg/ha. soil application,  $T_6$ =Boron as Borax at 17.5 Kg/ha. soil application,  $T_7$ =Molybdenum as Sodium Molybdate at 1.25 Kg/ha. soil application,

$T_8$  = Mixture of all above micronutrients soil application,  $T_9$  = Mn as Manganese sulphate at 17.5 Kg/ha. foliar application,  $T_{10}$  = Zn. as Zinc Sul. at 12.5 Kg/ha. foliar application,  $T_{11}$  = Cu as Copper Sul. at 12.5 Kg/ha. foliar application,  $T_{12}$  = Boron as Borax at 6.2 Kg/ha. foliar application,  $T_{13}$  = Molybdenum as Sodium Molybdate at 0.06 Kg/ha. foliar application and  $T_{14}$  = Mixture of all micronutrients by foliar application.

NPK = 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super + 33.6 Kg/ha. of  $K_2O$  as Pot. Sul. applied to all treatments except control.

### 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) 10.0 m. × 5.0 m. (b) 9.0 m. × 4.5 m. (v) 50 cm. × 25 cm. (vi) Yes.

### 4. GENERAL :

(i) Good (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964—1967 (Not conducted in 1966). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

### 5. RESULTS :

(i) 1790 Kg/ha. (ii) 416.0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	1407	1926	2000	1765	2105	1846	1543	1704
	$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$	$T_{14}$	
	1747	1963	1938	1722	1525	1988	1673	

C.D. = 420.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 63, 64, 65(MAE).**

**Site :- M.A.E. Centre, Umrals.**

**Type :- 'M'.**

**Object :- Type XII—To study the effect of foliar application of fertilizers on the yield of Wheat.**

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut for 63 ; *Jowar* and *Bajra* for 64 ; N.A. for 65. (c) N.A. (ii) Medium black. (iii) 14.11.63 ; 27.11.64 and 30.11.64 ; N.A. for 65. (iv) (a) 1 ploughing and 1-2 harrowings. (b) Drilling. (c) 67 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) 5600 Kg/ha. of F.Y.M. for 63 ; Nil for 64 ; N.A. for 65. (vi) N.P.—718 (130 days). (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 23.3.64 ; 18.3.65 ; N.A. for 65.

### 2. TREATMENTS :

#### Main-plot treatments

4 manurial treatments :  $M_1$  = 44.8 Kg/ha. of N as Urea,  $M_2$  = 22.4 Kg/ha. of  $P_2O_5$  as triple Super,  $M_3$  =  $M_1 + M_2$  and  $M_4$  = 44.8 Kg/ha. of N as Urea + 22.4 Kg/ha. of  $P_2O_5$  + 22.4 Kg/ha. of  $K_2O$ .

#### Sub-plot treatments

8 times and methods of application of manures :  $T_0$  = Control,  $T_1$  = Full dose to soil application at planting,  $T_2$  =  $\frac{1}{2}$  dose to soil at planting,  $T_3$  =  $\frac{1}{2}$  dose by foliar application,  $T_4$  =  $\frac{1}{2}$  dose by foliar application,  $T_5$  =  $\frac{1}{2}$  dose soil +  $\frac{1}{2}$  by foliar,  $T_6$  =  $\frac{1}{2}$  dose to soil +  $\frac{1}{2}$  by foliar and  $T_7$  = Only water spray.

Foliar application in 2 sprays 1st at 45 days and 2nd at 60 days.



## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 13.7 m.  $\times$  3.7 m. for 63 ; 15.0 m  $\times$  4.0 m. for 64 ; N.A. for 65. (b) 12.8 m.  $\times$  3.2 m. for 63 ; 12.6 m.  $\times$  3.1 m. for 64 ; N.A. for 65. (v) 46 cm.  $\times$  23 cm. for 63, 121 cm.  $\times$  45 cm. for 64 ; N.A. for 65. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1963—1965. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 849 Kg/ha. (ii) (a) 665.1 Kg./ha. [27 d.f. made up of pooled error]. (b) 308.6 Kg./ha. [252 d.f. made up of pooled error]. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

$$T_7 = 748 \text{ and } T_8 = 744 \text{ Kg/ha.}$$

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	Mean
N	824	773	735	843	969	766	818
P	952	800	775	867	952	798	857
NP	1147	813	857	895	959	935	934
NPK	978	874	736	751	897	703	823
Mean	975	815	776	839	944	800	858

**Crop :- Wheat (Rabi).**

**Site :- Rajkot (c.f.).**

**Ref :- Gj. 61(SFT).**

**Type :- 'M'.**

Object :—Type A—To study the response of Wheat to levels of N, P, and K applied individually and in combination.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N.A. (ii) Black soil. (iii) and (iv) N.A. (v) (a) to (e) N.A. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O = Control (No manure).

N = 22.4 Kg/ha. of N as A/S.

P = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

K = 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

NP = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

NK = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

PK = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

NPK = 22.4 Kg/ha. of N as A/S + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super + 22.4 Kg/ha. of K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on a kharif cereal, 8 on a rabi cereal, 8 on cash crops, 4 on an oil seed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate applications are studied on type C trials in two out of the four zones in each district every

year. The above experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Treatment	N	P	K	NP	NK	PK	NPK	S.E.
Av. response of grain in Kg/ha.	200	330	310	40	20	30	110	37.0

Control mean=1420 Kg/ha. and no. of trials=19.

**Crop :- Wheat.**

**Ref :- Gj. 61(SFT).**

**Site :- Rajkot (c.f.).**

**Type :- 'M'.**

Object :—Type B—To investigate the relative efficiency of different nitrogenous fertilizers at different doses.

## 1. BASAL CONDITIONS :

(a) to (c) N.A. (ii) Black. (iii) and (iv) N.A. (v) (a) to (e) N.A. (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

7 manurial treatments : O=Control (No manure),  $n_1=22.4$  Kg/ha. of N as A/S,  $n_2=44.8$  Kg/ha. of N as A/S,  $n'_1=22.4$  Kg/ha. of N as Urea,  $n'_2=44.8$  Kg/ha. N as Urea,  $n''_1=22.4$  Kg/ha. of N as A/S/N,  $n''_2=44.8$  Kg/ha. of N as A/S/N.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle on thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trials in a year, 8 on a Kharif cereal, 8 on a rabi cereal, 8 on cash crops 4 on an oilseed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B on crops other than legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The above experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/98.8 ha. (b) 1/97.7 ha. (iv) Yes.

## 4. GENERAL :

(i) to (vii) N.A.

## 5. RESULTS :

Treatment	O	$n_1$	$n_2$	$n'_1$	$n'_2$	$n''_1$	$n''_2$
Av. yield of grain in Kg/ha.	1290	1420	1530	1540	1710	1690	1820

G.M. = 1571 Kg/ha. S.E./mean = 65.1 Kg/ha., and No. of trials=19.

**Crop :- Wheat.**

**Ref :- Gj. (62), (63), (64), (65), S.F.T. for Rajkot and Gj. (64), (65). S.F.T. for other centres:**

**Site :- Junagarh, Baroda, Kaira, Mehsana, Bhavnagar, Rajkot and Surat (c.f.).**

**Type :- 'M'.**

Object :—Type A<sub>1</sub>—To study response curves of important cereal, cash and oil seed crops to Nitrogen applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagarh ; Grey brown for Kaira and Mehsana and Deep black for Baroda and Surat. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O = Control (No manure).  
 $N_1$  = 33.6 Kg/ha. of N as A/S.  
 $N_2$  = 67.2 Kg/ha. of N as A/S.  
 $P_1$  = 33.6 Kg/ha. of  $P_2O_5$  as Super.  
 $N_1P_1$  = 33.6 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super.  
 $N_2P_1$  = 67.2 Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super.  
 $N_2P_2$  = 67.2 Kg/ha. of N as A/S + 67.2 Kg/ha. of  $P_2O_5$  as Super.  
 $N_2P_2K_1$  = 67.2 Kg/ha. of N as A/S + 67.2 Kg/ha. of  $P_2O_5$  as Super + 33.6 Kg/ha. of  $K_2O$  as Mur. Pot.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years with in the same zone. Each field assistant is required to conduct 36 trials in a year, 9 on a Kharif cereal, 9 on rabi cereal 9 on cash crops, 6 on an oil-seed crop and 3 on a leguminous crop. One-third of the number of trials conducted (other than leguminous crops) are of type  $A_1$ , another one-third are of type  $A_2$  and the remaining one-third are of type  $A_3$ . The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the four zones, at the rate of one experiment per village. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962—1966 for Rajkot and 1964 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Rajkot

## 1962

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	516	533	396	449	602	742	809	177.0

Control mean = 1108 Kg/ha ; No. of trials = 8

## 1963

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	220	436	240	337	457	518	648	129.7

Control mean = 1224 Kg/ha. ; No. of trials = 7.

## 1964

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	214	374	199	374	485	674	804	69.0

Control mean = 1896 Kg/ha. ; No. of trials = 12.

## 1965

Treatment	$N_1$	$N_2$	$P_1$	$N_1P_1$	$N_2P_1$	$N_2P_2$	$N_2P_2K_1$	S.E.
Av. response of grain in Kg/ha.	117	316	199	336	443	288	829	131.3

Control mean = 2235 Kg/ha ; No of trials = 10.

**Junagarh****1964**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	420	313	403	557	581	643	927	125.5

Control mean=1756 Kg/ha. ; No. of trials=9.

**1965**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	100	255	205	309	391	511	609	42.1

Control mean=960 Kg/ha., No. of trials=10.

**Baroda****1964**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	199	355	419	474	337	642	465	112.6

Control mean=871 Kg/ha. ; No. of trials=9.

**1965**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	444	673	465	798	1075	1424	1466	154.3

Control mean=1324 Kg/ha. ; No. of trials=11.

**Kaira****1964**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	185	381	234	449	584	778	771	86.8

Control mean=1316 Kg/ha. ; No. of trials=11.

**1965**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	321	410	358	352	510	843	648	119.7

Control mean=1639 Kg/ha. ; No. of trials = 11.

**Mehsana****1964**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	204	302	386	497	609	597	910	128.6

Control mean=3285 Kg/ha. ; No. of trials=12.

**1965**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	91	122	217	207	353	411	552	40.2

Control mean=2044 Kg/ha. ; No. of trials=11.

**Bhavnagar**

1964

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	300	252	263	221	232	227	303	98.6

Control mean=1163 Kg/ha. ; No. of trials=8.

1965

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	67	208	205	256	311	362	525	42.1

**Surat**

S.F.T. (64)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	155	269	152	350	442	574	711	56.5

Control mean=1600 Kg/ha. ; No. of trials=12.

S.F.T. (65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	287	387	266	426	584	720	920	54.9

Control mean=1066 Kg/ha. ; No. of trials=12.

**Crop :- Wheat. (Rabi).****Ref :- Gj. 62, 63, 64, 65, (S.F.T.) for Rajkot, 64, 65, (S.F.T.) for other centres.****Site :-Rajkot, Bhavnagar, Junagarh,****Baroda, Surat, Kaira and Mehsana.****Type :- 'M'.****Object :-**To study response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients (Type A<sub>1</sub>).**1. BASAL CONDITIONS :**

(i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagarh, Deep black for Baroda and Surat and Grey brown for Kaira and Mehsana. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

O =Control (no manure).  
 N<sub>1</sub> =33.6 Kg/ha. of N.  
 P<sub>1</sub> =33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 P<sub>2</sub> =67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>1</sub> =33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>1</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub> =67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> =67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.  
 N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

**3. DESIGN :**Same as in type A<sub>1</sub> on page. 107.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1964—1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## S.F.T. (62)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of yield in Kg/ha.	58	240	175	411	411	376	392	48.3

Control mean = 1021 Kg/ha. ; No. of trials=7.

## S.F.T. (63)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of yield in Kg/ha.	184	125	343	348	437	525	740	68.4

Control mean = 1218 Kg/ha. ; No. of trials=7.

## S.F.T. (64)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of yield in Kg/ha.	28	113	167	276	388	436	583	92.2

Control mean = 1920 Kg/ha. ; No. of trials=12.

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of yield in Kg/ha.	194	361	376	415	500	657	798	113.5

Control mean = 2099 Kg/ha. ; No. of trials=12.

**Bhavnagar**

## S.F.T. (64)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	314	183	69	330	341	215	528	96.3

Control mean = 1002 Kg/ha. ; No. of trials=9.

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	180	200	273	246	270	426	566	61.9

Control mean = 1197 Kg/ha. ; No. of trials=12.

**Junagarh**

## S.F.T. (64)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	446	221	352	590	573	642	1020	60.2

Control mean = 1823 Kg/ha. ; No. of trials=11.

**S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	90	155	300	378	431	549	687	49.2

Control mean=1016 Kg/ha. ; No. of trials=11.

**Baroda****S.F.T. (64)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	232	-59	180	423	589	744	542	157.5

Control mean=1068 Kg/ha. ; No. of trials=9.

**S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	608	374	711	829	1001	1287	1551	102.4

Control mean=1134 Kg/ha. ; No. of trials=11.

**Surat****S.F.T. (64)**

Treatment	N <sub>2</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	181	148	207	345	409	598	793	48.3

Control mean=1477 Kg/ha. ; No. of trials=12.

**S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	239	162	205	383	464	579	817	63.3

Control mean=1028 Kg/ha. ; No. of trials=11.

**Kaira****S.F.T. (64)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	220	152	200	402	485	724	849	81.5

Control mean=1367 Kg/ha. ; No. of trials=12.

**S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	297	179	189	392	413	399	543	118.2

Control mean=1818 Kg/ha. ; No. of trials=12.

**Mehsana****S.F.T. (64)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of grain in Kg/ha.	381	376	407	619	562	780	1004	90.1

Control mean=2629 Kg/ha. ; No. of trials=12.

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	102	152	213	246	284	388	465	53.4

Control mean=1931 Kg/ha. ; No. of trials=13.

**Crop :- Wheat.**

**Site :- Rajkot(c.f.).**

**Ref :- Gj. 62(SFT).**

**Type :- 'M'.**

Object :-Type A<sub>2</sub>—To study response curve of important cereal, cash and oil seed crops to phosphorus applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic Alluvium. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O =Control (no manure).  
 N<sub>1</sub> =33.6 Kg/ha. of N.  
 P<sub>1</sub> =33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 P<sub>2</sub> =67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>1</sub> =33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>2</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>1</sub> =67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.  
 N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> on page 110.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	436	330	173	61	1227	336	330	0.0

Control mean=1020 Kg/ha. ; No. of trials=1

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62, 63, 64, 65(SFT) for Rajkot ; (64) S.F.T. for other centres.**

**Site :- Rajkot, Bhavnagar, Junagarh, Baroda, Surat, Mehsana and Kaira (c.f.).**

**Type :- 'M'.**

Object :-To study response curves of important cereal, cash and oilseed Crops to Potash applied singly and in combination with other nutrients (Type : A<sub>2</sub>).

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic Alluvium for Rajkot, Bhavnagar and Junagarh ; Deep black for Baroda and Surat ; grey brown for Mehsana and Kaira. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.



## 2. TREATMENTS :

- O = Control (no manure).  
 $N_1$  = 33.6 Kg/ha. of N.  
 $K_1$  = 33.6 Kg/ha. of  $K_2O$ .  
 $K_2$  = 67.2 Kg/ha. of  $K_2O$ .  
 $N_1K_1$  = 33.6 Kg/ha. of N+33.6 Kg/ha. of  $K_2O$ .  
 $N_1K_2$  = 33.6 Kg/ha. of N+67.2 Kg/ha. of  $K_2O$ .  
 $N_2K_2$  = 67.2 Kg/ha. of N+67.2 Kg/ha. of  $K_2O$ .  
 $N_1P_1K_1$  = 33.6 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ .  
 N applied as A/S.,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

Same as in type  $A_1$  on page 110.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1964 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Rajkot

## 62(SFT)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of grain in Kg/ha.	255	255	98	235	352	326	336	54.9

Control mean=976 Kg/ha., No. of trials=8

## 63(SFT)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of grain in Kg/ha.	327	233	300	427	341	557	504	95.1

Control mean=1138 Kg/ha., No. of trials=7.

## 64(SFT)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of grain in Kg/ha.	355	161	260	402	487	679	744	61.6

Control mean=1832 Kg/ha., No. of trials=12

## 65(SFT)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of grain in Kg/ha.	371	255	376	398	665	626	676	103.7

Control mean=1608 Kg/ha., No. of trials=9

## Mehsana

## S.F.T. (64)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of grain in Kg/ha.	234	283	420	543	602	681	993	101.8

Control mean=2650 Kg/ha., No. of trials=12

**S.F.T. (65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	6	148	111	274	264	347	439	100.1

Control mean=1699 Kg/ha. ; No. of trials=12

**Bhavnagar****S.F.T.(64)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	226	104	204	170	202	261	479	86.3

Control mean=951 Kg/ha. ; No. of trials=10

**S.F.T.(65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	160	180	220	272	387	243	522	69.6

Control mean=1029 Kg/ha. ; No. of trials=12

**Junagarh****S.F.T.(64)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	148	177	254	499	351	432	639	56.3

Control mean=1890 Kg/ha. ; No. of trials=11

**S.F.T.(65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	87	62	280	232	369	449	422	50.0

Control mean=1027 Kg/ha. ; No. of trials=11

**Baroda****S.F.T.(64)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	320	232	195	344	324	703	616	202.8

Control mean=892 Kg/ha. ; No. of trials=9

**S.F.T.(65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	264	248	442	451	703	939	1098	142.7

Control mean=1439 Kg/ha. ; No. of trials=11

**Surat****S.F.T.(64)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	224	165	258	350	515	650	581	108.7

Control mean=1427 Kg/ha. ; No. of trials=11

**S.F.T.(65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	280	225	304	371	451	593	762	32.1

Control mean=888 Kg/ha. ; No. of trials=11

**Kaira****S.F.T.(64)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	323	120	193	340	294	573	619	73.0

Control mean=1335 Kg/ha. ; No. of trials=12.

**S.F.T.(65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	361	188	190	417	474	636	575	81.9

Control mean=1591 Kg/ha. ; No. of trials=12.

**Crop :- Wheat (Rabi).****Ref :- Gj. 60(74), 61(103).****Site :- Agri. Res. Stn., Amreli.****Type :- 'C'.**

Object :- To find out the suitable date of sowing for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 60(74) ; Til (Sesamum) for 61(103). (c) N.A. for 60(74) ; 12.4 C.L./ha. of F.Y.M. for 61(103). (ii) Medium black. (iii) As per treatments. (iv) (a) 1 to 2 ploughings+1 to 2 harrowings. (b) Drilling. (c) 67 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60(74) ; 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(103). (vi) KCN-133. (vii) Irrigated. (viii) 2 weedings+3 interculturings for 60(74) ; Nil for 61(103). (ix) Nil for 60(74) ; 33 cm. in the year 1961. (x) 16, 26.3.1961 ; 25.3.1962.

**2. TREATMENTS :**

6 dates of sowing : D<sub>1</sub>=16th Oct., D<sub>2</sub>=23rd Oct., D<sub>3</sub>=30th Oct., D<sub>4</sub>=6th Nov. ; D<sub>5</sub>=13th Nov. ; and D<sub>6</sub>=20th Nov.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 24.4 m.×3.4 m. for 60(74) ; 12.2 m.×3.4 m. for 61(103). (b) 23.5 m.×3.0 m. for 60(74) ; 11.3 m.×3.0 m. for 61(103). (v) 46 cm.×23 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958-1961 (modified in 1960 ; expt. for 1959 was not conducted. (b) No. (c) Results of combined analysis given under 5. Results. (v) Jamnagar. (vi) Nil. (vii) Variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 1361 Kg/ha. (ii) 303.7 Kg/ha. (35 d.f. made up of pooled error and Treatments×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>
Av. yield	1112	1316	1424	1568	1335	1409

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(57), 61(69).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'C'.**

Object :—To find out the best date of sowing for Wheat.

1. **BASAL CONDITIONS :**

(i) (a) Nil. (b) Mug for 60(57); N.A. for 61(69). (c) Nil for 60(57); N.A. for 61(69). (ii) Medium black. (iii) As per treatments. (iv) (a) 1 ploughing+1 harrowing. (b) Drilling. (c) 67 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) 44.8 Kg/ha. of N as A/S+44.8 Kg/ha. of  $P_2O_5$  as Super for 60(57); 224.2 Kg/ha. of A/S+ 248.8 Kg/ha. of Super for 61(69). (vi) NP-798. (vii) Irrigated. (viii) Nil. (ix) N.A. for 60(57); Nil for 61(69). (x) N.A. for 60(57); 9 to 22.3.1962 for 61(69).

2. **TREATMENTS :**

6 dates of sowing :  $D_1=17$ th Oct.,  $D_2=24$ th Oct.,  $D_3=31$ st Oct.,  $D_4=7$ th Nov.,  $D_5=14$ th Nov. and  $D_6=21$ st Nov.

3. **DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  4.6 m. for 60(57); 10.7 m.  $\times$  4.3 m. for 61(69). (b) 9.1 m.  $\times$  3.7 m. for 60(57); 8.8 m.  $\times$  2.4 m. for 61(69). (v) 91 cm.  $\times$  46 cm. for 60(57); 91 cm.  $\times$  91 cm. for 61(69). (vi) Yes.

4. **GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958—1961. (b) No. (c) Results of combined analysis given under 5. Results. (v) Amreli. (vi) Nil. (vii) Expts. numbers 58(89), 59(22) have also been included for giving combined results. Error variances are homogeneous and Treatments  $\times$  years interaction is present.

5. **RESULTS :**

(i) 1536 Kg/ha. (ii) 248.0 Kg/ha. (15 d.f. made up of Treatments  $\times$  years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$D_1$	$D_2$	$D_3$	$D_4$	$D_5$	$D_6$
Av. yield	1129	1265	1588	1781	1761	1692

C.D. = 373.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(59).**

**Site :- Agri. Res. Stn., Deesa.**

**Type :- 'CV'.**

Object :—To find out suitable method of sowing for different varieties of Wheat.

1. **BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar and Guwar. (c) Nil. (ii) Sandy yellowish brown. (iii) 27.11.61. (iv) (a) 5 ploughings and 2 harrowings. (b) As per treatments. (c) 89.7 Kg/ha. (d) As per treatments. (e) N.A. (v) G.M. (Sann) 44.8 Kg/ha. of Sann seed was sown + 16.8 Kg/ha. of N as A/S. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) 107 cm. in whole year. (x) 30.3.62.

2. **TREATMENTS :**

**Main-plot treatments**

3 varieties :  $V_1=NP-710$ ,  $V_2=822$  and  $V_3=826$ .

**Sub-plot treatments**

3 methods of sowing :  $M_1=$ Sowing by plough cross-wise,  $M_2=$ Broadcasting and  $M_3=$ Drilling at 12'.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 13.7 m.  $\times$  4.6 m. (b) 12.2 m.  $\times$  3.7 m. (v) 76 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) and (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2912 Kg/ha. (ii) (a) 284.8 Kg/ha. (b) 287.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
M <sub>1</sub>	3003	2971	2668	2881
M <sub>2</sub>	3044	2984	2927	2985
M <sub>3</sub>	3108	2733	2767	2869
Mean	3052	2896	2787	2912

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 65(202).**

**Site :- Wheat Res. Stn., Junagadh.**

**Type :- 'CV'.**

**Object :-** To study the effect of higher doses of Nitrogen on mexi (hybrid) Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> (ii) Medium black. (iii) 21.11.65. (iv) (a) 1 ploughing, 2 harrowings. (b) Drilling (c) 86 Kg/ha. (d) 23 cm. row to row. (e) Nil. (v) 32 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) 1.3 cm. (x) 10.3.66

## 2. TREATMENTS :

**Main-plot treatments**

6 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=40, N<sub>2</sub>=80, N<sub>3</sub>=120, N<sub>4</sub>=160 and N<sub>5</sub>=200 Kg/ha.

**Sub-plot treatments**

2 varieties of wheat : V<sub>1</sub>=Sonara-64 and V<sub>2</sub>=Lerma Roja.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.0 m.  $\times$  2.8 m. (b) 8.0 m.  $\times$  0.5 m. (v) 100.0 cm.  $\times$  115.0 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965-68. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the expt. is continued beyond 1965 so the individual result is given below :

## 5. RESULTS :

(i) 2115 Kg/ha. (ii) (a) 162.5 Kg/ha. (b) 124.9 Kg/ha. (iii) Main effect of N, V and N  $\times$  V are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	Mean
V <sub>1</sub>	1116	1478	2181	2301	2394	2439	1985
V <sub>2</sub>	1031	1906	2221	2734	2748	2834	2246
Mean	1073	1692	2201	2517	2571	2637	2115

C.D. for N marginal means	= 136.6 Kg/ha.
C.D. for V marginal means	= 60.1 Kg/ha.
C.D. for V means and some levels of N	= 55.4 Kg/ha.
C.D. for N means at same levels of V	= 270.8 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- GJ. 64(33), 65(121).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'CMP'.**

Object :- To find out the optimum seed rate and manurial dose with a suitable spacing for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) *Bajra*—Wheat for 64(33), Nil for 65(121). (b) *Bajra*. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N as A/S for 64(33), 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(121). (ii) Medium black. (iii) 27.11.64, 24.11.65. (iv) (a) 1 ploughing+2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) Nil. (v) Nil. (vi) NP—824 (Medium). (vii) Irrigated. (viii) 1 weeding for 64(33), Nil for 65(121). (ix) Nil. (x) 22.3.65 ; 19.3.66.

**2. TREATMENTS :**

**Main-plot treatments**

All combinations of (1) and (2)

- (1) 2 seed rates : R<sub>1</sub>=67.2 and R<sub>2</sub>=112.0 Kg/ha.  
 (2) 2 spacing between plants : S<sub>1</sub>=22.9 cm. and S<sub>2</sub>=Criss cross.

**Sub-plot treatments**

All combinations of (3), (4) and (5)

- (3) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=44.8 Kg/ha.  
 (4) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=1120.8 Kg/ha.  
 (5) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=44.8 Kg/ha.

Note : Manures applied at sowing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main plots/replication, 8 sub-plots/main plot. (b) 40.2 m. × 27.4 m. for 64(33), N.A. for 65(121). (iii) 4. (iv) (a) 10.1 m. × 3.4 m. (b) 9.1 m. × 2.5 m. (v) 46 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Black rust was observed late in season for 64(33) : Nil for 65(121). (iii) Grain yield. (iv) (a) 1964 to 67. (b) No. (c) Nil. (v) N.A. for 64(33), Bhachau for 65(121). (vi) Nil. (vii) As the expts. is continual beyond 1965, hence the results of individual expts. are given below.

**5. RESULTS :**

**64(33)**

(i) 2134 Kg/ha. (ii) (a) 390.1 Kg/ha. (b) 284.9 Kg/ha. (iii) Main effect of N is highly significant and the main effect of P and interaction P × R are significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	N <sub>0</sub>	N <sub>1</sub>	F <sub>0</sub>	F <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
R <sub>1</sub>	2188	2156	1863	2482	2148	2196	2048	2297	2172
R <sub>2</sub>	2120	2074	1755	2439	2125	2069	2100	2093	2097
Mean	2154	2115	1809	2460	2137	2132	2074	2195	2134
P <sub>0</sub>	2093	2054	1792	2356	2061	2087			
P <sub>1</sub>	2215	2175	1826	2564	2213	2177			
F <sub>0</sub>	2168	2106	1796	2477					
F <sub>1</sub>	2140	2124	1822	2443					
N <sub>0</sub>	1786	1832							
N <sub>1</sub>	2522	2398							

C.D. for N or P marginal means = 100.4 Kg/ha.

C.D. for P means at the same level of R = 141.8 Kg/ha.

C.D. for R means at the same level of P = 174.6 Kg/ha.

65(191)

- (i) 2740 Kg/ha. (ii) (a) 344.9 Kg/ha. (b) 238.5 Kg/ha. (iii) Only main effect of N is highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	N <sub>0</sub>	N <sub>1</sub>	F <sub>0</sub>	F <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
R <sub>1</sub>	2829	2726	2661	2895	2836	2720	2707	2849	2778
R <sub>2</sub>	2771	2634	2594	2810	2698	2706	2664	2740	2702
Mean	2800	2680	2628	2853	2767	2713	2686	2795	2740
P <sub>0</sub>	2765	2606	2572	2794	2699	2672			
P <sub>1</sub>	2835	2754	2684	2906	2835	2755			
F <sub>0</sub>	2849	2685	2651	2883					
F <sub>1</sub>	2751	2675	2604	2822					
N <sub>0</sub>	2715	2540							
N <sub>1</sub>	2885	2820							

C.D. for N marginal means = 84.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Agri. Res. Stn., Bhachau.**

**Ref :- Gj. 65(134).**

**Type :- 'CM'.**

**Object :-** To determine the optimum requirements of spacing, seedrate and fertilizer for Wheat.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Groundnut. (c) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy soil. (iii) 6.11.65. (iv) (a) 2 ploughings, 1 harrowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) NP-718. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 3.3.66.

## 2. TREATMENTS :

**Main-plot treatments**

All combinations of (1) and (2)

(1) 2 spacings between rows :  $S_1=23$  cm. and  $S_2$ =Criss cross.(2) 2 seed rates :  $R_1=67.2$  and  $R_2=112.1$  Kg/ha.**Sub-plot treatments**

All combinations of (1), (2) and (3)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=44.8$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=44.8$  Kg/ha.(3) 2 levels of F.Y.M. :  $F_0=0$  and  $F_2=24.7$  C.L./ha.N and  $P_2O_5$  applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 8 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  4.6 m. (b) 10.1 m.  $\times$  3.7 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal ; No lodging. (ii) Nil. (iii) Grain yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1708 Kg/ha. (ii) (a) 713.5 Kg/ha. (b) 361.2 Kg/ha. (iii) Main effects of N and F are highly significant. Main effect of P is significant. (iv) Av. yield of grain in Kg/ha.

	$R_1$	$R_2$	$N_0$	$N_1$	$P_0$	$P_1$	$F_0$	$F_1$	Mean
$S_1$	1900	1673	1537	2036	1664	1909	1686	1887	1787
$S_2$	1626	1629	1588	1667	1617	1638	1529	1726	1628
Mean	1763	1651	1563	1852	1641	1774	1608	1807	1708
$F_0$	1680	1535	1483	1732	1540	1675			
$F_1$	1846	1767	1642	1971	1741	1872			
$P_0$	1772	1509	1478	1803					
$P_1$	1754	1793	1647	1900					
$N_0$	1635	1490							
$N_1$	1891	1812							

C.D. for N,P or F marginal means=125.8 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 60(177), 61(207), 62(203).****Site :- Dry Farming Res. Stn., Dhandhuka. Type :- 'CM'.**

Object :- To find out the optimum spacing and dose of N for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Wheat. (b) Cotton. (c) Nil for 60(177) ; 11.2 Kg/ha. of N for 61(207) and 62(203). (ii) Medium black. (iii) 26.10.1960 ; 26.10.1961 ; 1.11.1962. (iv) (a) 1 ploughing + 4 to 5 harrowings. (b) Drilling. (c) 49 Kg/ha. (d) As per treatments. (e) Nil. (v) Nil. (vi) Arnej—206 (medium). (vii) Un-irrigated. (viii) Nil. (ix) 1 cm., Nil, 2 cm. (x) 5.3.1961 ; 5.3.1962 ; 9.3.1963.



## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=11.2$  Kg/ha.

(2) 3 row spacings :  $S_1=30$ ,  $S_2=38$  and  $S_3=46$  cm.

N applied at sowing.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b)  $22.9\text{ m.} \times 22.9\text{ m.}$  (iii) 4. (iv) (a)  $11.0\text{ m.} \times 7.7\text{ m.}$  (b)  $9.1\text{ m.} \times 6.1\text{ m.}$   
(v)  $91\text{ cm.} \times 76\text{ cm.}$  (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Nil. (v) Vallabhipur.  
(vi) Nil. (vii) As the errors are heterogeneous and Treatment  $\times$  years interaction is absent, the results of individual years are presented.

## 5. RESULTS :

## Gj. 60(177)

(i) 873 Kg/ha. (ii) 199.7 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_0$	738	1103	980	940
$N_1$	841	771	805	806
Mean	790	937	892	873

## Gj. 61(207)

(i) 701 Kg/ha. (ii) 99.9 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_0$	803	700	686	730
$N_1$	686	682	650	673
Mean	744	691	668	701

## Gj. 62(203)

(i) 730 Kg/ha. (ii) 162.0 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$N_0$	705	724	692	707
$N_1$	665	788	804	752
Mean	685	756	748	730

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(140), 61(165), 62(160), 63(166), 64(100).**

**Site :- Trial-cum-Demons. Farm., Kholwad.**

**Type :- 'CM'.**

**Object :-** To find out the effect of differently treated *Kharif* crops on succeeding Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) to (c) As per treatments. (ii) Medium black. (iii) 14.11.1960 ; 15.11.1961 ; 17.11.1962 ; 4.12.1963 ; 24.10.1964. (iv) (a) 1 to 2 ploughings+1 to 3 harrowings. (b) Drilling. (c) 45 Kg/ha. for 60(140) ; 67 Kg/ha. for others. (d) 30 cm. between rows. (e) -. (v) 12.4 C.L./ha. of F.Y.M. applied to *kharsf* crops. (vi) NP—718. (vii) Irrigated. (viii) 3 interculturings for 62(160) ; 5 interculturings for 61(165), 63(166) ; Nil for 60(140), 64(100). (ix) 96 cm. ; 145 cm. ; 84 cm. ; 124 cm. ; 191 cm. in respective years. (x) 25.3.1961 ; 13.3.1962 ; 18.3.1963 ; 2 to 9.6.1964 ; 6.3.1965.

## 2. TREATMENTS :

10 previous crops : C<sub>1</sub>=Fallow (unmanured), C<sub>2</sub>=Fallow (manured), C<sub>3</sub>=Ploughed fallow, C<sub>4</sub>=Paddy, C<sub>5</sub>=Groundnut, C<sub>6</sub>=Groundnut with 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, C<sub>7</sub>=China mug, C<sub>8</sub>=China mug with 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, C<sub>9</sub>=G.M. (*Sann*) and C<sub>10</sub>=G.M. (*Sann*) with 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

44.8 Kg/ha of N as A/s+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> were applied of previous paddy crop and the present wheat crop in all the above treatments excepting C<sub>1</sub>.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 18.3 m. × 7.3 m. (b) 16.5 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 61(165) and normal for others. (ii) Wheat rust attack for 64(100) and no incidence for others. (iii) Yield of grain. (iv) (a) 1959—1964. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and interaction is present.

## 5. RESULTS :

(i) 1206 Kg/ha. (ii) 235.6 Kg/ha. (36 d.f. made up of Treatments × years interaction), (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>
Av. yield	938	1247	1180	650	1150
Treatment	C <sub>6</sub>	C <sub>7</sub>	C <sub>8</sub>	C <sub>9</sub>	C <sub>10</sub>
Av. yield	1216	1286	1347	1480	1562

C.D.=302.4 Kg/ha.

**Crop :- Wheat (*Rabi*).**

**Ref :- Gj. 61(160).**

**Site :- Trial-cum-Demons. Farnā, Kim.**

**Type :- 'CM'.**

Object :—To find out the suitable sowing time, manurial doses and seed rate for irrigated Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) As per treatments. (iv) (a) 1 ploughing and 3 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) NP—824. (vii) Irrigated. (viii) 3 interculturings. (ix) Nil. (x) 15.3.62.

## 2. TREATMENTS :

**Main-plot treatments**

All combinations of (1) and (2)

(1) 3 dates of sowing : D<sub>1</sub>=15 days before normal (23.10.1961), D<sub>2</sub>=Normal (17.11.1961) and D<sub>3</sub>=15 days after normal (22.11.1961).

(2) 3 seed rates : S<sub>1</sub>=56, S<sub>2</sub>=78 and S<sub>3</sub>=101 Kg/ha..

**Sub-plot treatments**

All combinations of (3) and (4).

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 Kg/ha. and N<sub>2</sub>=44.8 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 Kg/ha. and P<sub>2</sub>=44.8 Kg/ha.

menures applied on 23.10.1961, 7.11.1961.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 9 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 1/198 ha. (b) 1/247 ha. (v) N.A. (vi) Yes.

## 4. GENERAL :

- (i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) to (c) No. (v) N.A. (vi) to (vii) Nil.

## 5. RESULTS :

- (i) 967 Kg/ha. (ii) (a) 250.3 Kg/ha. (b) 176.3 Kg/ha. (iii) Main effect of D, N and interaction D×N are highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
S <sub>1</sub>	838	837	1189	781	909	1174	913	947	1003	955
S <sub>2</sub>	754	911	1282	785	964	1198	951	999	997	982
S <sub>3</sub>	859	905	1128	862	968	1062	914	979	999	964
Mean	817	884	1200	809	947	1145	926	975	1000	967
P <sub>0</sub>	791	846	1142	828	909	1042				
P <sub>1</sub>	825	851	1249	834	965	1156				
P <sub>2</sub>	835	957	1208	796	966	1237				
N <sub>0</sub>	686	813	929							
N <sub>1</sub>	853	870	1117							
N <sub>2</sub>	911	970	1553							

C.D. for D or S marginal means	= 111.1 Kg/ha.
C.D. for N or P marginal means	= 67.7 Kg/ha.
C.D. for N or P means at the same level of D or S	= 117.4 Kg/ha.
C.D. for D or S means at the same level of N or P	= 146.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(152), 61(51), 62(122).**

**Site :- Agri. Res. Stn., Tancha.**

**Type :- 'GM'.**

Object :- To find out the optimum spacing and manurial requirement of dry Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) G.M. (Sann) for 60(152) ; Jowar for 61(51) ; Lang for 62(122). (c) 44.8 Kg/ha. of Super for 60(152) ; Nil for 61(51) ; G.M. for 62(122). (ii) Black cotton soil. (iii) 26.10.1960 ; 15.11.1961 ; 17.11.1962. (iv) (a) 3 to 4 harrowings for 60(152), 61(51) ; 3 ploughings+5 harrowings for 62(122). (b) Drilling. (c) 45 Kg/ha. (d) As per treatments. (e) Nil. (v) G.M. for 60(152) ; Nil for others. (vi) A-206. (vii) Unirrigated. (viii) 1 interculturing. (ix) Nil for 60(152), 61(51) ; 52 cm. in the year 1962. (x) 2.3.1961 ; 13.3.1962 ; 21.3.1963.

## 2. TREATMENTS :

All combinations of (1) and (2)

- (1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=11.2 Kg/ha.  
 (2) 3 row spacings : S<sub>1</sub>=30, S<sub>2</sub>=46 and S<sub>3</sub>=61 cm.

## 3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 6. (b) 25.3 m.×22.0 m. for 61(51) ; N.A. for others. (iii) 4. (iv) (a) 11.0 m.×7.6 m. (b) 7.9 m.×6.1 m. (v) 183 cm.×76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Mild attack of stem borers for 60(152); Attack of stem borers and white ants for 61(51); No incidence for 62(122). (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Nil. (v) N.A. (vi) High temperature during growth period and rains just before maturity affected the crop adversely for 60(152). There was absence of dew at the time of harvest for 61(51). The crop was affected due to late sowing and insufficient moisture for 62(122). (vii) As the errors are heterogeneous and interaction is absent the results of individual years are presented.

## 5. RESULTS :

## Gj. 60(152)

(i) 381 Kg/ha. (ii) 249.5 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	361	313	363	346
N <sub>1</sub>	441	438	369	416
Mean	401	375	366	381

## Gj. 61(51)

(i) 472 Kg/ha. (ii) 49.1 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	418	479	444	447
N <sub>1</sub>	528	483	478	496
Mean	473	481	461	472

C.D. for N marginal means = 42.8 Kg/ha.

## Gj. 62(122)

(i) 604 Kg/ha. (ii) 54.3 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	595	617	605	606
N <sub>1</sub>	596	576	636	603
Mean	596	596	621	604

Crop :- Wheat (*Rabi*).

Ref :- Gj. 60(156), 61(97), 62(63), 63(43).

Site :- Dry Farming Res. Stn., Vallabhipur.

Type :- 'CM'.

Object :- To study the optimum dose of N along with spacing for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Nil for 60(156); Wheat for others. (c) Nil for 60(156), 63(43); 11.2 Kg/ha. of N for others. (ii) Medium black. (iii) 27.10.1960; 28.10.1961; 21.10.1962; 2.11.1963. (iv) (a) 8 to 10 harrowings. (b) Drilling. (c) 56 Kg/ha. for 60(156), 61(97); 49 Kg/ha. for others. (d) As per treatments. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. for 63(43); Nil for others. (vi) A-206. (vii) Unirrigated. (viii) 1 hand weeding for 60(156); Nil for 61(97); 1 interculturing for others. (ix) Nil, Nil, 3 cm.; 9 cm. (x) 22.2.1961; 14.2.1962; 14.2.1963; 12.3.1964.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=11.2$  Kg/ha.

(2) 3 row spacings :  $S_1=30$ ,  $S_2=38$  and  $S_3=46$  cm.

A/S was drilled at sowing.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a)  $11.0$  m.  $\times$   $7.6$  m. (b)  $9.5$  m.  $\times$   $5.8$  m. for  $S_1$ ,  $S_2$  and  $9.5$  m.  $\times$   $6.1$  m. for  $S_3$ . (v)  $76$  cm.  $\times$   $91$  cm. for  $S_1$ ,  $S_2$  and  $76$  cm.  $\times$   $76$  cm. for  $S_3$ . (vi) Yes.

## 4. GENERAL :

(i) Good for 63(43) and Normal for others. (ii) Slight attack of white ants for 61(97) and no incidence for others. (iii) Yield of grain. (iv) (a) 1960—1963. (b) No. (c) Nil. (v) Dhandhuka. (vi) Less cold in winter for 60(156). (vii) As errors are heterogeneous and Treatments  $\times$  years interaction is absent, results of individual years are presented.

## 5. RESULTS :

## 60(156)

(i) 728 Kg/ha. (ii) 113.0 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	692	764	674	710
N <sub>1</sub>	805	717	719	747
Mean	748	740	696	728

## 61(97)

(i) 740 Kg/ha. (ii) 123.4 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	800	701	669	723
N <sub>1</sub>	785	754	732	757
Mean	792	727	700	740

## 62(63)

(i) 777 Kg/ha. (ii) 44.2 Kg/ha. (iii) Main effect of R is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	737	820	743	767
N <sub>1</sub>	763	829	766	786
Mean	750	825	755	777

C.D. for R marginal means = 47.0 Kg/ha.

## 63(43)

(i) 1154 Kg/ha. (ii) 67.1 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	1049	1145	1119	1104
N <sub>1</sub>	1211	1208	1195	1205
Mean	1130	1176	1157	1154

C.D. for N marginal means = 58.5 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62, 63, 64(MAE).**

**Site :- M.A.E. Centre, Chalthan.**

**Type :- 'CM'.**

Object :—Type VIII—To study the optimum requirements of seed rate, time of sowing in combination with fertilizers doses for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Wheat-Paddy for 62 ; Cotton-Sann-Wheat for 63 ; Paddy-Wheat for 64. (b) Paddy for 62, 64 ; Sann (G.M.) for 63. (c) Nil for 62, 63 ; N.A. for 64. (ii) Medium black soil. (iii) As per treatments. (iv) (a) 2 ploughings and 3 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) Nil. (v) 5600 Kg/ha. of F.Y.M. for 62 ; Nil for others. (vi) NP-718. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 15, 24.3.63, 2.4.1963 for 62 ; 15.3.64, 1, 12.4.64 for 63 and 8, 9, 19, 20.3.1965, 26, 27.3.1965 for 64.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 dates of sowing : D<sub>1</sub>=8.11.62, D<sub>2</sub>=23.11.62 and D<sub>3</sub>=7.12.62.

(2) 3 seed rates : S<sub>1</sub>=56.0, S<sub>2</sub>=78.4 and S<sub>3</sub>=101.0 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

P and N drilled before sowing.

The dates of sowing tried for 63(MAE) are : D<sub>1</sub>=13.11.63, D<sub>2</sub>=28.11.63 and D<sub>3</sub>=13.12.63.

The dates of sowing for 64(MAE) are : D<sub>1</sub>=11.11.64, D<sub>2</sub>=25.11.64 and D<sub>3</sub>=6.12.64.

**3. DESIGN :**

(i) 3<sup>2</sup> × 2<sup>2</sup> split-plot. (ii) (a) 9 main—plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.8 m. × 4.9 m. (b) 8.5 m. × 3.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962 to 1965 (65 N.A.). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

**62(MAE)**

(i) 1052 Kg/ha. (ii) (a) 492.6 Kg/ha. (b) 136.7 Kg/ha. (iii) Main effects of N, P and interaction D × N are highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1195	948	811	862	1009	1084	615	1019	1320	985
P <sub>1</sub>	1221	993	903	929	1051	1137	644	1035	1438	1039
P <sub>2</sub>	1323	1072	1003	990	1137	1271	733	1137	1528	1133
Mean	1246	1004	906	927	1066	1164	664	1063	1429	1052
N <sub>0</sub>	740	631	621	541	689	762				
N <sub>1</sub>	1285	996	907	962	1045	1183				
N <sub>2</sub>	1714	1384	1189	1277	1464	1547				
S <sub>1</sub>	1078	891	811							
S <sub>2</sub>	1108	1064	1025							
S <sub>3</sub>	1553	1057	881							

C.D. for N or P marginal means = 52.5 Kg/ha.

C.D. for N means at the same level of D = 91.0 Kg/ha.

C.D. for D means at the same level of N = 230.2 Kg/ha.

#### 63(MAE)

- (i) 1211 Kg/ha. (ii) (a) 363.9 Kg/ha. (b) 125.5 Kg/ha. (iii) Main effects of D, N, P and interaction S×N and D×N are highly significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1135	1377	883	1097	1147	1151	848	1147	1400	1132
P <sub>1</sub>	1247	1395	985	1123	1267	1237	881	1207	1538	1209
P <sub>2</sub>	1303	1591	983	1193	1374	1310	925	1302	1650	1292
Mean	1228	1454	950	1137	1263	1233	885	1219	1529	1211
N <sub>0</sub>	829	1094	731	883	899	871				
N <sub>1</sub>	1207	1447	1003	1162	1243	1252				
N <sub>2</sub>	1649	1821	1117	1366	1646	1575				
S <sub>1</sub>	1072	1410	930							
S <sub>2</sub>	1405	1456	928							
S <sub>3</sub>	1208	1497	993							

C.D. for D marginal means = 161.4 Kg/ha.

C.D. for N or P marginal means = 48.2 Kg/ha.

C.D. for N means at the same level of D or S = 83.4 Kg/ha.

C.D. for D or S means at the same level of N = 174.5 Kg/ha.

#### 64(MAE)

- (i) 1153 Kg/ha. (ii) (a) 181.8 Kg/ha. (b) 129.9 Kg/ha. (iii) Main effects of N and P are highly significant and that of S and D are significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1128	1105	1044	1006	1142	1129	710	1098	1469	1092
P <sub>1</sub>	1234	1159	1049	1072	1154	1216	740	1161	1541	1147
P <sub>2</sub>	1317	1245	1095	1132	1259	1267	783	1197	1677	1219
Mean	1226	1170	1063	1070	1185	1204	744	1152	1562	1153
N <sub>0</sub>	780	707	746	701	745	788				
N <sub>1</sub>	1217	1162	1077	1055	1143	1258				
N <sub>2</sub>	1683	1640	1365	1454	1667	1566				
S <sub>1</sub>	1146	1075	989							
S <sub>2</sub>	1258	1210	1087							
S <sub>3</sub>	1276	1224	1112							

C. D. for D or S marginal means=80.7 Kg/ha.

C. D. for P or N marginal means=49.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60, 61 and 62(MAE).**

**Site :- M.A.E. Centre, Umrjala.**

**Type :- 'CM'.**

**Object :-**Type VIII—To study the effect of different dates of sowing, seed rates and manures on the yield of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Lucerne, *Bajri*, N.A. (c) N.A. (ii) Medium black. (iii) As per treatments. (iv) (a) 2 to 4 harrowings, one ploughing. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) 5600 Kg/ha. of F.Y.M. (vi) NP-718. (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 13.3.61; 26.3.61 ; 4.3.62; D<sub>1</sub> on 15.2.63, D<sub>2</sub> on 26.2.63 and D<sub>3</sub> on 2.3.63.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 dates of sowing : D<sub>1</sub>=15.10.60, D<sub>2</sub>=3.11.60 and D<sub>3</sub>=15.11.60.

(2) 3 seed rates : S<sub>1</sub>=56.0, S<sub>2</sub>=78.4 and S<sub>3</sub>=100.9 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

Dates of sowing for 61 are D<sub>1</sub>=29.10.61, D<sub>2</sub>=14.11.61 and D<sub>3</sub>=30.11.61.

Dates of sowing for 62 are D<sub>1</sub>=26.10.62, D<sub>2</sub>=10.11.62 and D<sub>3</sub>=25.11.62.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 9 main-plots/replication and 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 10.7 m. × 3.7 m. (b) 9.1 m. × 2.7 m. (v) 76 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Lodging due to stormy weather in 1960. Good for 61 and unsatisfactory for 62. (ii) White ant trouble for 62. Nil for other years. (iii) Yield of grain. (iv) (a) 1957—1962. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Inadequate water supply in 1962.

**5. RESULTS :**

**1960**

(i) 2258 Kg/ha. (ii) (a) 771.0 Kg/ha. (b) 205.7 Kg/ha. (iii) Main effects of N and P are highly significant and that of D is significant. (iv) Av. yield of grain in Kg/ha.



	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
D <sub>1</sub>	1808	2223	1891	1798	2066	2058	1863	1983	2076	1974
D <sub>2</sub>	2112	2675	2481	2361	2444	2464	2241	2444	2584	2423
D <sub>3</sub>	2462	2398	2269	2297	2379	2452	2195	2407	2526	2376
Mean	2127	2432	2214	2152	2296	2325	2100	2278	2395	2258
P <sub>0</sub>	1937	2287	2076	1992	2130	2178				
P <sub>1</sub>	2130	2444	2260	2204	2278	2352				
P <sub>2</sub>	2314	2565	2306	2260	2480	2445				
N <sub>0</sub>	2011	2343	2102							
N <sub>1</sub>	2158	2490	2240							
N <sub>2</sub>	2212	2463	2300							

C.D. for D or S marginal means=342.2 Kg/ha.

C.D. for N or P marginal means=79.0 Kg/ha.

### 1961

- (i) 766 Kg/ha. (ii) (a) 393.2 Kg/ha. (b) 239.3 Kg/ha. (iii) Main effects of N and P are highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
D <sub>1</sub>	766	710	756	618	747	867	655	756	821	744
D <sub>2</sub>	821	802	831	774	830	850	747	756	950	818
D <sub>3</sub>	828	666	711	693	700	812	710	729	766	735
Mean	805	726	766	695	759	843	704	747	846	766
P <sub>0</sub>	673	692	747	664	664	784				
P <sub>1</sub>	793	729	719	682	784	775				
P <sub>2</sub>	950	756	832	738	830	930				
N <sub>0</sub>	719	664	702							
N <sub>1</sub>	784	729	764							
N <sub>2</sub>	912	785	832							

C.D. for N or P marginal means=92.0 Kg/ha.

### 1962

- (i) 508 Kg/ha. (ii) (a) 814.5 Kg/ha. (b) 144.5 Kg/ha. (iii) Main effect of N and D×N are significant.  
 (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
D <sub>1</sub>	997	461	628	812	597	675	625	743	718	695
D <sub>2</sub>	333	563	538	486	470	477	419	508	436	478
D <sub>3</sub>	304	371	374	346	356	349	301	376	373	350
Mean	545	465	513	548	474	500	472	542	509	508
P <sub>0</sub>	531	401	483	493	456	466				
P <sub>1</sub>	591	511	523	596	503	526				
P <sub>2</sub>	513	482	533	556	463	508				
N <sub>0</sub>	601	481	562							
N <sub>1</sub>	463	473	486							
N <sub>2</sub>	570	441	490							

C.D. for N marginal means = 55.7 Kg/ha.  
 C.D. for N means at the same level of D = 96.2 Kg/ha.  
 C.D. for D means at the same level of N = 371.4 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60 (76).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'CMV'.**

Object :- To find out the optimum spacings, seed rate and manurial doses for different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Shallow, light black. (iii) 5,6,11.60. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 interculturations and 2 weedings. (ix) Nil. (x) 13.4.61.

**2. TREATMENTS :**

All combinations of (1), (2), (3), (4), (5) and (6)

- (1) 2 varieties : V<sub>1</sub>=KCN-133 and V<sub>2</sub>=224.
- (2) 2 row spacings : S<sub>1</sub>=22.9 cm. and S<sub>2</sub>=Criss Cross.
- (3) 2 seed rates : R<sub>1</sub>=67.3 and R<sub>2</sub>=112.1 Kg/ha.
- (4) 2 levels of F.Y.M : F<sub>0</sub>=0 and F<sub>1</sub>=11208.5 Kg/ha.
- (5) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=44.8 Kg/ha.
- (6) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=44.8 Kg/ha.

**3. DESIGN :**

(i) 2<sup>8</sup> confd. (ii) (a) 8 plots/block ; 8 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (b) 10.1 m. × 5.5 m. (v) 45.7 cm. × 45.7 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1959—1960. (b) No. (c) Nil (v) to (vii) Nil.

**5. RESULTS :**

(i) 1095 Kg/ha. (ii) 325.9 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Table of mean and differential responses in Kg/ha.

## Differential response

Mean response	V		S		R		F		N		P	
	V <sub>1</sub>	V <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	N <sub>0</sub>	N <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>
V — 297	—	—	—227	—366	—327	—267	—345	—248	—228	—365	—329	—264
S 54	123	—16	—	—	110	—3	66	42	2	106	—4	112
R 81	51	111	138	25	—	—	69	93	—9	171	—3	166
F 41	—7	90	53	29	30	53	—	—	106	—24	122	—39
N 59	128	—9	7	112	—31	150	125	—6	—	—	22	97
P 69	102	37	11	127	—15	154	149	—11	31	107	—	—

C.D. of mean response = 169.0 Kg/ha.

C.D. of differential response = 238.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(171), 62(32), 63(87).**

**Site :- Agri. Res. Stn., Bhachau.**

**Type :- 'CMV'.**

Object :—To find out the optimum spacing, seedrate and manurial dose for different varieties of Wheat.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra* for 60(171); Groundnut for others. (c) Nil for 60(171); N.A. for 62(32); 24.7 C.L./ha. of F.Y.M. for 63(87). (ii) Sandy soil. (iii) 3.11.1960; 29.11.1962; 6.11.1963. (iv) (a) 1 to 2 ploughings+1 to 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings for 60(171); Nil for 62(32); 2 hand hoeings for 63(87). (ix) Nil. (x) 6.3.1961; 16.3.1963; 9.3.1964.

2. TREATMENTS :

All combinations of (1), (2), (3), (4), (5) and (6)

- (1) 2 varieties : V<sub>1</sub>=KCN—133 and V<sub>2</sub>=NP—718.
- (2) 2 row spacings : S<sub>1</sub>=23 cm. and S<sub>2</sub>=Criss cross.
- (3) 2 seed rates : R<sub>1</sub>=67 and R<sub>2</sub>=112 Kg/ha.
- (4) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=11208.5 Kg/ha.
- (5) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=44.8 Kg/ha.
- (6) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=44.8 Kg/ha.

3. DESIGN :

(i) 2<sup>6</sup> confd. (ii) (a) 8 plots/block; 8 blocks/replication. (b) N.A. for 60(171), 62(32); 25.6 m. × 21.9 m. for 63(87). (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Attack of white ants for 60(171); Attack of stem borer for 62(32); No incidence for 63(87). (iii) Yield of grain. (iv) (a) 1960—1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Expt. conducted in 1961 vitiated completely due to severe attack of locust. (vii) Error variances are heterogeneous and interaction is present.

5. RESULTS :

(i) 1105 Kg/ha. (ii) 355.6 Kg/ha. (42 d.f. made up of various components of Treatments × years interaction (iii) Main effect of V and interaction S × F are significant. (iv) Table of mean and differential responses in Kg/ha.

## Differential response

Mean response	V		S		R		F		N		P	
	V <sub>1</sub>	V <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	N <sub>0</sub>	N <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>
V 113	—	—	75	151	56	170	172	55	67	159	80	146
S 76	38	114	—	—	107	46	—29	181	41	110	96	56
R —24	—82	32	6	—55	—	—	—18	—31	—18	—30	—46	—2
F —27	31	—86	—132	78	—21	—34	—	—	—105	50	35	—90
N 97	52	144	63	132	103	91	20	175	—	—	69	126
P 24	—9	57	44	4	2	46	86	—39	—5	52	—	—

C.D. for mean response = 103.6 Kg/ha.

C.D. for differential response = 145.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(136), 61(176).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'CMV'.**

Object :—To study the effect of different seed rates and fertilizers on different varieties of Wheat.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra* for 60(136); N.A. for 61(176). (c) Nil for 60(136); N.A. for 61(176). (ii) Medium black. (iii) 9.11.1960; N.A. (iv) (a) 2 harrowings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) Nil. (x) 7.3.1961; 10,27.4.1962.

#### 2. TREATMENTS :

##### Main-plot treatments

All combinations of (1), (2), (3) and (4)

(1) 3 varieties : V<sub>1</sub>=NP-710, V<sub>2</sub>=NP=718 and V<sub>3</sub>=Kenphad.

(2) 3 seed rates : R<sub>1</sub>=45, R<sub>2</sub>=67 and R<sub>3</sub>=90 Kg/ha.

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

##### Sub-plot treatments

2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=11208 Kg/ha.

N was applied as broadcast and P<sub>2</sub>O<sub>5</sub> by drilling.

#### 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block; 9 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 9.1 m. × 4.6 m. (b) 7.3 m. × 3.0 m. for 60(136); 8.2 m. × 3.7 m. for 61 (176). (v) 91 cm. × 76 cm. for 60(136); 46 cm. × 46 cm. for 61(176). (v) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1958—1961. (b) No. (c) Nil. (v) Junagadh and Umralla. (vi) Nil. (vii) Sub-plot errors are heterogeneous. Hence the results of individual years are presented.

#### 3. RESULTS :

##### 60 (136)

(i) 1417 Kg/ha. (ii) (a) 379.8 Kg/ha. (b) 258.4 Kg/ha. (iii) Main effects of N, P, F and interaction N×R, P×F are highly significant. Main effect of V and interaction N×P are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
V <sub>1</sub>	1048	1464	1602	1154	1435	1524	1266	1425	1422	1153	1589	1371
V <sub>2</sub>	1348	1495	1804	1322	1579	1746	1566	1514	1568	1375	1724	1549
V <sub>3</sub>	975	1410	1607	1092	1410	1491	1308	1438	1247	1179	1483	1331
Mean	1124	1456	1671	1189	1475	1587	1380	1459	1412	1235	1599	1417
F <sub>0</sub>	1000	1281	1426	907	1348	1451	1168	1318	1220			
F <sub>1</sub>	1247	1632	1917	1472	1601	1723	1592	1600	1605			
R <sub>1</sub>	1187	1417	1537	1110	1505	1524						
R <sub>2</sub>	1066	1377	1933	1250	1423	1704						
R <sub>3</sub>	1119	1575	1543	1208	1495	1534						
P <sub>0</sub>	994	1275	1299									
P <sub>1</sub>	1238	1491	1695									
P <sub>2</sub>	1139	1604	2019									

C.D. for N, P, R or V marginal means = 155.0 Kg/ha.

C.D. for F marginal means = 82.0 Kg/ha.

C.D. for F means at the same level of N, P, R or V = 142.1 Kg/ha.

C.D. for N, P, R or V means at the same level of F = 184.8 Kg/ha.

C.D. for body of N×P or N×R table = 268.4 Kg/ha.

61 (176)

(i) 909 Kg/ha. (ii) (a) 268.7 Kg/ha. (b) 150.4 Kg/ha. (iii) Main effects of N,P,V,F and interaction P×F are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
V <sub>1</sub>	690	999	1083	781	971	1020	844	960	968	859	989	924
V <sub>2</sub>	749	1000	1222	810	1106	1054	921	999	1051	895	1085	990
V <sub>3</sub>	707	811	924	691	921	830	756	801	884	752	876	814
Mean	715	937	1076	761	999	968	840	920	968	835	983	909
F <sub>0</sub>	637	842	1027	616	954	936	804	841	862			
F <sub>1</sub>	793	1032	1125	906	1044	1000	877	999	1073			
R <sub>1</sub>	669	858	994	639	1004	878						
R <sub>2</sub>	689	1031	1040	808	976	976						
R <sub>3</sub>	788	921	1195	835	1017	1051						
P <sub>0</sub>	684	733	865									
P <sub>1</sub>	736	1019	1243									
P <sub>2</sub>	725	1058	1121									

C.D. for V, N, P or R marginal means = 109.6 Kg/ha.

C.D. for F marginal means = 47.7 Kg/ha.

C.D. for F means at the same level of V, N, P or R = 82.7 Kg/ha.

C.D. for V, N, P or R means at the same level of F = 124.3 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- GJ 60(138), 61(182).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'CMV'**

Object :- To study the effect of different seedrates and fertilizers on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut for 60(138) ; Cotton for 61(182). (c) 12.4 C.L./ha. of F.Y.M. for 60(138) ; 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$  for 61(182). (ii) Medium black. (iii) 9, 13.11.1960 ; 22, 23.11.1961. (iv) (a) One harrowing for 60(138) ; 1 ploughing+harrowing for 61(182). (b) Hand sowing. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 weeding for 60(138) ; Nil for 61(182). (ix) Nil. (x) 16 to 19.3.1961 ; 23.3.1962.

**2. TREATMENTS :****Main-plot treatments**

All combinations of (1), (2), (3) and (4)

(1) 3 varieties :  $V_1=NP-710$ ,  $V_2=NP-718$  and  $V_3=Kenphad$ .(2) 3 seed rates :  $R_1=45$ ,  $R_2=67$  and  $R_3=90$  Kg/ha.(3) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(4) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.**Sub-plot treatments**2 levels of F.Y.M. :  $F_0=0$  and  $F_1=11208$  Kg/ha.**3. DESIGN :**

(i) Split-plot confd. (ii) 9 main-plots/block ; 9 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 10.1 m.  $\times$  5.5 m. (b) 9.1 m.  $\times$  4.6 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of aphids and rust for 61(182) ; No incidence for 60(138). (iii) Yield of grain. (iv) (a) 1958-1961. (b) No. (c) Results of combined analysis given under 5. (v) Jamnagar and Umralla. (vi) Nil. (vii) The expts. have been analysed as  $3^4 \times 2$  Confd. fact. because of incorrect layout plan. Expt. nos. 58(121) and 59(136) have also been included for giving combined results. Errors are homogeneous and interaction is present.

**5. RESULTS :**

(i) 1125 Kg/ha. (ii) 434.5 Kg/ha. (123 d.f. made up of various components of Treatments  $\times$  years interaction). (iii) Main effect of F, V and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$R_1$	$R_2$	$R_3$	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	Mean
$F_0$	1172	990	1078	1041	1087	1112	1041	1125	1074	994	1075	1171	1080
$F_1$	1254	1072	1184	1133	1189	1188	1141	1195	1174	1090	1163	1257	1170
Mean	1213	1031	1131	1087	1138	1150	1091	1160	1124	1042	1119	1214	1125
$P_0$	1122	944	1060	1019	1035	1072	1004	1099	1023				
$P_1$	1216	1017	1124	1071	1155	1131	1091	1147	1119				
$P_2$	1301	1132	1209	1171	1224	1247	1178	1234	1230				
$N_0$	1173	1005	1095	1025	1146	1102							
$N_1$	1251	1075	1154	1114	1175	1191							
$N_2$	1215	1013	1144	1122	1093	1157							
$R_1$	1185	952	1124										
$R_2$	1233	1072	1109										
$R_3$	1221	1069	1160										

C.D. for F marginal means = 66.8 Kg/ha.

C.D. for V or P marginal means = 82.0 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 60(41), 61(46).****Site :- Agri. Res. Farm, Halvad.****Type :- 'CMV'**

Object :—To study the effect of different seed rates, spacing and fertilizers on different varieties of Wheat.

**1. BASAL CONDITIONS :**

- (i) (a) Legume-Cereal-Cotton for 60(41); Nil for 61(46). (b) Groundnut. (c) 224.2 Kg/ha. of  $P_2O_5$  for 60(41); 44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$  for 61(46). (ii) Medium black. (iii) 12, 13.11.1960; 27 to 29.11.1961. (iv) (a) 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) One weeding. (ix) Nil. (x) 11.3.1961; 20.3.1962.

**2. TREATMENTS :**

- All combinations of (1), (2), (3), (4), (5), and (6)  
 (1) 2 varieties :  $V_1=KCN-133$  and  $V_2=NP-710$ .  
 (2) 2 row spacings :  $S_1=23$  cm. and  $S_2=Criss-cross$ .  
 (3) 2 seed rates :  $R_1=67$  and  $R_2=112$  Kg/ha.  
 (4) 2 levels of N :  $N_0=O$  and  $N_1=44.8$  Kg/ha.  
 (5) 2 levels of  $P_2O_5$  :  $P_0=0$  and  $P_1=44.8$  Kg/ha.  
 (6) 2 levels of F.Y.M. :  $F_0=O$  and  $F_1=11208$  Kg/ha.

**3. DESIGN :**

- (i) 2<sup>6</sup> Conf'd. (ii) (a) 8 plots/block; 8 blocks/replication. (b) NA. (iii) 1. (iv) (a) 10.4 m. × 6.1 m. for 60(41); 10.4 m. × 4.9 m. for 61(46). (b) 9.1 m. × 4.6 for 60(41); 9.1 m. × 3.7 m. for 61(46). (v) 61 cm. × 76 cm. for 60(41); 61 cm. × 61 cm. for 61(46). (vi) Yes.

**4. GENERAL :**

- (i) Normal for 60(41) and good for 61(46). (ii) Slight attack of shoot borers. (iii) Yield of grain. (iv) (a) 1959-1961. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. no. 59(12) have also been included for giving combined results. Errors are homogeneous and interaction is present.

**5. RESULTS :**

- (i) 1380 Kg/ha. (ii) 507.9 Kg/ha. (42 d. f. made up of various components of Treatments × years interaction). (iii) Main effects of N and P are highly significant and that of F is significant. (iv) Table of mean and differential responses in Kg/ha.

Differential response

Mean response	V		S		R		N		P		F	
	$V_1$	$V_2$	$S_1$	$S_2$	$R_1$	$R_2$	$N_0$	$N_1$	$P_0$	$P_1$	$F_0$	$F_1$
V — 1	—	—	— 18	16	33	— 35	— 12	10	— 5	3	— 30	28
S — 14	— 31	3	—	—	— 35	7	— 51	23	— 57	29	— 40	12
R 30	64	— 4	9	51	—	—	25	35	24	36	25	35
N 300	289	311	263	337	295	305	—	—	300	300	208	392
P 219	215	223	176	262	213	225	219	219	—	—	213	225
F 173	144	202	147	199	168	178	81	265	167	179	—	—

C.D. for mean response=148.0 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 60(40), 61(45).****Site :- Agri. Res. Farm, Halvad.****Type :- 'CMV'.**

Object :—To study the effect of different fertilizers and seed rates on different varieties of Wheat.

## 1. BASAL CONDITIONS :

- (i) (a) Legume, Cereal-Cotton for 60(40) ; Nil for 61(45). (b) Groundnut. (c) Nil for 60(40) ; 44.8 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$  for 61(45). (ii) Medium black. (iii) 12, 13.11.1960 ; 18, 19.11.1961. (iv) (a) One ploughing+one harrowing. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil for 60(40) ; 2 weedings for 61(45). (ix) N.A. for 63(40) ; Nil for 61(45). (x) 11.3.1961 ; 20.3.1962.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2), (3) and (4)

(1) 3 varieties :  $V_1=NP-710$ ,  $V_2=NP-718$  and  $V_3=Kenphad-28$ .

(2) 3 seed rates :  $R_1=45$ ,  $R_2=67$  and  $R_3=90$  Kg/ha.

(3) 3 levels of N :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(4) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

## Sub-plot treatments :

2 levels of F.Y.M. :  $F_0=0$  and  $F_1=11208$  Kg/ha.

## 3. DESIGN :

- (i) Split-plot confd. (ii) (a) 9 main-plots/block ; 9 blocks/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 10.4 m.  $\times$  6.1 m. (b) 9.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Attack of shoot borer. (iii) Yield of grain. (iv) (a) 1958-1961. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. nos. 58(85) and 59(79) have also been included for giving combined results. Errors are homogeneous and interaction is present.

## 5. RESULTS :

- (i) 989 Kg/ha. (ii) (a) 295.4 Kg/ha. (60 d.f. made up of interaction of V, S, N, P,  $N \times V$ ,  $N \times S$  and  $N \times P$  with years. (b) 198.1 Kg/ha. (27 d.f. made up of various components of Treatments  $\times$  years interaction, (iii) Main effects of N, P, F and interaction  $N \times P$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	$V_1$	$V_2$	$V_3$	$R_1$	$R_2$	$R_3$	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	Mean
$F_0$	930	976	950	924	935	997	643	995	1218	830	950	1076	952
$F_1$	978	1058	1042	1016	1023	1039	701	1077	1300	900	1028	1150	1026
Mean	954	1017	996	970	979	1018	672	1036	1259	865	989	1113	989
$P_0$	819	860	916	889	800	906	637	927	1031				
$P_1$	954	991	1022	971	995	1001	643	1030	1294				
$P_2$	1089	1200	1050	1050	1142	1147	736	1151	1452				
$N_0$	652	677	687	642	663	711							
$N_1$	1002	1077	1029	1030	1017	1061							
$N_2$	1208	1297	1272	1238	1257	1282							
$R_1$	918	1006	986										
$R_2$	946	1009	982										
$R_3$	998	1036	1020										

C.D. for N or P marginal means = 56.8 Kg/ha.

C.D. for F marginal means = 32.0 Kg/ha.

C.D. for body of  $N \times P$  table = 98.4 Kg/ha.



**Crop :- Wheat (Rabi).****Ref :- Gj. 60(106), 61(82).****Site :- Irrigation-cum-Demons. Farm, Umrala.****Type :- 'CMV'.**

Object :—To study the effect of different seed rates and fertilizers on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 16.11.1960; 19.11.1961. (iv) (a) Nil for 60(106); 1 ploughing+1 harrowing for 61(82). (b) Hand sowing for 60(106); Drilling for 61(82). (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) Nil. (x) 7.3.1961; 27.3.1962.

**2. TREATMENTS :****Main-plot treatments :**

All combinations of (1), (2), (3) and (4)

(1) 3 varieties :  $V_1=NP-710$ ,  $V_2=NP-718$  and  $V_3=Kenphad$ .(2) 3 seed rates :  $R_1=45$ ,  $R_2=67$  and  $R_3=90$  Kg/ha.(3) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(4) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.**Sub-plot treatments :**2 levels of F.Y.M. :  $F_0=0$  and  $F_1=11208$  Kg/ha.

A/S was applied in furrows and Super at the time of sowing.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 9 main-plots/block; 9 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a)  $10.1\text{ m.} \times 5.5\text{ m.}$  (b)  $9.1\text{ m.} \times 4.6\text{ m.}$  (v)  $46\text{ cm.} \times 46\text{ cm.}$  (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) No incidence for 60(106); slight attack of stem borers for 61(82). (iii) Yield of grain. (iv) (a) 1959-1961. (b) No. (c) Nil. (v) Jamnagar and Junagadh. (vi) Supply of irrigation water was irregular and inadequate which affected the yield for 61(82). (vii) Error variances for sub-plot treatments are heterogeneous.

**5. RESULTS :****60(106)**

(i) 1137 Kg/ha. (ii) (a) 308.6 Kg/ha. (b) 106.7 Kg/ha. (iii) Main effect of P is highly significant. Main effect of N and interaction  $N \times P$  are significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$R_1$	$R_2$	$R_3$	$V_1$	$V_2$	$V_3$	Mean
$F_0$	1044	1158	1125	780	1239	1307	1033	1154	1139	1027	1102	1197	1109
$F_1$	1059	1307	1130	905	1309	1282	1105	1175	1216	1127	1134	1235	1165
Mean	1051	1233	1127	842	1274	1295	1069	1164	1178	1077	1118	1216	1137
$V_1$	1047	1186	999	742	1307	1182	1045	1143	1042				
$V_2$	1072	1231	1051	858	1208	1288	966	1116	1272				
$V_3$	1035	1281	1332	927	1307	1415	1196	1233	1219				
$R_1$	1014	1224	968	817	1106	1283							
$R_2$	1003	1308	1182	921	1310	1262							
$R_3$	1137	1166	1231	789	1406	1339							
$P_0$	648	1119	760										
$P_1$	1265	1261	1295										
$P_2$	1240	1318	1327										

C.D. for P or N marginal means = 125.9 Kg/ha.

C.D. for body of  $N \times P$  table = 218.1 Kg/ha.

61(82)

(i) 1626 Kg/ha. (ii) 396.1 Kg/ha. (b) 191.9 Kg/ha. (iii) Main effects of N, P, F and interaction N×P are highly significant. Main effect of R and interactions N×F, P×F are significant. (iii) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
F <sub>0</sub>	1488	1597	1631	1477	1485	1754	1455	1579	1682	1600	1633	1483	1572
F <sub>1</sub>	1468	1741	1834	1474	1699	1868	1535	1762	1744	1703	1722	1617	1681
Mean	1478	1699	1732	1476	1592	1811	1495	1670	1713	1652	1677	1550	1626
V <sub>1</sub>	1473	1682	1800	1583	1585	1786	1519	1601	1834				
V <sub>2</sub>	1515	1760	1757	1486	1541	2005	1544	1825	1663				
V <sub>3</sub>	1445	1565	1640	1358	1650	1643	1422	1586	1642				
R <sub>1</sub>	1349	1521	1616	1337	1526	1622							
R <sub>2</sub>	1576	1740	1696	1494	1581	1936							
R <sub>3</sub>	1508	1746	1885	1596	1669	1875							
P <sub>0</sub>	1397	1701	1329										
P <sub>1</sub>	1408	1557	1811										
P <sub>2</sub>	1627	1749	2057										

C.D. for V, R, N or P marginal means = 161.5 Kg/ha.  
 C.D. for F marginal means = 60.8 Kg/ha.  
 C.D. for F means at the same level of V, R, N or P = 106.5 Kg/ha.  
 C.D. for V, R, N or P means at the same level of F = 178.0 Kg/ha.  
 C.D. for body of N×P table = 279.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 63, 64, 65 (MAE).**

**Site :- Irrigation-cum-Demons. Farm, Umrula.**

**Type :- 'CMV'.**

Object :—Type XIII—To study the effect of N,P,K levels with different dates of sowing on Wheat varieties.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 11.2 Kg. of N+22.4 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. for (65), Nil for others. (ii) Medium black soil. (iii) As per treatments. (iv) (a) 1 harrowing for(64), 2 harrowings for others. (b) Drilling. (c) 90 Kg/ha. for (65), 67 Kg/ha. for others. (d) 23 cm. between rows. (e) Nil. (v) 6000 Kg/ha. of F.Y.M./ha. for 65, Nil for others. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings for 63, 1 weeding for 64, Nil for 65. (ix) Nil. (x) 2.3.64, 26.2.65 to 10.3.65 and 2.3.66 and 18.3.66.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=50 and N<sub>2</sub>=100 Kg/ha.

(2) 3 varieties : V<sub>1</sub>=Local, V<sub>2</sub>=NP-718, and V<sub>3</sub>=NP-824.

(3) 3 dates of sowing : D<sub>1</sub>=1.11.65, D<sub>2</sub>=12.11.65, and D<sub>3</sub>=25.11.65.

**Sub-plot treatments :**

All combinations of (4) and (5).

(4) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=70 Kg/ha.

(5) 2 levels of K<sub>2</sub>O as Sul. of Potash : K<sub>0</sub>=0 and K<sub>1</sub>=50 Kg/ha.

## 3. DESIGN :

(i)  $3^3 \times 2^2$  split-plot confd. (ii) (a) 9 main—plots/block ; 3 blocks/replication, 4 sub—plots/main—plot. (b) N.A. (iii) 1. (iv) (a) 13.7 m.  $\times$  3.7 m., 14.0 m.  $\times$  4.0 m., 10.0 m.  $\times$  5.0 m. (b) 12.8 m.  $\times$  3.2 m., 12.9 m.  $\times$  3.1 m., 9.0 m.  $\times$  4.5 m. (v) 45 cm.  $\times$  23 cm., 55 cm.  $\times$  45 cm., and 50 cm.  $\times$  25 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for (65), normal for others. (ii) Nil. (iii) Grain yield. (iv) (a) 1963 to 65. (b) No. (c) Combined results are given under 5. Results. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1390 Kg/ha. (ii) (a) 566.0 Kg/ha. (made up of 18 d.f.) (b) 528.5 Kg/ha. (made up of 54 d.f.). (iii) Main effects of N and P are significant. (iv) Av. yield of grain in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
K <sub>0</sub>	1337	1427	1396	1288	1437	1435	1185	1493	1482	1263	1510	1387
K <sub>1</sub>	1366	1354	1460	1347	1394	1439	1208	1480	1492	1278	1508	1393
Mean	1351	1391	1428	1318	1415	1437	1197	1487	1487	1271	1509	1390
P <sub>0</sub>	1209	1266	1337	1206	1304	1303	1137	1342	1333			
P <sub>1</sub>	1494	1516	1518	1429	1527	1571	1255	1632	1641			
N <sub>0</sub>	1108	1250	1230	1217	1177	1195						
N <sub>1</sub>	1534	1413	1513	1425	1544	1490						
N <sub>2</sub>	1411	1509	1541	1309	1525	1627						
V <sub>1</sub>	1172	1356	1423									
V <sub>2</sub>	1367	1533	1347									
V <sub>3</sub>	1514	1283	1514									

C.D. for N marginal means = 161.8 Kg/ha.  
C.D. for P marginal means = 237.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Agri. Res. Stn., Amreli.**

**Ref :- Gj. 60(75).**

**Type :- 'P'.**

Object :—To find out economic number of irrigations for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Shallow, light black. (iii) 2.11.60. (iv) (a) One ploughing and 2 harrowings. (b) Drilling. (c) 67 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 44.8 Kg/ha. of N. (vi) KCN-133. (vii) Irrigated. (viii) 3 interculturings and 2 weedings. (ix) Nil. (x) 30.3.61.

## 2. TREATMENTS :

6 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7, I<sub>3</sub>=9, I<sub>4</sub>=11, I<sub>5</sub>=13 and I<sub>6</sub>=15 irrigations.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 13.7 m.  $\times$  8.2 m. (b) 12.8 m.  $\times$  7.3 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1959—1960. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 663 Kg/ha. (ii) 97.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>
Av. yield	484	512	743	759	656	826

C.D.=146.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(160), 62(28), 63(86).**

**Site :- Agri. Res. Stn., Bhachau.**

**Type :- 'P'.**

Object :- To find out the optimum number of irrigations for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* for 60(160); *Lucern* for 62(28); *Fallow* for 63(86). (c) 12.4 C.L./ha. of F.Y.M. + 56 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(28); Nil for 63(86). (ii) Sandy soil. (iii) 30.10.1960; 6.11.1962; 14.11.1963. (iv) (a) 1 to 2 ploughings+1 harrowing. (b) Drilling. (c) 67 Kg/ha. for 60(160) and 62(28); 99 Kg/ha. for 63(86). (d) 23 cm. between rows. (e) -. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60(160); 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(28); 12.4 C.L./ha. of F.Y.M. for 63(86). (vi) NP-718. (vii) Irrigated. (viii) 1 to 3 weedings. (ix) 1 cm. for 60(160) and Nil for others. (x) 27.2.1961; 3.3.1963; 9.3.1964.

## 2. TREATMENTS :

5 levels of irrigation : I<sub>1</sub>=12, I<sub>2</sub>=15, I<sub>3</sub>=18, I<sub>4</sub>=21 and I<sub>5</sub>=24 irrigations.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 13.7 m. × 13.7 m. for 63(86) and N.A. for others. (iii) 6. (iv) (a) 13.7 m. × 2.7 m. (b) 12.2 m. × 1.8 m. for 60(160), 62(28); 11.9 m. × 1.8 m. for 63. (v) 76 cm. × 46 cm. for 60(160), 62(128); 91 cm. × 46 cm. for 63(86). (v) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of stem borer. (iii) Yield of grain. (iv) (a) 1960-1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Shortage of rains for 60 (160) and 62 (28). (vii) Expt. conducted in 1961 vitiated completely due to locust attack. Errors are heterogeneous and Treatments × years interaction is absent. Hence the results of individual years are presented.

## 5. RESULTS :

## 60 (160)

(i) 1021 Kg/ha. (ii) 226.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>
Av. yield	555	712	962	1333	1543

C.D.=272.8 Kg/ha.

## 62 (28)

(i) 1440 Kg/ha. (ii) 250.7 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>
Av. yield	1058	1308	1439	1622	1771

C.D.=301.7 Kg/ha

## 63 (86)

(i) 2587 Kg/ha. (ii) 390.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>
Av. yield	1992	2098	2771	2984	3090

C.D.=470.2 Kg/ha

**Crop :- Wheat (Rabi).****Ref :- Gj. 60(69), 61(131).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'P'.**

Object :- To find out the optimum number of irrigations for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Sann* (G.M.) for 60 (69); Wheat for 61 (131). (c) Nil for 60 (69); 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61 (131). (ii) Medium black. (iii) 28.10.1960; 19.11.1961. (iv) (a) Nil. (b) Drilling for 60 (69); Hand sowing for 61 (131). (c) 67 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) G.M. (*Sann*) for 60 (69); 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61 (131). (vi) NP-710. (vii) Irrigated. (viii) 2 weedings for 60 (69); Nil for 61 (131). (ix) 1 cm., Nil. (x) 9.3.1961; 16.3.1962.

**2. TREATMENTS**6 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7, I<sub>3</sub>=9, I<sub>4</sub>=11, I<sub>5</sub>=13 and I<sub>6</sub>=15 irrigations.**3. DESIGN**

(i) R.B.D. (ii) (a) 6. (b) 26.2m.×23.5 m. for 60 (69); 22.0 m.×23.2 m. for 61 (131). (iii) 4. (iv) (a) 11.0 m.×7.3 m. (b) 9.1 m.×5.5 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) No incidence for 60 (69); Attack of aphids for 61 (131). (iii) Yield of grain. (iv) (a) 1959—1961. (b) No. (c) Results of combined analysis given under 5. (v) (a) N.A.(b) Nil. (vi) Nil. (vii) Errors are heterogeneous and interaction is absent. Hence the results of individual years are presented.

**5. RESULTS :****60 (69)**

(i) 1649 Kg/ha. (ii) 418.6 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>
Av. yield	1369	1585	1655	1709	1958	1618

**61 (131)**

(i) 229 Kg/ha. (ii) 181.5 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>
Av. yield	1822	2137	2264	2397	2845	2283

C.D.=273.6 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 60(42), 61(48).****Site :- Agri. Res. Farm, Halvad.****Type :- 'P'.**

Object :- To assess the effect of different intervals of irrigations on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Legume-Cereal-Cotton for 60(42); Nil for 61(43). (b) Cotton for 60(42); *Sann* (G.M.) for 61(48). (c) 125 Kg. of manure mixture for 60(42); Nil for 61(43). (ii) Medium black. (iii) 4.11.1960; 25.11.1961. (iv) (a) 2 ploughings+3 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) 44.8 Kg/ha. of N in two doses+44.8 Kg/ha. of  $P_2O_5$ . (vi) NP-710. (vii) Irrigated. (viii) Nil for 60(42); one weeding for 61(48). (ix) Nil. (x) N.A. for 60(42); Last week of March, 1962.

## 2. TREATMENTS :

3 levels of irrigation :  $I_1=5$ ,  $I_2=7$  and  $I_3=9$  irrigations.  
Irrigations in  $I_1$ ,  $I_2$  and  $I_3$  were given at intervals of 18, 13 and 10 days respectively.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 21.3 m. × 8.0 m. for 60(42); 21.3 m. × 8.5 m. for 61(48). (b) 18.3 m. × 5.7 m. (v) 152 cm. × 114 cm. for 60(42); 152 cm. × 141 cm. for 61(48). (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1955-1961 (modified in 1959). (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) Errors are heterogeneous and Treatments × years interaction is absent. Hence the results of individual years are presented.

## 5. RESULTS :

## 60(42)

(i) 1880 Kg/ha. (ii) 327.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$I_1$	$I_2$	$I_3$
Av. yield	1727	1861	2052

## 61(48)

(i) 2836 Kg/ha. (ii) 244.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$I_1$	$I_2$	$I_3$
Av. yield	2690	2884	2933

**Crop :- Wheat (*Rabi*).**

**Ref :- Gj. 63 (229), 64(211), 65(250).**

**Site :- Trial-cum. Demons. Farm, Pilwai. Type :- 'P'.**

**Object :- To study the effect of different methods of irrigation on Wheat.**

## 1. BASAL CONDITIONS :

(i) (a) *Bajri*-Wheat. (b) *Bajri*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63 and 64; 12.4 C.L./ha. of F.Y.M.+49.4 Kg/ha. of N+24.7 Kg/ha. of  $P_2O_5$  for 1965. (ii) Sandy soil. (iii) 18.11.1963; 15.11.1964; 4.11.1965. (iv) (a) 2 to 6 ploughings and 1 harrowing. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63 (229), 64 (211); 74.1 Kg/ha. of N+49.4 Kg/ha. of  $P_2O_5$  for 1965. (vi) NP-824 (medium). (vii) Irrigated. (viii) 1 to 6 weedings and interculturing. (ix) 4 cm; Nil; Nil. (x) 24.3.1964; 1.4.1965; 22.3.1966.

## 2. TREATMENTS :

5 sizes of beds for irrigation :  $I_1=9.1\text{ m.} \times 18.3\text{ m.}$ ,  $I_2=4.6\text{ m.} \times 18.3\text{ m.}$ ,  $I_3=4.6\text{ m.} \times 4.6\text{ m.}$ ,  $I_4=4.8\text{ m.} \times 9.1\text{ m.}$  and  $I_5=9.1\text{ m.} \times 9.1\text{ m.}$

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 3. (iv) (a) and (b) 9.1 m. × 18.3 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of brown rust for 64; Nil for others. (iii) Grain and fodder yield. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 3357 Kg/ha. (ii) 382.6 Kg/ha. [32 d.f. made up of interaction of treatment with years and pooled error]. (iii) Treatment differences are not significant (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>
Av. yield	3291	3572	3165	3192	3566

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(78).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'P'.**

Object :—To study the most economic mode of irrigation for Wheat.

## 1. BASAL CONDITIONS :-

(i) (a) Wheat-Groundnut. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 26.11.62. (iv) (a) One harrowing. (b) Drilling. (c) 90 Kg/ha. (d) 23 cm. between rows. (e) N.A. (v) N.A. (vi) NP—718. (vii) Irrigated. (viii) Nil. (ix) 35 cm. in whole year. (x) 8.3.63.

## 2. TREATMENTS :

3 irrigational treatments : I<sub>1</sub>=Flood irrigations, I<sub>2</sub>=Irrigations in different sizes of beds and I<sub>3</sub>=Irrigations in furrows.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 2. (iv) (a) and (b) 19.8 m. × 3.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) to (c) No. (v) to (vii) Nil.

## 5. RESULTS :

(i) 748 Kg/ha. (ii) 79.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	835	773	635

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(80), 61(96).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'P'.**

Object :- To find out the optimum number of irrigations for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 60 (80); Groundnut for 61 (96). (c) N.A. for 60(80); Nil for 61 (96). (ii) Medium black. (iii) 15.11.1960; 11.11.1961. (iv) (a) 1 ploughing+1 harrowing. (b) Drilling. (c) 67 Kg/ha. (d) 23 cm. between rows. (e) Nil. (v) Nil for 60 (80); 12.4 C.L./ha. of F.Y.M. for 61 (96). (vi) NP—718. (vii) Irrigated. (viii) One weeding. (ix) 44 cm. for the year 1960; Nil for 61 (96). (x) 10.3.1961; 13.3.1962.

## 2. TREATMENTS :

3 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 5.5 m. (b) 8.2 m. × 4.6 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) No incidence for 60 (80); Slight attack of stem borer for 61 (96). (iii) Yield of grain. (iv) (a) 1956-1961 (modified in 1959). (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Irregular and inadequate supply of irrigation water affected the yield for 61 (96). (vii) Results of expt. no. 59 (99) have also been included for giving combined results. Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1612 Kg/ha. (ii) 219.8 Kg/ha. (34 d.f. made up of pooled error and Treatments  $\times$  years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	1518	1553	1764

C.D. = 149.0 Kg/ha.

**Crop :- Wheat (Rabi).**  
**Site :- I.D.F., Jamnagar.**

**Ref :- Gj. 65(81).**  
**Type :- 'IM'.**

Object :—To find out the water requirements and optimum dose of manure for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Nil (Fallow). (c) N.A. (ii) Medium black (light soil). (iii) 10.11.65. (iv) (a) 2 ploughings, 2 harrowings. (b) Drilling. (c) 51.6 Kg/ha. (d) 22.9 cm. between rows. (e) Nil. (v) Nil. (vi) NP-824. (vii) As per treatments. (viii) Nil. (ix) 0.3 cm. (x) N.A.

## 2. TREATMENTS :

**Main-plot treatments :**

4 irrigations : I<sub>1</sub>=2 irrigations (20% moisture available in soil), I<sub>2</sub>=3 irrigations (60% moisture available in soil), I<sub>3</sub>=4 irrigations (60% moisture available in soil and I<sub>4</sub>=7 irrigations (80% moisture available in soil).

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

(1) 4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=49.4, N<sub>2</sub>=98.8 and N<sub>3</sub>=123.6 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=37.0 Kg/ha.

(3) 2 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0 and K<sub>1</sub>=37.0 Kg/ha.

N applied in furrows and P<sub>2</sub>O<sub>5</sub> drilled in soil at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 16 sub plots/main-plot. (b) Nil. (iii) 2. (iv) (a) 5.5 m.  $\times$  7.6 m. (b) 4.6 m.  $\times$  7.0 m. (v) 46 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1728 Kg/ha. (ii) (a) 792.9 Kg/ha. (b) 245.4 Kg/ha. (iii) Main effects of N, P and interaction N  $\times$  P are highly significant. Main effects of K, interactions P  $\times$  K and I  $\times$  N are significant.



	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	K <sub>0</sub>	K <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	1695	1527	1433	1285	1503	1467	1513	1457	1485
N <sub>1</sub>	1953	1859	1433	1451	1655	1693	1564	1784	1674
N <sub>2</sub>	2056	2141	1422	1630	1667	1958	1729	1897	1812
N <sub>3</sub>	2469	2195	1594	1544	1902	1982	1737	2147	1942
Mean	2044	1922	1470	1477	1882	1775	1635	1821	1728
P <sub>0</sub>	1891	1782	1426	1443					
P <sub>1</sub>	2195	2062	1515	1513					
K <sub>0</sub>	1944	1871	1502	1409					
K <sub>1</sub>	2143	1972	1438	1546					

C.D. for N marginal means=122.7 Kg/ha.

C.D. for P or K marginal means=86.8 Kg/ha.

C.D. for N means at the same level of I=245.4 Kg/ha.

C.D. for I means at the same level of N=587.4 Kg/ha.

C.D. for means in the body of N×P table=173.5 Kg/ha.

C.D. for means in the body of P×K table=122.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- GJ. 65(243).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'IM'.**

**Object :-** To find out the irrigational and fertilizer requirements of Wheat.

**1. BASAL CONDITIONS :**

- (i) (a) Paddy-Wheat. (b) Paddy. (c) 49.4 Kg. of N+24.7 Kg. of P<sub>2</sub>O<sub>5</sub>/ha. (ii) Black soil. (iii) 30.10.65. (iv) (a) 1 ploughing, 2 harrowings. (b) Drilling. (c) 99 Kg/ha. (d) 30.5 cm. row to row. (e) Nil. (v) Nil. (vi) NP-824. (vii) Irrigated as per treatments. (viii) 1 weeding. (ix) Nil. (x) 25.2.66.

**2. TREATMENTS :**

**Moin-plot treatments :**

Irrigations to be given at A<sub>0</sub>=80% available moisture in soil, A<sub>1</sub>=60% available moisture in soil, A<sub>2</sub>=40% available moisture in soil and A<sub>3</sub>=20% available moisture in soil.

**Note :** Beside these irrigations 7 irrigations were given from 1.11.65 to 13.2.65.

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

- (1) 4 levels of Nitrogen as A/S applied in 3 equal doses : N<sub>0</sub>=49.4 N<sub>1</sub>=74.1, N<sub>2</sub>=98.8 and N<sub>3</sub>=123.5 Kg/ha.  
 (2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : on P<sub>0</sub>=0 and P<sub>1</sub>=37.1 Kg/ha.  
 (3) 2 levels of K<sub>2</sub>O as Mur. of Pot. K<sub>0</sub>=0 and K<sub>1</sub>=37.1 Kg/ha.

**3. DESIGN :**

- (i) Split-plot. (ii) (a) 4 main-plots/replication, 16 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.8 m. × 7.3 m. (b) 4.6 m. × 7.0 m. (v) 61.0 cm. × 61.0 cm. (vi) Yes.

**4. GENERAL :**

- (i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1965 to 68. (b) No. (v) N.A. (vi) Nil. (vii) Irrigations could not be given as per requirements hence main-plot treatments are taken as replications for analysis.

**5. RESULTS :**

- (i) 1144 Kg/ha. (ii) 300.9 Kg/ha. (iii) Main effect of P is highly significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	1048	1127	1106	1070	1088
N <sub>1</sub>	1141	1296	1132	1305	1218
N <sub>2</sub>	948	1221	1047	1122	1085
N <sub>3</sub>	1177	1194	1227	1145	1186
Mean	1079	1210	1128	1160	1144
K <sub>0</sub>	1067	1188			
K <sub>1</sub>	1090	1231			

C.D. for P marginal means=105.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj 63(165), 64(99).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'IM'.**

Object :- To study the response of Wheat to irrigations and manures.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut for 63 (165); Paddy for 64 (99). (c) Nil. (ii) Medium black. (iii) 9.12.1963; 26.10.1964. (iv) (a) 4 harrowings for 63 (165); 4 ploughings+harrowings for 64 (99). (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. (vi) NP-824. (vii) Irrigated. (viii) 1 interculturing for 63(165); Nil for 64(99). (ix) 124 cm. and 191 cm. for respective years. (x) 15 to 22.4.1964; 14.3.1965.

**2. TREATMENTS :**

**Main-plot treatments**

All combinations of (1) and (2)

(1) 3 frequencies of irrigations : F<sub>1</sub>=5, F<sub>2</sub>=7 and F<sub>3</sub>=9 irrigations.

(2) 3 intensities of irrigation : I<sub>1</sub>=5.1, I<sub>2</sub>=7.6 and I<sub>3</sub>=10.2 cm.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 and P<sub>3</sub>=67.2 Kg/ha.

N and P<sub>2</sub>O<sub>5</sub> were applied by drilling.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 5.5 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) No incidence for 63 (165) ; Attack of wheat rust for 64 (99). (iii) Yield of grain. (iv) (a) 1963-1964. (b) No. (c) Nil. (v) Thasra. (vi) Nil. (vii) Sbn-plot errors are heterogeneous. Hence the results of individual years are presented.

**5. RESULTS :**

**Gj. 63 (165)**

(i) 1596 Kg/ha. (ii) (a) 318.8 Kg/ha. (b) 219.0 Kg/ha. (iii) Main effects of F, N and P are highly significant and interaction F × N is significant (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	1316	1261	1335	1053	1363	1496	1227	1279	1406	1304
N <sub>2</sub>	1645	1705	1746	1402	1803	1891	1559	1704	1833	1699
N <sub>3</sub>	1786	1796	1773	1415	2039	1901	1787	1755	1813	1785
Mean	1582	1587	1618	1290	1735	1763	1524	1579	1684	1596
P <sub>1</sub>	1514	1538	1521	1184	1643	1746				
P <sub>2</sub>	1532	1608	1598	1297	1720	1721				
P <sub>3</sub>	1701	1616	1735	1389	1842	1821				
F <sub>1</sub>	1384	1254	1232							
F <sub>2</sub>	1652	1754	1799							
F <sub>3</sub>	1711	1754	1823							

C.D. for F marginal means = 141.6 Kg/ha.  
 C.D. for N or P marginal means = 83.8 Kg/ha.  
 C.D. for N means at the same level of F = 145.3 Kg/ha.  
 C.D. for F means at the same level of N = 184.0 Kg/ha.

## Gj. 64 (99)

(i) 1639 Kg/ha. (ii) (a) 787.1 Kg/ha. (b) 269.8 Kg/ha. (iii) Main effects of F and N are highly significant. Main effect of P and interactions F×N and F×P are significant. (iv) Av. yield grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	1054	1138	1167	818	1293	1248	1080	1126	1153	1120
N <sub>2</sub>	1727	1700	1777	1374	2121	1709	1716	1690	1798	1735
N <sub>3</sub>	2061	2093	2032	1594	2454	2138	1882	2136	2168	2062
Mean	1614	1644	1659	1262	1956	1698	1559	1651	1706	1639
P <sub>1</sub>	1437	1597	1644	1129	1981	1568				
P <sub>2</sub>	1670	1640	1642	1210	1965	1777				
P <sub>3</sub>	1735	1694	1690	1447	1922	1750				
F <sub>1</sub>	1175	1272	1339							
F <sub>2</sub>	2002	1925	1941							
F <sub>3</sub>	1665	1734	1696							

C.D. for F marginal means = 349.4 Kg/ha.  
 C.D. for N or P marginal means = 103.3 Kg/ha.  
 C.D. for N or P means at the same level of F = 178.9 Kg/ha.  
 C.D. for F means at the same level of N or P = 378.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Ref :- Gj. 63(184), 64(119).**

**Type :- 'IM'.**

**Object :-** To find out the requirements of irrigation and fertilizer dose for Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton for 63 and Tobacco for 64. (c) N.A. for 63 ; 112.1 Kg/ha. of N+89.7 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$  for 1964. (ii) Medium black. (iii) 5.12.1963 ; 6.12.1964. (iv) (a) 2 ploughings and 2 harrowings for 63(184) ; 1 harrowing for 64(119). (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) NP-824. (vii) Irrigated. (viii) Nil. (ix) N.A. (x) 16.4 1964 ; 5.4.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of irrigations :  $F_1=2$ ,  $F_2=3$  and  $F_3=4$  irrigations.

(2) 3 intensities of irrigations :  $I_1=5.1$ ,  $I_2=7.6$  and  $I_3=10.2$  cm.

**Sub-plot treatments :**

All combinations of (3) and (4)

(3) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

(4) 3 levels of  $P_2O_5$  as Super :  $P_1=22.4$ ,  $P_2=44.8$  and  $P_3=67.2$  Kg/ha.  $P_2O_5$  drilled on 29.11.1963 and N drilled on 29.11.63 and 16.1.64 for 63 and  $P_2O_5$  drilled on 5.12.64, N drilled on 5.12.64 and 11.1.65 for 64.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  5.5 m. (b) 7.3 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances for main-plot treatments are heterogeneous and interaction of treatments in main-plot with years is absent.

## 5. RESULTS :

**63(184)**

(i) 1402 Kg/ha. (ii) (a) 523.2 Kg/ha. (b) 269.3 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in Kg/ha.

	$F_1$	$F_2$	$F_3$	$I_1$	$I_2$	$I_3$	$P_1$	$P_2$	$P_3$	Mean
$N_1$	1347	1346	1474	1450	1393	1324	1321	1406	1440	1389
$N_2$	1363	1393	1435	1376	1397	1418	1393	1368	1430	1397
$N_3$	1343	1322	1528	1464	1425	1374	1354	1327	1582	1421
Mean	1351	1377	1479	1430	1405	1372	1356	1367	1484	1402
$P_1$	1297	1286	1485	1413	1339	1316				
$P_2$	1323	1295	1483	1391	1383	1327				
$P_3$	1433	1550	1469	1486	1493	1473				
$I_1$	1377	1435	1478							
$I_2$	1394	1375	1446							
$I_3$	1282	1321	1513							

C.D. for P marginal means=103.3 Kg/ha.

**64119)**

(i) 880 Kg/ha. (ii) (a) 171.2 Kg/ha. (b) 237.7 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	816	829	914	805	795	959	810	835	914	853
N <sub>2</sub>	880	931	955	868	821	1077	889	978	899	922
N <sub>3</sub>	899	841	855	784	796	1015	866	833	896	865
Mean	865	867	908	819	804	1017	855	882	903	880
P <sub>1</sub>	845	867	853	761	839	965				
P <sub>2</sub>	892	788	966	875	760	1011				
P <sub>3</sub>	858	946	905	821	813	1075				
F <sub>1</sub>	788	824	845							
F <sub>2</sub>	788	734	890							
F <sub>3</sub>	1019	1043	989							

C.D. for F marginal means=75.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- GJ. 65(252).**

**Site :- T.C.D.F., Pilwai.**

**Type :- 'IM'.**

**Object :-** To find out the optimum requirements of water and fertilizers for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Guwar in *Kharif*. (c) 12.4 C.L./ha. of F.Y.M.+12.4 Kg/ha. N+24.7 Kg/ha. P<sub>2</sub>O<sub>5</sub>.  
(ii) Sandy loam soil. (iii) 7.11.65 (iv) (a) 3 harrowings. (b) Drilling. (c) 98.8 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) NP-824. (vii) Irrigated. (viii) 2 interculturings. (ix) Nil. (x) 18.3.66.

**2. TREATMENTS :**

**Main-plot treatments :**

4 levels of irrigations : I<sub>1</sub>=7 irrigations with 20% available moisture, I<sub>2</sub>=9 irrigations with 40% available moisture, I<sub>3</sub>=11 irrigations with 60% available moisture and I<sub>4</sub>=14 irrigations with 80% available moisture.

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

(1) 4 levels of N as A/S : N<sub>1</sub>=49.4, N<sub>2</sub>=74.1, N<sub>3</sub>=98.8 and N<sub>4</sub>=123.5 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=37.0 Kg/ha.

(3) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0 and K<sub>1</sub>=37.0 Kg/ha.

N broadcast on 30.12.65, 9.1.66 ; P<sub>2</sub>O<sub>5</sub> broadcast on 6.11.65.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 16 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 5.8 m. (b) 4.9 m. × 4.6 m. (v) 213 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. Aldrex 2-4-D applied as a control measure. (iii) Grain and fodder yield. 1965 only. (b) No. (c) Nil. (v) N.A. (iv) (a) (vi) and (vii) Nil.

**5. RESULTS :**

(i) 2365 Kg/ha. (ii) (a) 1887.7 Kg/ha. (b) 542.6 Kg/ha. (iii) Main effect of N and interaction N×P and I×N are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	2292	1970	2786	2231	1553	2587	2494	2646	2308	2332	2320
P <sub>1</sub>	2433	2506	2472	2228	1623	2598	2604	2814	2550	2269	2410
Mean	2363	2238	2629	2229	1588	2592	2549	2730	2429	2300	2365
K <sub>0</sub>	2416	2405	2819	2077	1617	2567	2609	2923			
K <sub>1</sub>	2309	2071	2438	2382	1558	2618	2489	2536			
I <sub>1</sub>	1810	1497	1429	1614							
I <sub>2</sub>	2444	2225	2954	2746							
I <sub>3</sub>	2197	2803	2931	2264							
I <sub>4</sub>	2999	2427	3200	2292							

C.D. for N marginal means=271.2 Kg/ha.  
 C.D. for N means at the same level of I=544.6 Kg/ha.  
 C.D. for I means at the same level of N=1553.6 Kg/ha.  
 C.D. for means in the body of N × P table=383.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 65(269).**

**Site :- T.C.D.F., Thasra.**

**Type :- 'IM'.**

Object :- To find out the water and fertilizer requirements of Wheat.

1. BASAL CONDITIONS :

(i) (a) Bajri-Wheat. (b) Bajri. (c) 74.1 Kg. N + 37.1 Kg. P<sub>2</sub>O<sub>5</sub>/ha. (ii) Goradu soil. (iii) 26.11.65.  
 (iv) (a) 2 ploughings, 1 harrowing. (b) Drilling. (c) 98.8 Kg/ha. (d) 30.5 cm. row to row. (e) Nil.  
 (v) Nil. (vi) NP-824 (Medium). (viii) Irrigated as per treatments. (viii) 2 weedings. (ix) Nil.  
 (x) 28.3.66.

2. TREATMENTS :

**Main-plot treatments :**

4 levels of irrigations : A<sub>0</sub>=Irrigation given at 80% available moisture (10 irrigations), A<sub>1</sub>=Irrigation given at 60% available moisture (8 irrigations), A<sub>2</sub>=Irrigation given at 20% available moisture (6 irrigations).

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

- (1) 4 levels of Nitrogen as A/S @  $\frac{1}{4}$  dose before sowing on 26.11.65 and  $\frac{1}{4}$  dose on 29.12.65 as top dressing N<sub>0</sub>=49.4 Kg. N/ha., N<sub>1</sub>=74.1 Kg. N/ha., N<sub>2</sub>=98.8 Kg. N/ha. and N<sub>3</sub>=123.5 Kg. N/ha.
- (2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super phosphate applied before sowings 26.11.65, P<sub>0</sub>=0 and P<sub>1</sub>=37.05 Kg. P<sub>2</sub>O<sub>5</sub>/ha.
- (3) 2 levels of K<sub>2</sub>O as Sulphate of Potash before sowing 26.11.65 : K<sub>0</sub>=0 and K<sub>1</sub>=37.1 Kg. K<sub>2</sub>O/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 16 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.8 m. × 7.3 m. (b) 4.6 m. × 7.0 m. (v) 61.0 cm. × 61.0 cm. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 contd. (b) No. (v) to (vii) Nil.

5. RESULTS :

(i) 2252 Kg/ha. (ii) (a) 421.4 Kg/ha. (b) 760.8 Kg/ha. (iii) Main effect of N alone is highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
A <sub>0</sub>	1637	2408	2318	2672	2215	2303	2255	2262	2259
A <sub>1</sub>	1877	2090	2399	2726	2246	2299	2333	2213	2273
A <sub>2</sub>	1749	2240	2421	2874	2180	2462	2253	2389	2321
A <sub>3</sub>	2188	1794	2112	2516	2161	2143	2139	2166	2152
Mean	1863	2133	2313	2697	2201	2302	2245	2258	2252
K <sub>0</sub>	1750	2177	2397	2657	2182	2309			
K <sub>1</sub>	1975	2088	2229	2737	2220	2295			
P <sub>0</sub>	1807	2100	2251	2246					
P <sub>1</sub>	1918	2166	2374	2749					

C.D. for N marginal means = 760.8 Kg/ha.

Crop :- Wheat (*Rabi*).

Ref :- Gj. 62(151), 63(179), 64(107).

Site :- Trial-Cum-Demons. Farm, Thasra. Type :- 'IM'.

Object :- To study the effect of N, P and irrigation on the yield of Wheat.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar for 62(151); Bajri for others. (c) Nil for 62(151); 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super for others. (ii) Sandy loam. (iii) 26.11.1962; 13.11.1963; 16.11.1964. (iv) (a) 3 ploughings and 1 harrowing. (b) Drilling. (c) 90 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) NP-824. (vii) Irrigated. (viii) 4 weedings for 62(151); 2 to 5 weedings and 1 interculturing for others. (ix) 67 cm.; 102 cm.; 77 cm. in the whole of year. (x) 6.4.1963; 23.3.1964; 22.3.1965.

#### 2. TREATMENTS :

##### Main-plot treatments :

All combinations of (1) and (2)

- (1) 3 frequencies of irrigation : F<sub>1</sub>=5, F<sub>2</sub>=7 and F<sub>3</sub>=9 irrigations.  
 (2) 3 intensities of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 acre inches.

##### Sub-plot treatments :

All combinations of (1) and (2)

- (1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.  
 (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 and P<sub>3</sub>=67.2 Kg/ha.

N applied in 2 doses, 1st at sowing and 2nd dose one month after sowing. P<sub>2</sub>O<sub>5</sub> applied at sowing.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication; 9 sub-plots/main-plot. (b) Nil. (iii) 2. (iv) (a) 5.5 m. × 9.1 m. (b) 3.7 m. × 7.3 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1962 contd. (modified in 65). (b) No. (c) Results of combined analysis given under 5. (v) Kholwad. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, the results of individual years are presented.

## 5. RESULTS :

## 62(151)

(i) 1388 Kg/ha. (ii) (a) 392.4 Kg/ha. (b) 226.5 Kg/ha. (iii) Main effects of N and P are highly significant and that of F is significant. (iv) Av. yield of grain in Kg/ha.

	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	1100	1090	1194	1105	1138	1142	1047	1169	1168	1128
N <sub>2</sub>	1233	1492	1411	1374	1424	1338	1401	1259	1476	1379
N <sub>3</sub>	1358	1754	1858	1542	1690	1737	1559	1652	1760	1657
Mean	1230	1445	1488	1341	1417	1406	1336	1360	1468	1388
P <sub>1</sub>	1237	1370	1400	1314	1368	1325				
P <sub>2</sub>	1224	1365	1491	1323	1401	1356				
P <sub>3</sub>	1230	1601	1572	1385	1482	1536				
I <sub>1</sub>	1270	1358	1394							
I <sub>2</sub>	1238	1475	1539							
I <sub>3</sub>	1183	1503	1531							

C.D. for N or P marginal means = 87.0 Kg/ha.

C.D. for F marginal means = 174.1 Kg/ha.

## 63(179)

(i) 2755 Kg/ha. (ii) (a) 268.2 Kg/ha. (b) 403.6 Kg/ha. (iii) Main effect of N is highly significant and interaction F×P is significant. (iv) Av. yield of grain in Kg/ha.

	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	2517	2388	2355	2442	2450	2367	2352	2461	2446	2420
N <sub>2</sub>	2681	2107	2942	2803	2830	2797	2772	2720	2938	2810
N <sub>3</sub>	2950	3067	3085	2915	3245	2942	3015	2957	3131	3034
Mean	2716	2754	2794	2720	2842	2702	2713	2713	2838	2755
P <sub>1</sub>	2649	2818	2672	2660	2791	2689				
P <sub>2</sub>	2711	2512	2915	2776	2861	2501				
P <sub>3</sub>	2788	2932	2795	2724	2874	2917				
I <sub>1</sub>	2745	2660	2755							
I <sub>2</sub>	2737	2882	2907							
I <sub>3</sub>	2666	2720	2720							

C.D. for N marginal means

= 155.1 Kg/ha.

C.D. for two P means at the same level of F

= 268.5 Kg/ha.

C.D. for two F means at the same level of P

= 201.2 Kg/ha.

## 64(107)

(i) 2014 Kg/ha. (ii) (a) 750.9 Kg/ha. (b) 535.2 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.



	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	1809	1730	1759	1835	1781	1682	1742	1744	1812	1766
N <sub>2</sub>	2084	1802	1952	2062	2049	1727	2078	1854	1906	1946
N <sub>3</sub>	2380	2114	2496	2290	2390	2311	2213	2444	2334	2330
Mean	2091	1882	2069	2062	2073	1907	2011	2014	2017	2014
P <sub>1</sub>	2217	1833	1983	2014	2101	1918				
P <sub>2</sub>	1964	1885	2193	2271	1929	1842				
P <sub>3</sub>	2093	1927	2031	1902	2190	1960				
I <sub>1</sub>	2309	1875	2103							
I <sub>2</sub>	2220	1871	2128							
I <sub>3</sub>	1845	1900	1975							

C.D. for N marginal means = 205.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(181), 62(63).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'IC'.**

**Object :-** To assess the time of first irrigation when soaked and unsoaked Wheat is sown with or without soaking land.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 61 (181); Maize and Wheat for 62(63). (c) 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(181) ; 4.9 C.L./ha. of F.Y.M.+49.4 Kg/ha. of K<sub>2</sub>O+197.7 Kg/ha. of N+247.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62 (63). (ii) Medium black. (iii) 30.11.1961 ; 14.11.1962. (iv) (a) 1 ploughing+1 harrowing for 61 (181); Nil for 62 (63). (b) Hand sowing. (c) 67 Kg/ha. for 61(181); 90 Kg/ha. for 62(63). (d) 23 cm. between rows. (e) Nil. (v) 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) NP-710. (vii) Irrigated. (viii) One weeding for 61 (181); Nil for 62 (63). (ix) Nil for 61 (181); 60 cm. for the year 1962. (x) 29.3.1962; 2, 10 and 20.3.1963.

**2. TREATMENTS :**

**Main-plot treatments :**

2 treatments of land for sowing : L<sub>0</sub>=No soaking and L<sub>1</sub>=Soaking.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 seed treatments : S<sub>0</sub>=No soaking and S<sub>1</sub>=Soaking of seed in water for 12 hours.

(2) 3 times of first irrigation : T<sub>0</sub>=O, T<sub>1</sub>=10 and T<sub>2</sub>=20 days after sowing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 7.6 m. × 4.6 m. (b) 6.2 m. × 2.7 m. (v) 76 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Attack of aphids for 61 (181); No incidence for 62 (63). (iii) Yield of grain. (iv) (a) 1961-1962. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Main and sub-plot error variances are heterogeneous.

**5. RESULTS :**

**61 (181)**

(i) 2185 Kg/ha. (ii) (a) 125.6 Kg/ha. (b) 363.6 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	L <sub>0</sub>	L <sub>1</sub>	Mean
S <sub>0</sub>	2404	2328	2015	2202	2296	2349
S <sub>1</sub>	2348	2188	1827	2130	2112	2121
Mean	2376	2258	1921	2166	2204	2185
L <sub>0</sub>	2385	2257	1856			
L <sub>1</sub>	2367	2259	1986			

C.D. for T marginal means = 211.1 Kg/ha.

**62 (63)**

(i) 1596 Kg/ha. (ii) (a) 249.4 Kg/ha. (b) 260.7 Kg/ha. (iii) Main effect of T and interaction L×T are highly significant. (iv) Av. yield of grain in Kg/ha.

	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	S <sub>0</sub>	S <sub>1</sub>	Mean
L <sub>0</sub>	1838	1485	1339	1600	1508	1554
L <sub>1</sub>	1638	1675	1601	1640	1636	1638
Mean	1738	1580	1470	1620	1572	1596
S <sub>0</sub>	1777	1606	1477			
S <sub>1</sub>	1699	1554	1453			

C.D. for T marginal means = 151.4 Kg/ha.

C.D. for T means at the same level of L = 213.9 Kg/ha.

C.D. for L means at the same level of T = 229.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Agri. Res. Stn., Bhachau.**

**Ref :- Gj. 65 (133).**

**Type :- 'ICM'.**

**Object :-** To find out the optimum requirements of seed rate, manure and irrigation on Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P. (ii) Sandy soil. (iii) 14.11.65. (iv) (a) 2 ploughings, 1 harrowing. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) N.P-718. (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (x) 3.3.66.

**2. TREATMENTS :**

**Main-plot treatments :**

3 Irrigations : I<sub>1</sub>=5, I<sub>2</sub>=7, and I<sub>3</sub>=9 irrigations. Details of irrigation N.A.

**Sub-plot treatments :**

All combinations of (1) (2) and (3)

(1) 3 levels of Nitrogen as A/S at sowing : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.3 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super at sowing : P<sub>0</sub>=0, P<sub>1</sub>=33.6, and P<sub>2</sub>=67.3 Kg/ha.

(3) 3 seed rates : S<sub>0</sub>=67.3, S<sub>1</sub>=89.7, and S<sub>2</sub>=112.1 Kg/ha.

**3. DESIGN :**

(i) 3×3<sup>3</sup> split-plot confounded (NPS<sup>2</sup> is totally confd.). (ii) (a) 3 main-plots/replication ; 27 sub-plots in 3 blocks of 9 plots each/main-plot. (iii) 2. (iv) (a) 9.1 m.×4.6 m. (b) 8.2 m.×3.7 m. (v) 45.7 cm.×45.7 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Nil.

## 5. RESULT :

(i) 906 Kg/ha. (ii) (a) 765.2 Kg/ha. (b) 347.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
N <sub>0</sub>	827	792	939	873	829	856	497	1117	945	853
N <sub>1</sub>	937	903	926	873	1005	888	524	1151	1091	922
N <sub>2</sub>	928	912	987	1025	881	912	586	1237	1004	942
Mean	897	869	951	924	905	888	536	1168	1031	906
I <sub>1</sub>	483	544	579	560	535	511				
I <sub>2</sub>	1145	1073	1287	1178	1142	1185				
I <sub>3</sub>	1064	990	986	1033	1138	969				
S <sub>0</sub>	912	841	1018							
S <sub>1</sub>	989	837	889							
S <sub>2</sub>	791	929	945							

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 64 (252).**

**Site :- Central Exptl. Stn., Junagadh**

**Type :- 'ICM'.**

**Object :-** To study the effect of seed rates, irrigations and fertilisers on the yield of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut-Wheat. (b) Groundnut. (c) Nil. (ii) Medium black soil. (iii) 17.11.64. (iv) (a) 1 ploughing and 3 harrowings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (v) 24.7 C.L./ha. of F.Y.M. (vi) NP-824. (vii) As per treatments. (viii) Nil. (ix) Nil. (x) 7.3.65.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigations : I<sub>1</sub>=9 irrigations from 27.11.64 to 23.2.65, I<sub>2</sub>=11 irrigations from 27.11.64 to 27.2.65 and I<sub>3</sub>=13 irrigations from 27.11.64 to 19.2.65.

**Sub-plot treatments :**

All combinations of (1) (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=O, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=O, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of seed rates : R<sub>1</sub>=67, R<sub>2</sub>=90 and R<sub>3</sub>=112 Kg/ha.

## 3. DESIGN :

(i) 3×3<sup>3</sup> split-plot confd. (ii) (a) 3 main-plots/replication, 27 sub-plots in 3 blocks of 9 plots each/main-plot, (iii) 2. (iv) (a) 9.1 m.×4.6 m. (b) 8.2 m.×3.7 m. (v) 46 cm.×46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964. (b) No. (c) Nil. (v) to vii) Nil.

## 5. RESULTS :

(i) 1638 Kg/ha. (ii) (a) 426.9 Kg/ha. (b) 181.7 Kg/ha. (iii) Main effect of N is highly significant. Interactions N×P, I×N and I×P are highly significant. Interaction N×R is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	1393	1484	1673	1625	1462	1463	1434	1532	1584	1517
N <sub>1</sub>	1732	1548	1772	1660	1712	1680	1509	1752	1791	1684
N <sub>2</sub>	1962	1500	1677	1735	1622	1782	1870	1697	1572	1713
Mean	1696	1511	1707	1673	1599	1642	1604	1660	1649	1638
P <sub>0</sub>	1583	1434	1796	1629	1597	1587				
P <sub>1</sub>	1762	1574	1645	1658	1653	1670				
P <sub>2</sub>	1742	1524	1681	1733	1546	1668				
R <sub>1</sub>	1766	1489	1765							
R <sub>2</sub>	1633	1551	1612							
R <sub>3</sub>	1688	1492	1745							

C.D. for N, marginal means = 69.8 Kg/ha.

C.D. for N, or P means at the same level of I = 120.9 Kg/ha.

C.D. for I means at the same level of N or P = 353.4 Kg/ha.

C.D. for means in the body of N×P or N×R table = 120.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- I.D.F., Halvad.**

**Ref :- Gj. 65(65).**

**Type :- 'ICM'.**

Object :- To find out the optimum requirements of seed rate and irrigation for different levels of N and P.

1. BASAL CONDITIONS ;

(i) (a) Cotton—Wheat. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 2.12.65. (iv) (a) 3 harrowings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) N.P.—824. (vii) As per treatments. (viii) and (ix) Nil. (x) 25.3.66.

2. TREATMENTS :

**Main-plot treatments**

No. of irrigations : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

**Sub-plot treatments**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 seed rates : R<sub>1</sub>=67.2, R<sub>2</sub>=89.7 and R<sub>3</sub>=112.1 Kg/ha.

N and P<sub>2</sub>O<sub>5</sub> applied at sowing and the intensity of irrigation is 3 acre inches.

3. DESIGN :

(i) 3×3<sup>2</sup> split-plot (NPR<sup>2</sup> is confd.). (ii) (a) 3 main-plots/replication, 27 sub-plots in 3 blocks of 9 sub-plots/main-plot. (iii) 2. (iv) (a) 9.1 m.×4.6 m. (b) 7.3 m.×3.7 m. (v) 91 cm×46 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 764 Kg/ha. (ii) (a) 302.2 Kg/ha. (b) 252.5 Kg/ha. (iii) Main effects of N and P are highly significant. Interaction N×P is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
P <sub>0</sub>	478	764	806	679	606	763	803	659	585	683
P <sub>1</sub>	485	882	880	770	756	721	808	681	759	749
P <sub>2</sub>	523	880	1174	903	895	780	947	842	789	859
Mean	495	842	953	784	752	755	853	727	711	764
I <sub>1</sub>	610	900	1047	924	843	791				
I <sub>2</sub>	446	824	911	707	685	790				
I <sub>3</sub>	430	802	901	721	729	683				
R <sub>1</sub>	531	841	980							
R <sub>2</sub>	450	827	979							
R <sub>3</sub>	504	858	901							

C.D. for N or P marginal means =96.5 Kg/ha.  
 C.D. for body of N×P table =167.0 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref. :- Gj. 63(102), 64(153).**

**Site :- Irrigation-cum-Dèmons. Farm, Halvad.**

**Type :- 'ICM'.**

Object :- To find out the optimum seed rate, manurial dose and irrigation for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Cotton—Groundnut—Wheat—Cotton for 63(102) ; Nil for 64(153). (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 23, 24.11.1963 ; 10.11.1964. (iv) (a) 1 harrowing. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) N.P.—824. (vii) Irrigated. (viii) Nil. (ix) 26 cm. for the year 1963 ; Nil for 64(153). (x) 18.3.1964 ; 5.3.1965.

**2. TREATMENTS :**

**Main-plot treatments**

3 levels of irrigations : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

**Sub-plot treatments**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 seed rates : S<sub>1</sub>=67, S<sub>2</sub>=90 and S<sub>3</sub>=112 Kg/ha.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 3 main-plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.9 m. for 63(102) ; 9.1 m.×4.6 m. for 64(153). (b) 7.3 m.×3.7 m. (v) 91 cm.×61 cm. for 64(103) ; 91 cm.×46 cm. for 64(153). (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-1964 (modified in 1963). (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Since sub-plot errors are heterogeneous, the results of individual years are presented.

**5. RESULTS :**

**63(102)**

(i) 1135 Kg/ha. (ii) (a) 571.8 Kg/ha. (b) 238.4 Kg/ha. (iii) Main effect of N, P and interaction N×P, I×N are highly significant. (iv) Av. yield of grain Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
N <sub>0</sub>	774	1045	581	711	841	848	763	836	801	800
N <sub>1</sub>	1348	1253	1035	936	1258	1442	1178	1197	1261	1212
N <sub>2</sub>	1322	1485	1372	1020	1447	1712	1290	1414	1475	1393
Mean	1148	1261	996	889	1182	1334	1077	1149	1179	1135
S <sub>1</sub>	1031	1230	970	843	1073	1315				
S <sub>2</sub>	1145	1283	1019	901	1228	1315				
S <sub>3</sub>	1268	1270	999	923	1245	1369				
P <sub>0</sub>	908	986	773							
P <sub>1</sub>	1157	1336	1053							
P <sub>2</sub>	1379	1461	1162							

C.D. for N, or P marginal means = 90.9 Kg/ha.  
 C.D. for N means at the same level of I = 157.4 Kg/ha.  
 C.D. for I means at the same level of N = 271.7 Kg/ha.  
 C.D. for body of N×P, table = 157.3 Kg/ha.

64(153)

(i) 798 Kg/ha. (ii) (a) 442.9 Kg/ha. (b) 130.1 Kg/ha. (iii) Main effects of N, P and interaction N×P are highly significant. Interaction I×N is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
N <sub>0</sub>	270	199	298	229	242	296	225	282	260	256
N <sub>1</sub>	801	862	1035	773	977	948	924	871	903	899
N <sub>2</sub>	1176	1169	1372	931	1354	1433	1214	1253	1250	1239
Mean	749	743	902	644	858	892	788	802	804	798
S <sub>1</sub>	744	713	906	658	820	885				
S <sub>2</sub>	733	756	917	670	860	877				
S <sub>3</sub>	770	761	882	605	893	915				
P <sub>0</sub>	589	594	750							
P <sub>1</sub>	823	779	971							
P <sub>2</sub>	835	856	984							

C.D. for N or P marginal means = 49.5 Kg/ha.  
 C.D. for N means at the same level of I = 85.9 Kg/ha.  
 C.D. for I means at the same level of N = 198.4 Kg/ha.  
 C.D. for body of N×P table = 85.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Ref :- Gj. 63(268), 64(286).**

**Type :- 'ICM'.**

**Object :-** To find out the optimum seed rate, dose of fertilizers under different no. of irrigations.

## 1. BASAL CONDITIONS :

- (i) (a) *Bajri*—Wheat—Tabacco. (b) *Bajri*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 18.11.63 ; 24.11.64. (iv) (a) 2 ploughings and 1 harrowing. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) NP—824 (medium). (vii) Irrigated. (viii) 2 weedings and one interculturing. (ix) Nil. (x) 28.3.64 ; 1.4.1965.

## 2. TREATMENTS :

## Main-plot treatments :

3 levels of irrigation :  $I_1=7$ ,  $I_2=9$  and  $I_3=11$  irrigations.

## Sub-plot treatments :

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.  
 (3) 3 seed rates :  $S_1=67.2$ ,  $S_2=89.7$  and  $S_3=112.1$  Kg/ha.

## 3. DESIGN :

- (i)  $3 \times 3^3$  split-plot confd. (ii) (a) 3 main-plots/replication ; 27 sub-plots in 3 blocks of 9 sub-plots/main-plot (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  4.9 m. (b) 7.3 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Nil but spraying of Aldrex. (iii) Yield of grain. (iv) (a) 1962—64 (modified in 62). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the error variances for sub-plot treatments are heterogeneous therefore individual years results presented below.

## 5. RESULTS :

63(268)

- (i) 2751 Kg/ha. (ii) (a) 687.3 Kg/ha. (b) 470.7 Kg/ha. (iii) Main effect of N alone is highly significant (iv) Av. yield of grain in Kg/ha.

	$I_1$	$I_2$	$I_3$	$P_0$	$P_1$	$P_2$	$S_1$	$S_2$	$S_3$	Mean
$N_0$	2199	2078	2128	1972	2203	2230	2182	2110	2114	2135
$N_1$	2801	2859	2963	2840	2886	2896	2874	2793	2957	2875
$N_2$	3233	3141	3357	3114	3416	3202	3345	3168	3218	3244
Mean	2744	2693	2816	2643	2835	2776	2800	2690	2763	2751
$S_1$	2826	2764	2811	2699	2847	2855				
$S_2$	2622	2654	2795	2587	2828	2656				
$S_3$	2784	2662	2842	2641	2830	2818				
$P_0$	2627	2560	2741							
$P_1$	2705	2805	2994							
$P_2$	2901	2714	2714							

C.D. for N marginal means =180.7 Kg/ha.

64(286)

- (i) 2522 Kg/ha. (ii) (a) 1252.1 Kg/ha. (b) 355.4 Kg/ha. (iii) Main effects of N, P, S and interaction  $I \times N$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
N <sub>0</sub>	2321	2230	1717	1875	2024	2369	2026	2074	2168	2089
N <sub>1</sub>	2892	2591	2460	2579	2697	2668	2612	2678	2654	2648
N <sub>2</sub>	2911	2770	2803	2657	2829	2998	2556	2870	3058	2828
Mean	2708	2531	2327	2370	2517	2679	2398	2541	2627	2522
S <sub>1</sub>	2647	2382	2166	2238	2392	2564				
S <sub>2</sub>	2705	2527	2390	2467	2541	2614				
S <sub>3</sub>	2772	2683	2425	2406	2616	2857				
P <sub>0</sub>	2514	2348	2249							
P <sub>1</sub>	2710	2494	2346							
P <sub>2</sub>	2901	2749	2386							

C.D. for N, P or S marginal means = 136.4 Kg/ha.  
 C.D. for N means at the same level of I = 236.3 Kg/ha.  
 C.D. for I means at the same level of I = 1034.4 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 63(195), 64(142).**

**Site :- Agri. Res. Stn., Umrjala.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum seed rate, dose of fertilizers under different no. of irrigation.

**1. BASAL CONDITIONS :**

(i) (a) Wheat-Groundnut-Sesamum. (b) Sesamum. (c) Nil. (ii) Medium black. (iii) 10.11.63 ; 16.11.64. (iv) 1 ploughing and 2 harrowings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) 24.7 C.L./ha. of F.Y.M. for 63 ; 12.4 C.L./ha. of F.Y.M. for 64. (vi) NP-824. (vii) As per treatments. (viii) 1 to 4 weedings. (ix) 46 cm. ; 95 cm. (x) 19.3.64 ; 12.3.65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigations : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 seed rates : R<sub>1</sub>=67, R<sub>2</sub>=90 and R<sub>3</sub>=112 Kg/ha.

Time and intensity of irrigation is N.A.

N applied in two equal doses half at sowing and half one month after sowing by hand infurrows, P<sub>2</sub>O<sub>5</sub> applied in furrows at sowing

**3. DESIGN**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 27 sub-plots in 3 blocks of 9 plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 4.7 m. (b) 8.2 m. × 3.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since error variances for sub-plot treatments are heterogeneous, the results of individual years are presented.

**5. RESULTS :**

**63(195)**

(i) 1850 Kg/ha. (ii) (a) 704.1 Kg/ha. (b) 274.6 Kg/ha. (iii) Main effect of N, P are highly significant. Main effect of R and interactions P × R, I × N are significant. (iv) Av. yield of grain in Kg/ha



	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	1485	1456	1409	1385	1423	1542	1404	1403	1544	1450
N <sub>1</sub>	1895	2084	1817	1761	1999	2035	1916	1906	1973	1932
N <sub>2</sub>	1997	2199	2313	1950	2257	2301	2093	2039	2276	2169
Mean	1792	1913	1846	1699	1893	1959	1804	1816	1931	1850
R <sub>1</sub>	1718	1857	1838	1579	1947	1888				
R <sub>2</sub>	1742	1846	1860	1628	1793	2028				
R <sub>3</sub>	1916	2036	1841	1890	1940	1962				
P <sub>0</sub>	1700	1677	1719							
P <sub>1</sub>	1792	1967	1921							
P <sub>2</sub>	1884	2095	1899							

C.D. for N, P or R marginal means = 105.5 Kg/ha.  
 C.D. for N means at the same level of I = 182.4 Kg/ha.  
 C.D. for I means at the same level of N = 581.7 Kg/ha.  
 C.D. for means in the body of P×R table = 182.2 Kg/ha.

64(142)

(i) 1871 Kg/ha. (ii) (a) 553.4 Kg/ha. (b) 210.8 Kg/ha. (iii) Main effects of N, P and interaction N×P are highly significant. Interaction P×R is significant. (iv) Av. yield of grain Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
N <sub>0</sub>	1693	1339	1646	1477	1550	1651	1566	1499	1614	1559
N <sub>1</sub>	1950	1783	2105	1776	1941	2121	1921	1949	1968	1946
N <sub>2</sub>	2165	1958	2198	1721	2158	2442	2045	2069	2207	2107
Mean	1936	1693	1983	1658	1883	2071	1844	1839	1930	1871
R <sub>1</sub>	1906	1696	1930	1600	1945	1987				
R <sub>2</sub>	1873	1637	2009	1681	1739	2098				
R <sub>3</sub>	2030	1747	2010	1693	1965	2128				
P <sub>0</sub>	1776	1445	1753							
P <sub>1</sub>	1913	1746	1991							
P <sub>2</sub>	2120	1889	2205							

C.D. for N or P marginal means = 80.9 Kg/ha.  
 C.D. for means in the body of N×P or P×R table = 140.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Ref :- GJ. 60(59).**

**Type :- 'ICMV'.**

**Object :-** To find out the best variety of Wheat with suitable seed rate and suitable dose of manure.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Cotton. (c) 24.7 C.L./ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 19 and 20.11.60. (iv) (a) 2 ploughings and 7 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) 117 cm. (x) 9.3.61.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 2 varieties :  $V_1=NP-710$  and  $V_2=NP-824$ .

(2) 2 seed rates :  $S_1=67$  and  $S_2=90$  Kg/ha.

## Sub-plot treatments :

All combinations of (3), (4) and (5)

(3) 3 levels of N :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(4) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(5) 3 irrigation doses :  $I_1=5$ ,  $I_2=7$  and  $I_3=9$  irrigations.

Fertilizers were applied at sowing.

## 3. DESIGN :

- (i) Split-plot confd. (ii) (a) 4 main-plots/replication, 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  4.9 m. (b) 7.3 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Slight attack of stem borer. (iii) Grain and fodder yield. (iv) (a) 1960-62. (b) 1st year. (c) Nil. (v) Dabhoi, Halvad, Jamnagar, Kholwad, Kim and Thasra. (vi) Nil. (vii) The soils of the farm being highly retentive of moisture, 5 irrigations were given to all the plots uniformly and analysed accordingly.

## 5. RESULTS :

- (i) 1787 Kg/ha. (ii) (a) 545.9 Kg/ha. (b) 323.8 Kg/ha. (iii) Main effects of V, N and interaction  $S \times N$  are highly significant. Main effect of S and interaction  $V \times S$  are significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	Mean
$V_1$	1615	1660	1345	1593	1974	1575	1653	1684	1637
$V_2$	2124	1751	1565	2006	2240	1938	1926	1947	1937
Mean	1869	1705	1455	1799	2107	1756	1790	1815	1787
$P_0$	1792	1720	1439	1758	2072				
$P_1$	1893	1687	1431	1774	2166				
$P_2$	1923	1708	1495	1866	2084				
$N_0$	1428	1428							
$N_1$	1952	1646							
$N_2$	2227	1987							

C.D. for V or S marginal means = 236.4 Kg/ha.

C.D. for N marginal means = 106.9 Kg/ha.

C.D. for N means at the same level of S = 151.1 Kg/ha.

C.D. for S means at the same level of N = 260.0 Kg/ha.

C.D. for means in the body of  $V \times S$  table = 334.4 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Ref :- Gj. 61(117), 62(110).**

**Type :- 'ICMV'.**

**Object :-** To find out the best variety of Wheat with suitable seed rate and suitable manurial and irrigational dose.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy for 61(117); Sann (G.M.) for 62(110). (c) Nil. (ii) Clay loam. (iii) 7.12.1961; 29.11.1962. (iv) (a) 2 ploughings+2 to 4 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil for 61(117); 2 weedings for 62(110). (ix) 176 cm.; 135 cm. in respective years. (x) 10.4.1962; Last fortnight of April, 1963.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 2 varieties :  $V_1=NP-710$  and  $V_2=NP-824$ .

(2) 2 seed rates :  $S_1=67$  and  $S_2=90$  Kg/ha.

## Sub-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.

(3) 3 levels of irrigation :  $I_1=3$ ,  $I_2=4$  and  $I_3=5$  irrigations.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main-plots/replication, 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2 [2nd replication vitiated completely for 61(117)]. (iv) (a) 9.1 m.  $\times$  4.9 m. (b) 7.3 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-1962 (modified in 1961). (b) No. (c) Nil. (v) Dabhoi, Halvad, Jamnagar, Kholwad, Kim and Thasra. (vi) Nil. (vii) Since sub-plot errors are heterogeneous, the results of individual years are presented.

## 5. RESULTS :

## 61(117)

(i) 1576 Kg/ha. (ii) (a) 546.8 Kg/ha. (b) 158.3 Kg/ha. (iii) Main effects of N, I and interactions  $N \times I$ ,  $P \times I$ ,  $V \times N$ ,  $V \times I$  and  $S \times I$  are highly significant. Interaction  $S \times N$  is significant. (iv) Av. yield of, grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$I_1$	$I_2$	$I_3$	$S_1$	$S_2$	$V_1$	$V_2$	Mean
$P_0$	972	1576	2040	1635	1436	1517	1370	1688	1432	1626	1529
$P_1$	1090	1688	2059	1576	1641	1619	1513	1711	1532	1692	1612
$P_2$	1065	1710	1987	1887	1563	1311	1493	1681	1609	1565	1587
Mean	1042	1658	2029	1699	1547	1482	1459	1693	1525	1628	1576
$V_0$	918	1586	2070	1437	1584	1553	1471	1578			
$V_1$	1167	1729	1987	1962	1509	1412	1446	1809			
$S_1$	930	1478	1968	1443	1513	1420					
$S_2$	1154	1837	2089	1955	1580	1545					
$I_1$	1174	1604	2320								
$I_2$	1021	1607	2013								
$I_3$	931	1763	1753								

C.D. for N, or I marginal means

=74.6 Kg/ha.

C.D. for N, or I means at the same level of V or S

=105.6 Kg/ha.

C.D. for V or S means at the same level of N, or I

=270.9 Kg/ha.

C.D. for body of  $N \times P$ ,  $N \times I$  or  $P \times I$  table

=129.2 Kg/ha.

## 62(110)

(i) 1659 Kg/ha. (ii) (a) 285.2 Kg/ha. (b) 278.1 Kg/ha. (iii) Main effects of N and I are highly significant. Interaction  $N \times I$  is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	1324	1671	1952	1514	1701	1732	1622	1676	1623	1675	1649
P <sub>1</sub>	1353	1686	1903	1562	1533	1847	1646	1649	1647	1648	1647
P <sub>2</sub>	1402	1819	1818	1584	1584	1871	1673	1686	1697	1663	1680
Mean	1360	1725	1891	1553	1606	1817	1647	1670	1656	1662	1659
V <sub>1</sub>	1319	1740	1908	1522	1608	1837	1639	1672			
V <sub>2</sub>	1401	1710	1874	1585	1604	1796	1655	1668			
S <sub>1</sub>	1322	1717	1903	1558	1607	1776					
S <sub>2</sub>	1397	1734	1879	1549	1605	1857					
I <sub>1</sub>	1277	1600	1782								
I <sub>2</sub>	1395	1656	1768								
I <sub>3</sub>	1407	1920	2123								

C.D. for N, or I marginal means = 90.9 Kg/ha.  
 C.D. for body of N × I table = 157.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref. GJ. 60(93), 61(122), 62(118).**

**Site :- Agri. Res. Stn., Dabhoi.**

**Type :- 'ICMV'.**

Object :- To study the effect of different fertilizers, levels of irrigation and seed rates on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M. + 156.9 Kg/ha. of N as A/S + 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super for 60(93); 33.6 Kg/ha. of A/S + 44.8 Kg/ha. of Super for 61(122); 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(118). (ii) Medium black. (iii) 16, 17.12.1960; 7.12.1961; 7.11.1962. (iv) (a) 2 ploughings + 4 harrowings for 60(93); Nil for others. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 1 or 2 interculturings for 60(93); Nil for others. (ix) Nil for 60(93) and 61(122); 90 cm. in the year 1962. (x) 7 to 12.4.1961; 12.5.1962; 24.3.1963.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

- (1) 2 varieties : V<sub>1</sub> = NP-710 and V<sub>2</sub> = NP-824.  
 (2) 2 seed rates : S<sub>1</sub> = 67 and S<sub>2</sub> = 90 Kg/ha.

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S : N<sub>0</sub> = 0, N<sub>1</sub> = 33.6 and N<sub>2</sub> = 67.2 Kg/ha.  
 (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub> = 0, P<sub>1</sub> = 33.6 and P<sub>2</sub> = 67.2 Kg/ha.  
 (3) 3 levels of irrigation : I<sub>1</sub> = 3, I<sub>2</sub> = 4 and I<sub>3</sub> = 5 irrigations.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main-plots/replication; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2 [one replication vitiated for 62(118)]. (iv) (a) 9.1 m. × 4.9 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-1962. (b) No, (c) Nil. (v) Bardoli, Halvad, Jamnagar, Kholwad, Kim and Thasra. (vi) Nil. (vii) Since sub-plot errors are heterogeneous, the results of individual years are presented.

## 5. RESULTS :

60(93)

(i) 1179 Kg/ha. (ii) (a) 364.0 Kg/ha. (b) 276.0 Kg/ha. (iii) Main effects of N and interaction  $V \times N$  are highly significant. Interaction  $V \times S$  is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	1107	1230	1334	1209	1241	1221	1211	1236	1211	1236	1224
P <sub>1</sub>	923	1319	1303	1079	1226	1241	1181	1182	1187	1177	1182
P <sub>2</sub>	882	1191	1318	1135	1174	1082	1070	1191	1135	1125	1130
Mean	971	1247	1318	1141	1214	1181	1154	1203	1178	1179	1179
V <sub>1</sub>	846	1353	1335	1170	1198	1166	1210	1145			
V <sub>2</sub>	1096	1141	1301	1112	1230	1196	1098	1261			
S <sub>1</sub>	1009	1206	1248	1141	1189	1133					
S <sub>2</sub>	933	1288	1388	1141	1239	1229					
I <sub>1</sub>	919	1183	1321								
I <sub>2</sub>	1032	1301	1308								
I <sub>3</sub>	961	1256	1326								

C.D. for N marginal means

=90.2 Kg/ha.

C.D. for N means at the same level of V

=127.6 Kg/ha.

C.D. for V means at the same level of N

=147.4 Kg/ha.

C.D. for the body of  $V \times S$  table

=222.9 Kg/ha.

## Gj. 61(122)

(i) 1180 Kg/ha. (ii) (a) 654.8 Kg/ha. (b) 467.2 Kg/ha. (iii) Interaction  $N \times I$  alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	1093	1112	1216	1138	1051	1232	1166	1115	1079	1201	1140
P <sub>1</sub>	1116	1190	1300	1249	1158	1249	1236	1201	1218	1220	1219
P <sub>2</sub>	1160	1169	1210	1144	1237	1158	1242	1118	1163	1197	1180
Mean	1140	1157	1242	1177	1149	1213	1215	1145	1153	1206	1180
V <sub>1</sub>	1159	1147	1154	1106	1225	1129	1181	1126			
V <sub>2</sub>	1121	1167	1330	1249	1072	1297	1248	1163			
S <sub>1</sub>	1171	1203	1270	1139	1174	1331					
S <sub>2</sub>	1109	1111	1214	1216	1123	1095					
I <sub>1</sub>	967	1288	1277								
I <sub>2</sub>	1232	1162	1053								
I <sub>3</sub>	1221	1021	1397								

C.D. for body of  $N \times I$  table

=264.3 Kg/ha.

## Gj. 62 (118)

(i) 1248 Kg/ha. (ii) (a) 263.5 Kg/ha. (b) 179.6 Kg/ha. (iii) Main effects of V, N, P and interaction  $N \times P$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mcan
P <sub>0</sub>	735	1233	1317	1124	1106	1056	1013	1177	1001	1190	1095
P <sub>1</sub>	757	1364	1788	1261	1324	1324	1262	1343	1169	1437	1303
P <sub>2</sub>	878	1373	1788	1345	1342	1352	1366	1327	1203	1489	1346
Mean	790	1323	1631	1243	1257	1244	1214	1282	1124	1372	1248
V <sub>1</sub>	691	1179	1503	1153	1109	1111	1093	1155			
V <sub>2</sub>	889	1468	1759	1333	1406	1376	1334	1409			
S <sub>1</sub>	803	1281	1557	1117	1237	1227					
S <sub>2</sub>	776	1366	1705	1310	1277	1260					
I <sub>1</sub>	835	1266	1629								
I <sub>2</sub>	747	1314	1710								
I <sub>3</sub>	788	1389	1554								

C.D. for V marginal means =124.1 Kg/ha.  
 C.D. for N or P marginal means =84.6 Kg/ha.  
 C.D. for body of N×P I table =146.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62 (97).**

**Site :-Irrigation Demons. Farm, Halvad.**

**Type :- 'ICMV'.**

**Object :-**To find out the optimum seed rate, variety and manurial doses under different irrigations for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Groundnut-Wheat. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 20.11.62. (iv) (a) 2 ploughing and 1 harrowing. (b) Drilling. (c) As per treatments. (d) 15 cm. row to row. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) 35 cm. (in whole year) (x) 12 and 13.3.63.

**2. TREATMENTS :**

Same as in expt. no. 60(59) conducted at Bardoli on page 162. Fertilizers applied as broadcast at sowing.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main-plots/replication ; 3 blocks/main plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.6 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962-contd. (b) No. (c) Nil. (v) (a) Bardoli, Dabhoi, Jamnagar, Kholwad, Kim and Thasra. (b) Nil. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1288 Kg/ha. (ii) (a) 534.5 Kg/ha. (b) 200.7 Kg/ha. (iii) Main effects of V, N, P, I and interaction N×I are highly significant. Interaction N×P is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	811	1253	1453	1096	1137	1294	1187	1164	1045	1307	1176
P <sub>1</sub>	833	1384	1645	1252	1267	1342	1220	1354	1176	1399	1287
P <sub>2</sub>	875	1573	1757	1300	1439	1466	1338	1465	1287	1516	1402
Mean	840	1403	1622	1216	1281	1367	1248	1328	1169	1407	1288
V <sub>1</sub>	704	1317	1487	1077	1181	1250	1173	1165			
V <sub>2</sub>	975	1489	1757	1356	1381	1485	1324	1490			
S <sub>1</sub>	810	1362	1573	1165	1239	1341					
S <sub>2</sub>	869	1444	1670	1267	1323	1394					
I <sub>1</sub>	833	1367	1449								
I <sub>2</sub>	828	1383	1632								
I <sub>3</sub>	858	1459	1785								

C.D. for V marginal means =144.5 Kg/ha.  
 C.D. for N, P, or I marginal means =66.4 Kg/ha.  
 C.D. for body of N×I tables =115.2 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- GJ. 60(132).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'ICMV'.**

Object :—To find out the optimum seed rate, variety and manurial doses under different irrigation for Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 18 and 23.11.60. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) Nil. (x) 6.3.61.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

- (1) 2 varieties : V<sub>1</sub>=NP-718 and V<sub>2</sub>=NP-798.  
 (2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (3), (4) and (5)

- (3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.  
 (4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.  
 (5) 3 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main-plots/replication 3, blocks/main plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×5.5 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-1962. (b) No. (c) Nil. (v) (a) Bardoli, Dabhoi, Halvad, Kholwad, Kim and Thasra (b) Nil. (vi) and (vi) Nil.

**5. RESULTS :**

(i) 874 Kg/ha. (ii) (a) 327.7 Kg/ha. (b) 296.8 Kg/ha. (iii) Main effects of N, P and interaction N×P are highly significant. Interaction V×S is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	396	648	777	565	679	577	600	614	577	637	607
P <sub>1</sub>	498	1149	1315	947	983	1031	1046	928	952	1022	987
P <sub>2</sub>	521	1168	1395	931	1114	1040	1088	968	969	1087	1028
Mean	472	988	1162	814	925	883	911	837	833	915	874
V <sub>1</sub>	489	912	1097	805	867	826	931	734			
V <sub>2</sub>	455	1064	1227	824	983	939	893	939			
S <sub>1</sub>	522	985	1227	837	969	928					
S <sub>2</sub>	421	991	1098	791	881	838					
I <sub>1</sub>	461	974	1007								
I <sub>2</sub>	483	1003	1290								
I <sub>3</sub>	472	987	1189								

C.D. for N or P marginal means

C.D. for means in the body of N×P table

C.D. for means in the body of V×S table

=98.0 Kg/ha.

=34.1 Kg/ha.

=141.9 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Ref :- GJ. 61(70).**

**Type :- 'ICMV'.**

Object :- To study the optimum dose of N, P along with seed rates and irrigations on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 23 and 25.11.1961. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings. (ix) N.A. (x) 26.3.62.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-824.

(2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (3), (4) and (5)

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

(5) 3 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.6 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Slight attack of top-shoot borer. (iii) Grain yield. (iv) (a) 1960-1962. (b) No. (c) Nil. (v) Bardoli, Dabhoi, Halwad, Kholwad, Kim and Thasra. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1128 Kg/ha. (ii) (a) 584.2 Kg/ha. (b) 87.2 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.



	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	726	1035	1205	976	955	1035	981	997	918	1060	919
P <sub>1</sub>	865	1280	1425	1160	1185	1225	1266	1115	1200	1180	1190
P <sub>2</sub>	768	1386	1462	1180	1258	1177	1182	1228	1104	1307	1205
Mean	786	1234	1364	1105	1133	1146	1143	1113	1074	1188	1128
V <sub>1</sub>	682	1162	1378	1054	1118	1450	1088	1059			
V <sub>2</sub>	891	1306	1360	1156	1147	1243	1197	1167			
S <sub>1</sub>	816	1229	1313	1111	1122	1196					
S <sub>2</sub>	757	1232	1344	1100	1143	1096					
I <sub>1</sub>	817	1171	1328								
I <sub>2</sub>	721	1272	1395								
I <sub>3</sub>	821	1249	1369								

C.D. for N or P marginal means =127.1 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(35).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'ICMV'.**

Object :- To study the optimum dose of N, P along with seed rates and irrigations on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 21.11.62. (iv) (a) One ploughing. (b) Drilling. (c) As per treatments. (d) 23 cm. between rows. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 4 weedings. (ix) Nil. (x) 27, 28.3.63.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

- (1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-824.  
 (2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (3), (4) and (5)

- (3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.  
 (4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>2</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.  
 (5) 3 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

N applied as broadcast on 10.11.1962, 8.1.1963 and 19.1.1963 and P<sub>2</sub>O<sub>5</sub> drilled on 12.11.1962.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main-plots/replication, 3 blocks/main plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 4.6 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Slight attack of top shoot borers and stem borers. (iii) Grain yield. (iv) (a) 1960--1962. (b) No. (c) Nil. (v) (a) Bardoli, Halvad, Kim, Kholwad, Dabhoi and Thasra. (b) Nil, (vi) and (vii) Nil.

**5. RESULTS :**

(i) 678 Kg/ha. (ii) (a) 220.1 Kg/ha. (b) 183.9 Kg/ha. (iii) Main effects of V, N, P, I and interaction N×I are highly significant. Main effect of S is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	435	680	745	512	607	741	647	592	690	549	620
P <sub>1</sub>	453	711	933	531	722	844	751	647	746	652	699
P <sub>2</sub>	466	791	891	595	628	925	767	665	794	638	716
Mean	451	727	856	546	652	837	722	635	743	613	678
V <sub>1</sub>	487	800	943	594	718	918	796	690			
V <sub>2</sub>	415	655	769	498	587	755	647	579			
S <sub>1</sub>	496	750	919	565	708	893					
S <sub>2</sub>	406	705	793	527	597	781					
I <sub>1</sub>	394	583	661								
I <sub>2</sub>	481	680	795								
I <sub>3</sub>	478	919	1113								

C.D. for V marginal means = 66.0 Kg/ha.  
 C.D. for N, P or I marginal means = 60.8 Kg/ha.  
 C.D. for body of N×I table = 105.4 Kg/ha.

**Crop :- Wheat (Rabi).**

**Site :- Central Exptl. Stn., Junagadh.**

**Ref :- Gj. 62(174).**

**Type :- 'ICMV'.**

Object —To find out the effect of irrigation levels of N, P and seed rate on different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 22.4 Kg/ha. of N. (ii) Medium black. (iii) 13.11.62. (iv) (a) Nil. (b) Hand sowing. (c) As per treatments. (d) 23 cm. between rows. (e) Nil. (v) Nil. (vi) As per treatments. (vii) As per treatments. (viii) Nil. (ix) 5.0 cm. (x) 7 to 15.3.63,

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-824.

(2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (3), (4) and (5)

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(5) 3 levels of irrigation : I<sub>1</sub>=9, I<sub>2</sub>=11 and I<sub>3</sub>=13 irrigations.

N applied in 2 doses, ½ dose on 13.11.62 by hand and other half dose on 5.1.63. P<sub>2</sub>O<sub>5</sub> applied by hand at sowing.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 4.6 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 46 cm.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1962 only. (b) No. (c) Nil. (v) Kim, Kholwad, Thasra and Jamnagar. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2939 Kg/ha. (ii) (a) 1415.3 Kg/ha. (b) 315.7 Kg/ha. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	2657	2780	2901	2726	2730	2881	2698	2860	2645	2913	2779
P <sub>1</sub>	2894	3136	3053	2968	3088	3026	2912	3143	2925	3130	3027
P <sub>2</sub>	2793	3008	3231	2911	3066	3048	2862	3159	2856	3165	3030
Mean	2781	2975	3062	2870	2961	2985	2824	3054	2809	3069	2939
V <sub>1</sub>	2651	2806	2969	2761	2808	2856	2603	3014			
V <sub>2</sub>	2912	3143	3154	2980	3115	3115	3045	3094			
S <sub>1</sub>	2655	2885	2932	2766	2834	2872					
S <sub>2</sub>	2908	3064	3191	2974	3089	3099					
I <sub>1</sub>	2722	2867	3022								
I <sub>2</sub>	208	3087	2994								
I <sub>3</sub>	2818	2970	3168								

C.D. for N or P marginal means =104.6 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 60(142).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'ICMV'.**

**Object :-**To find out suitable seed rates with suitable doses of manures and irrigations for different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) N.A. (ii) Medium black. (iii) 25.11.60. (iv) (a) 4 ploughings and 2 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) 96 cm. in whole year. (x) 27.3.61.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-718.

(2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (3), (4) and (5)

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(5) 3 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

P<sub>2</sub>O<sub>5</sub> applied on 20.12.60 and N applied in doses on 20.12.60 and 4.1.61.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main-plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 4.9 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Slight attack of stem borers. (iii) Grain yield. (iv) (a) 1960-1962. (b) No. (c) Nil. (v) Bardoli, Dabhoi, Halvad, Kim, Jamnagar and Thasra. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 839 Kg/ha. (ii) (a) 299.7 Kg/ha. (b) 269.7 Kg/ha. (iii) Main effect of N, I, P and interaction N×I, V×P are highly significant. Interactions P×I and S×P are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	569	721	734	559	677	788	705	644	726	623	675
P <sub>1</sub>	677	867	1015	639	877	1043	817	889	791	915	853
P <sub>2</sub>	787	1076	1106	807	909	1253	937	1042	1005	974	990
Mean	678	888	952	668	821	1028	820	858	841	837	839
V <sub>1</sub>	695	884	945	678	795	1050	857	825			
V <sub>2</sub>	660	892	959	658	847	1007	782	892			
S <sub>1</sub>	675	897	889	656	814	989					
S <sub>2</sub>	680	880	1015	680	828	1067					
I <sub>1</sub>	565	691	749								
I <sub>2</sub>	708	928	828								
I <sub>3</sub>	760	1046	1279								

C.D. for N, P or I marginal means = 68.4 Kg/ha.  
 C.D. for N×I marginal means = 83.9 Kg/ha.  
 C.D. for P means at the same level of V or S = 96.8 Kg/ha.  
 C.D. for V or S means at the same level of P = 117.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- GJ. 61(166).**

**Site :- Trial-cum-Demons-Farm, Kholwad.**

**Type :- 'ICMV'.**

Object :—To find out suitable seed rate with suitable doses of manures and irrigations for different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) N.A. (ii) Medium black. (iii) 17.11.61. (iv) (a) 1 ploughing. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) As per treatments. (viii) Nil. (ix) Nil. (x) 24.11.72.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-824.

(2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (3), (4) and (5)

(3) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(4) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(5) 3 levels of irrigation : I<sub>1</sub>=3, I<sub>2</sub>=4 and I<sub>3</sub>=5 irrigations.

N applied on 18.11.1961, 16.12.1961 and P<sub>2</sub>O<sub>5</sub> applied on 18.11.1961.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.9 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×61 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—1962 (Modified in 1961). (b) No. (c) Nil. (v) Kim, Thasra, Jamnagar, Dabhoi, Bardoli and Halvad. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1362 Kg/ha. (ii) (a) 318.9 Kg/ha. (b) 27.2 Kg/ha. (iii) Main effects of N, P and I are highly significant. Main effect of V and interaction N×I are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	942	1393	1513	1080	1336	1432	1198	1367	1221	1344	1283
P <sub>1</sub>	1028	1456	1632	1043	1510	1564	1326	1419	1314	1431	1372
P <sub>2</sub>	951	1566	1779	1208	1601	1487	1437	1427	1391	1473	1432
Mean	974	1472	1641	1110	1482	1494	1320	1404	1309	1416	1362
V <sub>1</sub>	915	1451	1560	1072	1398	1465	1256	1361			
V <sub>2</sub>	1032	1493	1723	1149	1576	1523	1384	1448			
S <sub>1</sub>	953	1409	1599	1079	1432	1450					
S <sub>2</sub>	995	1535	1683	1142	1533	1538					
I <sub>1</sub>	853	1160	1318								
I <sub>2</sub>	1027	1658	1762								
I <sub>3</sub>	1041	1598	1843								

C.D. for V marginal means

=95.5 Kg/ha.

C.D. for N, P or I marginal means

=90.2 Kg/ha.

C.D. for body of N×I table

=156.3 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 62(37).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'ICMV'.**

**Object :-**To find out suitable seed rates with suitable doses of manures and irrigations for different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) N.A. (ii) Medium black. (iii) 8.12.62. (iv) (a) One harrowing. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) and (ix) Nil. (x) 20.3.63.

## 2. TREATMENTS :

Same as in expt. no. 62(35) conducted at Jamnagar on page 170.

P<sub>2</sub>O<sub>5</sub> applied on 7.12.1962 and N applied in rows on 18.12.1962 and 2.1.1963.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main-plots/replication 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.9 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×61 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. (ii) Slight attack of rust. (iii) Grain and fodder yield. (iv) (a) 1960 to 1962. (b) No. (c) Nil. (v) Kim, Thasra Jamnagar, Dabhoi, Bardoli and Halvad. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1110 Kg/ha. (ii) (a) 321.4 Kg/ha. (b) 192.1 Kg/ha. (iii) Main effects of V, N, P and I are highly significant. Interactions N×I, V×I and S×P are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	691	1090	1345	938	1104	1083	1044	1040	919	1165	1042
P <sub>1</sub>	734	1214	1495	1110	1127	1206	1146	1149	1084	1211	1148
P <sub>2</sub>	688	1258	1477	1085	1133	1205	1070	1212	1068	1214	1141
Mean	704	1187	1439	1044	1121	1165	1087	1134	1024	1197	1110
V <sub>1</sub>	655	1072	1344	909	1047	1115	1025	1022			
V <sub>2</sub>	754	1303	1534	1180	1196	1215	1149	1245			
S <sub>1</sub>	686	1175	1399	1021	1127	1112					
S <sub>2</sub>	723	1200	1479	1068	1116	1217					
I <sub>1</sub>	692	1124	1317								
I <sub>2</sub>	725	1205	1434								
I <sub>3</sub>	696	1233	1565								

C.D. for V marginal means = 139.0 Kg/ha.  
 C.D. for I, N, or P marginal means = 63.6 Kg/ha.  
 C.D. for P means at the same level of S = 89.7 Kg/ha.  
 C.D. for S means at the same level of P = 153.5 Kg/ha.  
 C.D. for means in the body of N×I table = 110.2 Kg/ha.  
 C.D. for V means at the same level of I = 153.5 Kg/ha.  
 C.D. for I means at the same level of V = 89.7 Kg/ha.

**Crop :- Wheat (Rabi).**

**Ref :- Gj. 61(159), 62(36).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'ICMV'.**

**Object :-** To study the effect of different fertilizers, levels of irrigation and seed rates on different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 61(159); Cotton for 62(36). (c) N.A. for 61(159); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(36). (ii) Medium black. (iii) 16.11.1961; 14.11.1962. (iv) (a) 1 to 2 ploughings+2 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. for 61(159); Nil for 62(36). (vi) As per treatments. (vii) Irrigated. (viii) 7 interculturings for 61(159); Nil for 62(36). (ix) Nil. (x) 30.3.1962; 25.3.1963.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-824.

(2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of irrigation ; I<sub>1</sub>=3, I<sub>2</sub>=4 and I<sub>3</sub>=5 irrigations.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main-plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.9 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 61(159) ; Unsatisfactory for 62(36). (ii) Nil ; Endrine sprayed once for 62(36). (iii) Yield of grain. (iv) (a) 1960-1962(modified in 1961). (b) No. (c) Results of combined analysis given under 5. (v) (a) Bardoli, Dabhoi, Halvad, Jamnagar, Kholwad and Thasra. (b) Nil. (vi) Nil. (vii) Sub-plot errors are heterogeneous.

## 5. RESULTS :

## 61(159)

(i) 1056 Kg/ha. (ii) (a) 320.1 Kg/ha. (b) 294.9 Kg/ha. (iii) Main effects of N and P are highly significant. Interaction S×I is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	654	1074	1165	981	962	950	959	970	957	972	964
P <sub>1</sub>	741	1087	1317	1003	1036	1106	1019	1078	1046	1051	1048
P <sub>2</sub>	747	1227	1490	1190	1205	1070	1175	1135	1065	1245	1155
Mean	714	1129	1324	1058	1068	1042	1051	1061	1023	1089	1056
V <sub>1</sub>	658	1078	1332	995	1050	1024	1017	1028			
V <sub>2</sub>	770	1181	1316	1122	1086	1060	1085	1093			
S <sub>1</sub>	686	1087	1381	1040	1133	981					
S <sub>2</sub>	742	1172	1268	1077	1003	1102					
I <sub>1</sub>	712	1168	1295								
I <sub>2</sub>	708	1110	1385								
I <sub>3</sub>	723	1110	1292								

C.D. for N or P marginal means

=97.4 Kg/ha.

C.D. for I means at the same level of S

=137.6 Kg/ha.

C.D. for S means at the same level of I

=145.0 Kg/ha.

## 62(36)

(i) 547 Kg/ha. (ii) (a) 96.4 Kg/ha. (b) 96.3 Kg/ha. (iii) Main effects of V and S are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	526	540	543	531	542	538	507	567	505	568	537
P <sub>1</sub>	547	543	526	520	531	565	518	559	518	559	539
P <sub>2</sub>	592	536	570	554	564	579	524	607	544	588	566
Mean	555	540	546	535	545	578	516	578	522	572	547
V <sub>1</sub>	519	509	539	502	536	529	482	563			
V <sub>2</sub>	591	571	553	568	555	592	550	593			
S <sub>1</sub>	540	509	500	496	516	537					
S <sub>2</sub>	570	571	593	574	575	584					
I <sub>1</sub>	539	532	534								
I <sub>2</sub>	565	520	551								
I <sub>3</sub>	561	568	553								

C.D. for V or S marginal means =28.8 Kg/ha.

**Crop :- Wheat (Rabi).****Ref. :- Gj. 60(122).****Site :- Trial-cum-Demons. Farm, Kim.****Type :- 'ICMV'.**

Object :—To find out suitable seed rates with suitable doses of manures and irrigations for different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 29.11.60. (iv) (a) 2 ploughings and 3 harrowings. (b) Drilling. (c) As per treatments. (d) and (e) N.A. (v) 12.7 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated. (viii) Nil. (ix) 103 cm. in whole year. (x) 25, 29 to 31.3.1961.

**2. TREATMENTS :**

Same as in expt. no. 62(35) conducted at Jamnagar on page 170.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 4 main-plots/replication, 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 1. (iv) (a) 9.1 m. × 4.9 m. (b) 7.3 m. × 3.7 m. (v) 91 cm × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Attack of aphids ; Endrin was sprayed. (iii) Grain yield. (iv) (a) 1950–1962. (b) No. (c) Nil. (v) (a) Bardoli, Dabhoi, Halvad, Jamnagar, Kholwad and Thasra. (b) Nil. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1162 Kg/ha. (ii) (a) 282.9 Kg/ha. (b) 167.0 Kg/ha. (iii) Main effects of N, P and interaction N × P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	788	890	910	823	894	871	889	836	875	850	863
P <sub>1</sub>	1063	1216	1357	1191	1196	1249	1216	1208	1191	1233	1212
P <sub>2</sub>	1131	1523	1582	1384	1419	1432	1367	1457	1420	1403	1412
Mean	994	1210	1283	1133	1170	1184	1157	1167	1162	1162	1162
V <sub>1</sub>	1013	1222	1252	1166	1144	1177	1110	1215			
V <sub>2</sub>	974	1197	1315	1100	1185	1191	1205	1119			
S <sub>1</sub>	1002	1213	1256	1109	1194	1168					
S <sub>2</sub>	985	1206	1310	1157	1146	1199					
I <sub>1</sub>	974	1186	1240								
I <sub>2</sub>	980	1244	1285								
I <sub>3</sub>	1028	1199	1325								

C.D. for N or P marginal means = 78.8 Kg/ha.

C.D. for the body of N × P table = 96.4 Kg/ha.

**Crop :- Wheat (Rabi).****Ref :- Gj. 62(218).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'ICMV'.**

Object :—To find out the optimum requirements of water, seed rate and fertilizer for different varieties of Wheat.

**1. BASAL CONDITIONS :**

(i) (a) *Bajri*—Wheat—Tobacco. (b) *Bajri*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 7.11.62. (iv) (a) 2 ploughings and 1 harrowing. (b) Hand sowing. (c) As per treatments. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 3 weedings and 2 inter-culturings. (ix) Nil. (x) 14.3.63 ; 29.3.63.



## 2. TREATMENTS :

**Main-plot treatments**

All combinations of (1) and (2)

(1) 2 varieties :  $V_1=NP-710$  and  $V_2=NP-824$ .(2) 2 seed rates :  $S_1=67$  and  $S_2=90$  Kg/ha.**Sub-plot treatments**

All combinations of (3), (4) and (5)

(3) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.(4) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.(5) 3 levels of irrigations :  $I_1=7$ ,  $I_2=3$  and  $I_3=11$  irrigations.

Details of application of fertilizer and irrigation N.A.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main-plots/replication, 3 blocks/main-plot and 9 sub-plots/main-plot.

(iii) 2. (iv) 9.4 m.  $\times$  4.9 m. (b) 7.1 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Slight attack of rust. (iii) Grain and fodder yield. (iv) (a) 1962 only. (b) No. (c) Nil.

(v) N.A. (vi) Nil. (vii) Nil.

## 5. RESULTS :

(i) 1777 Kg/ha. (ii) (a) 477.6 Kg/ha. (b) 351.1 Kg/ha. (iii) Main effects of N and I are highly significant.

Interaction of  $P \times I$  is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$I_1$	$I_2$	$I_3$	$S_1$	$S_2$	$V_1$	$V_2$	Mean
$P_0$	1375	1828	2112	1668	1681	1966	1759	1785	1715	1829	1772
$P_1$	1364	1881	2040	1708	1872	1705	1816	1708	1772	1752	1762
$P_2$	1400	1957	2031	1630	1878	1879	1876	1716	1715	1877	1796
Mean	1380	1889	2061	1669	1810	1850	1817	1736	1734	1819	1777
$V_1$	1353	1851	1997	1663	1760	1778	1726	1741			
$V_2$	1407	1927	2124	1675	1860	1922	1907	1731			
$S_1$	1404	1975	2072	1743	1818	1890					
$S_2$	1357	1803	2049	1595	1802	1811					
$I_1$	1349	1776	1881								
$I_2$	1353	1950	2127								
$I_3$	1437	1940	2173								

C.D. for N or I marginal means = 114.7 Kg/ha.

C.D. for the body of  $P \times I$  table = 281.1 Kg/ha.**Crop :- Wheat (Rabi).****Ref :- GJ. 60(65), 61(187), 62(38).****Site :- Trial-cum-Demons-Farm, Thasra.****Type :- 'ICMV'.****Object :-** To study the effect of different fertilizers, levels of irrigation and seed rates on different varieties of Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 60 (65); Cotton for 61 (187); *Bajra* for 62 (38). (c) N. A. for 60 (65); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61 (187); 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62 (38). (ii) Sandy loam. (iii) N. A., 14.11.1961; 10.11.1962. (iv) (a) 3 ploughings+5 harrowings. (b) Drilling. (c) As per treatments. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) N. A. for 60 (65); Nil for 61 (187); One interculturing for 62 (38). (ix) N. A. for 60 (65); Nil for others. (x) N. A. for 60 (65); 22.3.1962; 22.3.1963.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 2 varieties : V<sub>1</sub>=NP-710 and V<sub>2</sub>=NP-824.

(2) 2 seed rates : S<sub>1</sub>=67 and S<sub>2</sub>=90 Kg/ha.

## Sub-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

(3) 3 levels of irrigation : I<sub>1</sub>=5, I<sub>2</sub>=7 and I<sub>3</sub>=9 irrigations.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 4 main-plots/replication ; 3 blocks/main-plot and 9 sub-plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×4.9 m. (b) 7.3 m.×3.7 m. (v) 91 cm.×61 cm. (vi) Yes.

## 4. GENERAL :

(i) N. A. for 60 (65); Good for others. (ii) Attack of stem borer and rust for 62 (38); No incidence for others. (iii) Yield of grain. (iv) (a) 1960-1962. (b) No. (c) Results of combined analysis are given under 5. (v) Bardoli, Dabhoi, Halvad, Jam nagar, Kholwad and Kim. (vi) Nil. (vii) Sub-plot error variances are heterogeneous.

## 5. RESULTS :

## 60 (65)

(i) 2016 Kg/ha. (ii) (a) 346.1 Kg/ha. (b) 396.6 Kg/ha. (ii) Main effects of V and N are highly significant. Main effects of P and I are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	1343	2112	2302	1833	2011	1914	1918	1921	1823	2016	1919
P <sub>1</sub>	1499	2243	2393	1938	2031	2165	1974	2116	1929	161	2045
P <sub>2</sub>	1668	2252	2336	1966	2123	2167	2060	2109	1919	2251	2085
Mean	1503	2202	2344	1912	2055	2082	1984	2049	1890	2143	2016
V <sub>1</sub>	1425	2076	2170	1808	1917	1946	1991	1788			
V <sub>2</sub>	1582	2329	2517	2016	2194	2219	1976	2309			
S <sub>1</sub>	1434	2210	2308	1826	2059	2068					
S <sub>2</sub>	1573	2194	2380	1998	2051	2097					
I <sub>1</sub>	1420	2097	2219								
I <sub>2</sub>	1536	2309	2320								
I <sub>3</sub>	1554	2200	2493								

C.D. for V marginal means = 99.4 Kg/ha.

C.D. for N, P or I marginal means = 130.9 Kg/ha.

## 61 (187)

(i) 2351 Kg/ha. (ii) (a) 511.7 Kg/ha. (b) 242.5 Kg/ha. (iii) Main effects of N, P and interaction N×V, N×S are highly significant. Main effects of V, I and interaction P×I are significant (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	1152	2202	2893	2028	2058	2161	2036	2128	1262	2202	2082
P <sub>1</sub>	1468	2422	3041	2172	2404	2354	2287	2333	2258	2362	2310
P <sub>2</sub>	1718	2760	3502	2680	2578	2722	2644	2676	2536	2784	2660
Mean	1446	2461	3145	2293	2347	2412	2322	2379	2252	2449	2351
V <sub>1</sub>	1361	2292	3103	2218	2244	2294	2211	2293			
V <sub>2</sub>	1530	2630	3188	2369	2449	2530	2433	2466			
S <sub>1</sub>	1349	2443	3175	2266	2292	2409					
S <sub>2</sub>	1542	2480	3116	2321	2401	2416					
I <sub>1</sub>	1423	2424	3033								
I <sub>2</sub>	1462	2391	3187								
I <sub>3</sub>	1453	2568	3216								

C. D. for V marginal means = 146.9 Kg/ha.  
 C. D. for N, P or I marginal means = 80.0 Kg/ha.  
 C. D. for N means at the same level of V or S = 113.3 Kg/ha.  
 C. D. for V or S means at the same level of N = 173.4 Kg/ha.  
 C. D. for the body of P×I table = 138.6 Kg/ha.

62 (38)

(i) 1699 Kg/ha. (ii) (a) 417.1 Kg/ha. (b) 245.0 Kg/ha. (iii) Main effects of V, N, P, I, and interactions N×I, P×I are highly significant. Interaction V×P is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	Mean
P <sub>0</sub>	947	1686	2108	1503	1686	1551	1566	1594	1418	1743	1580
P <sub>1</sub>	1026	1939	2225	1574	1904	1712	1680	1780	1540	1920	1730
P <sub>2</sub>	1174	1886	2301	1788	1748	1825	1730	1844	1716	1858	1787
Mean	1049	1837	2211	1622	1779	1696	1659	1739	1558	1840	1699
V <sub>1</sub>	937	1697	2040	1443	1628	1603	1540	1575			
V <sub>2</sub>	1161	1977	2383	1801	1931	1789	1777	1904			
S <sub>1</sub>	997	1825	2154	1556	1748	1672					
S <sub>2</sub>	1101	1849	2268	1688	1809	1721					
I <sub>1</sub>	1075	1758	2032								
I <sub>2</sub>	1042	1968	2328								
I <sub>3</sub>	1029	1785	2274								

C. D. for V marginal means = 119.8 Kg/ha.  
 C. D. for N, P or I marginal means = 80.8 Kg/ha.  
 C. D. for P means at the same level of V = 114.2 Kg/ha.  
 C. D. for V means at the same level of P = 151.8 Kg/ha.  
 C. D. for the body of N×I or P×I table = 140.0 Kg/ha.

**Crop :- Jowar (Kharif).**  
**Site :- Central Exptl., Stn., Junagadh.**

**Ref :- Gj. 64(250), 65(182).**  
**Type :- 'M'.**

**Object :-**To study the effect of nitrogen on the yield of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut ; Cotton. (c) 22.4 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ ; 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 21.7.64; 22.7.65. (iv) (a) 2 harrowings ; 1 ploughing. (b) Drilling (c) 9 Kg/ha. ; 24.7 Kg/ha. (d) 38 cm. between rows ; 46 cm.  $\times$  15 cm. (e) N.A. ; 1 to 2 plants/hill. (v) Nil. (vi) S-210. (vii) Unirrigated. (viii) 3 interculturings ; 2 weedings+2 interculturings. (ix) 137 cm ; 59 cm. (x) 2.12.64 ; 20.11.65.

**2. TREATMENTS :**

3 Manurial treatments :  $N_0$ =Control (No nitrogen),  $N_1$ =22.4 Kg/ha. of N at sowing and  $N_2$ =44.8 Kg/ha. of N in two equal doses, 1st dose at sowing and 2nd dose 5 weeks after sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 10.1 m.  $\times$  4.6 m. (b) 8.2 m.  $\times$  2.8 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Stunted growth due to heavy and continuous rains ; Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1964—contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

**64 (250)**

(i) 1069 Kg/ha. (ii) 177.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$N_0$	$N_1$	$N_2$
Av. yield	977	1031	1198

**65(182)**

(i) 795 Kg/ha. (ii) 107.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$N_0$	$N_1$	$N_2$
Av. yield	766	780	839

**Crop :- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Kothara.**

**Ref :- Gj. 61(28).**  
**Type :- 'M'**

**Object :-**To compare the effects of improved method and local method of manuring on the yield of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 24.7 C.L./ha. of F.Y.M. (ii) Medium black to sandy. (iii) 29.7.1961. (iv) (a) Nil. (b) Drilling. (c) 11 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) S-210. (vii) Unirrigated (viii) 1 interculturing. (ix) 87 cm. (x) 6 12.1961.

**2. TREATMENTS :**

2 methods of manuring :  $M_1$ =Local method (No manuring) and  $M_2$ =Improved method (44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super+12.4 C.L./ha. of F.Y.M.)  
 N applied in furrows in two equal doses,  $\frac{1}{2}$  at sowing and  $\frac{1}{2}$  after one month.  $P_2O_5$  applied at sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 12. (iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) to (c) No. (v) to (vii) Nil.

## 5. RESULTS :

(i) 332 Kg/ha. (ii) 84.6 Kg/ha. (iii) Treatment difference is highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	210	453

C.D. = 76.0 Kg/ha.

**Crop :- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 65 (229).**

**Type :- 'M'.**

Object :—To study the cumulative effect of fertilizers on Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Jowar. (b) Cotton. (c) 44.8 Kg/ha. of N and F.Y.M. as per treatments.  
(ii) Black Soil. (iii) 10.8.65 (iv) (a) 3 harrowings. (b) Drilling. (c) 12 Kg/ha. (d) 91 cm. between rows.  
(e) —. (v) Nil. (vi) B.P.—53. (vii) Irrigated. (viii) 5 interculturings. (ix) N.A. (x) 1.3.66.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 6 sources of 44.8 Kg/ha. of N : S<sub>0</sub>=Control, S<sub>1</sub>=Urea, S<sub>2</sub>=A/S/N, S<sub>3</sub>=C/A/N, S<sub>4</sub>=A/S and S<sub>5</sub>=A/S. Phos.

(2) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 CL/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 12 (b) —. (iii) 2. (iv) (a) 27.4 m.×18.3 m. (b) 23.8 m.×14.6 m. (v) 183 cm.×183 cm. (vi) Yes.

## 4. GENERAL :

(i) No. (ii) (a) Nil. (iii) Grain and fodder yield. (iv) 1963—1965 (b) Yes (Permanent plot Expt.). (v) to (vii) Nil.

## 5. RESULTS :

(i) 1573 Kg/ha. (ii) 68.9 Kg/ha. (iii) Main effect of S and interaction S×F are highly significant. Main effect of F is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	Mean
F <sub>0</sub>	1373	1701	1770	1244	1516	1623	1538
F <sub>1</sub>	1086	1801	1924	1564	1853	1419	1608
Mean	1230	1751	1847	1404	1684	1521	1573

C.D. for S marginal means = 107.1 Kg/ha.

C.D. for F marginal means = 61.8 Kg/ha.

C.D. for the body of S×F table = 151.5 Kg/ha.

**Crop :- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 60 (52), 61 (145).**

**Type :- 'M'.**

Object :—To study the effect of N, P and K combined with F.Y.M. on the yield of Jowar.

## 1. BASAL CONDITIONS :

- (i) (a) Cotton—*Jowar*. (b) Cotton. (c) Nil for 60 (52); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 61 (145). (ii) Deep black. (iii) 23.8.1960; 22.9.1961. (iv) (a) 2 harrowings. (b) Drilling. (c) 11 Kg/ha. (d) 91 cm.×30 cm. (e) —. (v) Nil. (vi) B.P.—53. (vii) Un-irrigated for 60 (52); Irrigated for 61 (145). (viii) 3 interculturings+1 weeding+1 thinning for 60 (52); Nil for 61 (145). (ix) 87 cm., 122 cm. (x) 15.3.1961; 16.3.1962.

## 2. TREATMENTS :

All combinations of (1), (2), (3) and (4)

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=33.6$  and  $P_2=67.2$  Kg/ha.  
 (3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=33.6$  and  $K_2=67.2$  Kg/ha.  
 (4) 3 levels of F.Y.M. :  $F_0=0$ ,  $F_1=6.2$  and  $F_2=12.4$  C.L./ha.

## 3. DESIGN :

- (i) 3<sup>4</sup> Confd. (ii) (a) 9 plots/block and 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Attack of top shoot borer for 61 (145); No incidence for 60 (52). (iii) Yield of grain. (iv) (a) 1957—1961. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Due to continuous rains and long wet spell in July and August sowing was delayed much. (vii) Results of expt. no. 57 (66), 58 (83) and 59 (75) have also been included for giving combined results. Error variances are heterogeneous and Treatments×years interaction is present.

## 5. RESULTS :

- (i) 1161 Kg/ha. (ii) 230.1 Kg/ha. (128 d.f. made up of various components of Treatments×years interaction.) (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$F_0$	$F_1$	$F_2$	$K_0$	$K_1$	$K_2$	Mean
$P_0$	1002	1168	1376	1131	1214	1201	1205	1209	1132	1182
$P_1$	956	1174	1311	1157	1120	1164	1152	1153	1136	1147
$P_2$	1009	1207	1246	1132	1146	1184	1114	1166	1182	1154
Mean	989	1183	1311	1140	1160	1183	1157	1176	1150	1161
$K_0$	969	1217	1285	1183	1125	1163				
$K_1$	1021	1177	1330	1123	1176	1229				
$K_2$	977	1155	1318	1114	1179	1157				
$F_0$	987	1153	1280							
$F_1$	991	1204	1285							
$F_2$	989	1192	1368							

C.D. for N marginal means = 54.9 Kg/ha.

**Crop :- Jowar (Kharif).**

**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 60(54), 61(189).**

**Type :- 'M'.**

**Object :-**To see the effect of different micronutrients on the yield of Jowar.

## 1. BASAL CONDITIONS :

- (i) (a) Cotton—*Jowar*. (b) Cotton. (c) 44.8 Kg/ha. of N for 60(54); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for other. (ii) Deep black. (iii) 20.8.1960; 21.8.1961. (iv) (a) N.A. for 60(54); 2 ploughings for others. (b) Drilling. (c) 11.2 Kg/ha. (d) 91 cm.×30 cm. (e) N.A. (v) Nil for 60(54); 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+20.2 Kg/ha. of  $P_2O_5$  for 61(189). (vi) B.P.—53. (vii) Irrigated for 60(54) and unirrigated for 61(189). (viii) 2 interculturings, 1 weeding, 1 thinning for 64(54); 2 interculturings for 61(189). (ix) 87 cm.; 122 cm. (x) 12.3.1961; 20.3.1962.

## 2. TREATMENTS :

All combinations of (1) (2) (3) and (4)

- (1) 2 levels of Copper :  $C_0$ =Absence and  $C_1$ =Presence.  
 (2) 2 levels of Boron :  $B_0$ =Absence and  $B_1$ =Presence.  
 (3) 2 levels of Manganese :  $M_0$ =Absence and  $M_1$ =Presence.  
 (4) 2 levels of Zinc :  $Z_0$ =Absence and  $Z_1$ =Presence.

## 3. DESIGN :

(ii) Fact. in R.B.D. (ii) (a) 16. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 8.2 m. (b) 7.3 m. × 6.4 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 60(54); Satisfactory for 61(189). (ii) Nil for 60(54); Attack of top shoot borer for other.  
 (iii) Grain and fodder yield. (iv) (a) 1959—61 (modified in 60). (b) No. (c) Nil. (v) N.A. (vi) Nil.  
 (vii) Since the error variances are heterogeneous and Treatments × years interaction is absent, the results of the individual years are presented.

## 5. RESULTS :

## 60(54)

(i) 1486 Kg/ha. (ii) 183.4 Kg/ha. (iii) None of the effects is significant. (iv) Mean and differential response table is given below.

	Mean response	Cu		B		Mn		Zn	
		Absence	Presence	Absence	Presence	Absence	Presence	Absence	Presence
Cu	62	—	—	44	79	51	72	62	61
B	-19	-37	-2	—	—	27	-65	-39	1
Mn	-35	-46	-25	10	-81	—	—	28	-99
Zn	25	26	24	6	45	89	-39	—	—

## 61(189)

(i) 3822 Kg/ha. (ii) 619.5 Kg/ha. (iii) None of the effects is significant. (iv) Mean and differential response table in Kg/ha.

	Mean response	Cu		B		Mn		Zn	
		Absence	Presence	Absence	Presence	Absence	Presence	Absence	Presence
Cu	42	—	—	35	49	-54	138	-59	143
B	29	22	36	—	—	135	-77	-15	73
Mn	-97	-193	-1	9	-203	—	—	-25	-169
Zn	-39	-140	62	-83	5	33	-111	—	—

**Crop :- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- GJ. 62(130), 63(136), 65(230).**  
**Type :- 'M'.**

Object :—To study the residual effect of role of organic manures on Cotton on the succeeding Jowar crop.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—Jowar. (b) Cotton. (c) As per treatments. (ii) Deep black soil. (iii) N.A. : 23.7.1963 ; 4.8.1965. (iv) (a) N.A. for 62(130), 63(136) ; 2 harrowings for 65(230). (b) Drilling. (c) 9.0 Kg/ha. 11.2 Kg/ha. ; 12.4 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) Nil. (vi) B.P.—53. (vii) Unirrigated. (viii) N.A. for 62(130), 63(136) ; 1 interculturing. (ix) 62.0 cm. ; 120.0 cm. ; 89.3 cm. for 65(230). (x) N.A. 3.2.1964 ; 2.3.1966.

## 2. TREATMENTS :

10 manurial treatments :  $M_0$ =Control (No manure),  $M_1$ =Bulky manure i.e., 12.4 C.L./ha. of F.Y.M.,  $M_2$ = $\frac{1}{2}$  dose of bulky manure +  $\frac{1}{2}$  dose of NPK fertilizer equivalent,  $M_3$ =NPK fertilizers equivalent to  $M_1$ ,  $M_4$ = $M_1$ +44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ ,  $M_5$ = $\frac{1}{2}$  dose of  $M_1$ +44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ ,  $M_6$ =NPK fertilizer equivalent to bulky manure dose+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ ,  $M_7$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ ,  $M_8$ =44.8 Kg/ha. of N and  $M_9$ =67.2 Kg/ha. of N.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 14.6 m $\times$ 9.1 m for 62(130), 63(136), 65(230). (b) 11.0 m.  $\times$ 6.1 m. for 62(130), 63(136); 12.2 m. $\times$ 5.5 m. for 65(230). (v) 182 cm. $\times$ 151 cm. for 62(130), 63(136); 121 cm. $\times$ 183 cm. for 65(230). (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1958-64 (modified in 1961). (b) Yes. (c) Results of the combined analysis are given under 5. (v) and (vi) Nil. (vii) Expts for 1960 and 1961 are N.A. and Expt. for 1964 the crop failed completely. Error variances are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 1499 Kg/ha. (ii) 239.0 Kg/ha. (99 d.f. made up of pooled error and Treatments $\times$ years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$	$M_8$	$M_9$
Av. yield	1225	1320	1379	1490	1499	1556	1862	1536	1414	1712

C.D.=193.4 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 63(139), 64(79), 65(264).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

Object :—To study the effect of micronutrients by soil application on Jowar.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar*—Cotton for 63(139); Cotton—*Jowar* for 64(79); Nil for 65(264). (b) *Jowar* for 63(139); Cotton for 64(79); *Jowar* and *Tur* for 65(264). (c) Nil for 63(139); 44.8 Kg/ha. of N for 64(79); Nil for 65(264) (ii) Deep black soil. (iii) 17.8.1963; 1.8.1964; 13.8.1965. (iv) (a) 1 harrowing for 63(139); 1 ploughing and 2 harrowings for others. (b) Drilling. (c) 11.2 Kg/ha. (d) 91 cm. $\times$ 23 cm. for 63(139), 64(79); 91 cm. between rows for 65(264). (e) N.A. (v) 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of N for 63(139); Nil for others. (vi) B.P.—53. (vii) Irrigated for 63(139); Unirrigated for others. (viii) 2 interculturings for 63(139); weedings for 64(79); 2 interculturings and weedings for 65(264); (ix) 119.9 cm.; 212.7 cm.; 88.9 cm. (x) 5.2.1964; 11.2.1965; 9.2.1966.

## 2. TREATMENTS :

8 micronutrient treatments :  $T_0$ =Control,  $T_1$ =Boron at 11.2 Kg/ha. of Borax,  $T_2$ =Copper at 28.0 Kg/ha. of Cu. Sul.  $T_3$ =Zinc at 28.0 Kg/ha. of Zn. Sul.  $T_4$ =Manganese at 56.0 Kg/ha. of Mn. Sul.  $T_5$ =Molybdenum at 11.2 Kg/ha. of Sodium Molybdate,  $T_6$ =Iron at 56.0 Kg/ha. of Fe. Sul. and  $T_7$ =Mixture of above all together.

Treatment  $T_6$  has not been tried in 63(139).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8 for 64(79), 65(264); 7 for 63(139). (b) N. A. (iii) 3 for 64(79), 65(264); 2 for 63(139). (iv) (a) 11.0 m. $\times$ 9.4 m. for 64(79), 65(264); 12.2 m. $\times$ 5.5 m. for 63(139). (b) 9.1 m. $\times$ 7.9 m. for 64(79); 9.8 m. $\times$ 7.9 m. for 65(264); 11.0 m. $\times$ 3.7 m. for 63(139). (v) 91 cm. $\times$ 61 cm. for 64(79), 63(139); 61 $\times$ 61 cm. for 65(264) (vi) Yes.



**4. GENERAL :**

(i) Normal for 63(139); Below normal for 64(79); Not satisfactory for 65(264). (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963—1965 (Treatment modified in 64). (b) No. (c) Nil. (v) N.A. (vi) Heavy rains in July-August affected the growth for 64(79); Shortage of rains during growth period for 65(264); Nil for 63(139). (vii) Expt. for 64(79), 65(264) have been pooled and the results of the individual years are presented below, because interaction of Treatments with years is absent and error variances are heterogeneous.

**5. RESULTS :****63(139)**

(i) 966 Kg/ha. (ii) 204.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>7</sub>
Av. yield	660	1009	1299	1049	1045	959	739

**64(79)**

(i) 499 Kg/ha. (ii) 70.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	502	495	459	520	444	520	519	533

**65(264)**

(i) 882 Kg/ha. (ii) 137.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	747	845	890	881	876	983	998	833

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 62(131).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

**Object :-** To study the effect of C/N vs. A/S on the yield of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) 28.7.1962. (iv) (a) 1 harrowing. (b) Drilling. (c) 9.0 Kg/ha. (d) 91.5 cm. between rows. (e) Nil. (v) Nil. (vi) BP-53 (late). (vii) Un-irrigated. (viii) 2 interculturings. (ix) 61.9 cm. (x) N.A.

**2. TREATMENTS :**

All combinations of (1) and (2)

- (1) 2 sources of 44.8 Kg/ha. of N : S<sub>1</sub>=C/N and S<sub>2</sub>=A/S.  
 (2) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 4. (b) N. A. (iii) 6. (iv) (a) 11.0 m × 7.6 m. (b) 8.5 m × 4.6 m. (v) 122.0 cm. × 152.4 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962-contd. (Failed in 1964). (b) Yes. (c) Nil (v) and (vi) Nil. (vii) Expt. on Jowar crop taken in alternate years starting from 1962.

**5. RESULTS :**

(i) 1321 Kg/ha. (ii) 220.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	F <sub>0</sub>	F <sub>1</sub>	Mean
S <sub>1</sub>	1294	1371	1332
S <sub>2</sub>	1252	1367	1310
Mean	1273	1369	1321

**Crop :- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 64(80).**  
**Type :- 'M'.**

Object :- To find out the effect of different micronutrients by Foliar application on Jowar,

1. **BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Deep black. (iii) 1.8.1964 ; resowing on 3.9.1964. (iv) (a) 1 ploughing, 2 harrowings. (b) Drilling. (c) 11.2 Kg/ha. (d) 91.5 cm. × 22.9 cm. (e) —. (v) Nil. (vi) BP-53 (late). (vii) Unirrigated. (viii) 2 weedings, 2 harrowings and 1 gap filling. (ix) 212.7 cm. (x) 11.2.1965.

2. **TREATMENTS :**

8 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Boron at 2.2 Kg/ha. of Borax, T<sub>2</sub>=Copper at 9.0 Kg/ha. of Cu Sul.+9.0 Kg/ha. of lime, T<sub>3</sub>=Zinc at 3.4 Kg/ha. of Zn Sul.+2.2 Kg/ha. of lime, T<sub>4</sub>=Manganese at 3.4 Kg/ha. of Mn Sul.+2.2 Kg/ha. of lime, T<sub>5</sub>=Molybdenum at 0.2 Kg/ha. of Sodium Molybdate, T<sub>6</sub>=Ferrous at 11.2 Kg/ha. of Fe Sul.+11.2 Kg/ha. of lime and T<sub>7</sub>=Mixture of above all micronutrients.

Spraying of the above micronutrients in 1123 litres of water/ha. during the flowering period.

3. **DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N. A. (iii) 3. (iv) 11.0 m. × 9.1 m. (b) 9.1 m. × 7.9 m. (v) 91.5 cm. × 61.0 cm. (vi) Yes.

3. **GENERAL :**

(i) Germination and growth was below normal due to heavy rains during sowing and growth period. (ii) Attack of stem borers. (iii) Grain and fodder yield. (iv) (a) 1964—contd. (b) No. (c) Nil. (v) N. A. (vi) Heavy rains. (vii) Due to heavy rains in July-August resowing was done in Sept.

5. **RESULTS :**

(i) 425 Kg/ha. (ii) 78.7 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	461	475	370	447	422	388	376	462

**Crop :- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Viramgam.**

**Ref :- Gj. 64 (165), 65 (58).**  
**Type :- 'M'.**

Object :- To study the residual effects of organic and inorganic manures applied to previous Cotton crop on Jowar.

1. **BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Cotton. (c) As per treatments. (ii) Medium black. (iii) 19.7.64, 23.7.65. (iv) (a) 3 harrowings, 2 harrowings. (b) Drill sowing. (c) 17 Kg/ha. (d) 46 cm., 61 cm. between rows. (e) —. (v) Nil. (vi) C—10-2. (vii) Unirrigated. (viii) 2 interculturings and 1 weeding. (ix) 47 cm. 39 cm. (x) 13.10.64, 14.10.65.

## 2. TREATMENTS :

7 manurial treatments :  $T_0$ =Control,  $T_1$ =12.4 C.L./ha. of F.Y.M.,  $T_2$ =6.2 C.L./ha. of F.Y.M.+N, P and K equivalent to 6.2 C.L./ha. of F.Y.M.,  $T_3$ =N, P and K equivalent to 12.4 C.L./ha. of F.Y.M.,  $T_4$ =12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N,  $T_5$ =N, P and K equivalent to 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N and  $T_6$ =22.4 Kg/ha. of N.

These manures and fertilizers were applied to previous Cotton crop.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 4.9 m.×30.5 m. (b) 3.7 m.×27.7 m. (v) 61 cm.×141 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964-65. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Variances are heterogeneous and interaction of Treatments with years is absent.

## 5. RESULTS :

## 64 (165)

(i) 345 Kg/ha. (ii) 51.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	259	267	375	406	343	441	322

C.D.=76.9 Kg/ha.

## 65 (58)

(i) 460 Kg/ha. (ii) 91.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	407	453	410	516	468	551	415

**Crop :- Jowar ( Kharif ).**

**Ref :- Gj. 62 (191), 63 (191), 64 (138).**

**Site :- Dry Farming Res. Stn., Rajkot. Type :- 'MV'.**

Object :-To find out the suitable dose of N, P and K with suitable variety of Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Jowar. (b) Bajra for 62 (191); Groundnut for 63 (191) and 64 (138). (c) 12.4 C.L./ha. of F.Y.M. for 62 (191); Nil for others. (ii) Medium black. (iii) 16.7.62; 13.7.63; 6.6.64. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 11.2 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil for 62(191), 63(191); 12.4 C.L./ha. of F.Y.M. for 64 (138). (vi) As per treatments. (vii) Unirrigated. (viii) 3 weedings. (ix) 76 cm. 40 cm.; 50 cm.; (x) 6.10.62; 29.10.63; 21.10.64.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2) and (3)

- (1) 3 levels of Nitrogen as A/S :  $N_0=0$ ,  $N_1=22.4$ , and  $N_2=44.8$  Kg/ha.
- (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.
- (3) 3 varieties :  $V_1$ =Local,  $V_2$ =E-56 A and  $V_3$ =S-231.

## Sub-plot treatments

2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=44.8$  Kg/ha.

## 3. DESIGN:

(i) Split-plot. (ii) (a) 9 main-plots/block, 3 blocks/replication, 2 sub-plots/main-plot. (b) N.A. (iii) One. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962 to 1964. (b) No. (c) Nil. (v) Jam-Khambalia. (vi) Nil. (vii) As the sub-plot error variances are heterogenous the results of the individual experiments are presented under 5. Results.

## 5. RESULTS :

## 62 (191)

(i) 477 Kg/ha. (ii) (a) 66.0 Kg/ha. (b) 88.3 Kg/ha. (iii) Main effects of V, N, P and the interactions  $V \times N$ ,  $V \times P$  and  $N \times P$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	274	614	804	438	592	662	567	561	564
V <sub>2</sub>	556	636	911	452	871	810	689	733	711
V <sub>3</sub>	157	178	133	109	169	190	166	146	156
Mean	329	476	626	333	544	554	474	480	477
K <sub>0</sub>	313	505	604	340	524	558			
K <sub>1</sub>	345	447	648	325	564	550			
P <sub>1</sub>	271	248	480						
P <sub>2</sub>	373	536	723						
P <sub>3</sub>	343	644	675						

C.D. for N, V or P marginal means = 76.1 Kg/ha.

C.D. for means in the body of  $V \times N$ ,  $V \times P$  or  $N \times P$  table = 131.9 Kg/ha.

## 63 (191)

(i) 455 Kg/ha. (ii) (a) 156.7 Kg/ha. (b) 166.2 Kg/ha. (iii) Main effects of V, N and P are highly significant and the interactions  $V \times N$  and  $V \times P$  are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	367	357	368	283	343	466	371	357	364
V <sub>2</sub>	371	842	1097	367	918	1025	800	740	770
V <sub>3</sub>	144	214	335	172	161	360	218	244	231
Mean	294	471	600	274	474	617	463	447	455
K <sub>0</sub>	333	499	557	289	457	644			
K <sub>1</sub>	255	443	643	259	491	590			
P <sub>0</sub>	233	247	342						
P <sub>1</sub>	280	573	569						
P <sub>2</sub>	369	593	889						

C.D. for V, N or P marginal means = 180.8 Kg/ha.

C.D. for means in the body of  $V \times N$  or  $V \times P$  table = 221.4 Kg/ha.

## 64 (138)

(i) 271 Kg/ha. (ii) (a) 132.8 Kg/ha. (b) 52.7 Kg/ha. (iii) Main effects of V, N and interaction  $N \times K$  are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	126	191	280	188	190	219	177	221	199
V <sub>2</sub>	156	484	491	258	408	465	372	382	377
V <sub>3</sub>	207	267	240	247	197	270	260	216	238
Mean	163	314	337	231	265	318	270	273	271
K <sub>0</sub>	176	331	302	215	275	319			
K <sub>1</sub>	150	297	372	247	255	317			
P <sub>0</sub>	173	242	278						
P <sub>1</sub>	168	353	274						
P <sub>2</sub>	148	347	459						

C.D. for V or N marginal means =153.2 Kg/ha.

C.D. for K means at the same level of N=256.5 Kg/ha.

C.D. for N means at the same level of K=264.1 Kg/ha.

**Crop :- Jowar ( Kharif ).**

**Ref :- Gj. 60 (114), 61 (86).**

**Site :- Dry Farming Res. Stn., Rajkot.**

**Type :- 'MV'.**

**Object :-**To study the response of N, P and K on different varieties of Jowar.

#### 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra-Jowar-Cotton. (b) Bajra. (c) Nil. (ii) Medium black. (iii) 26.6.1960 ; 9.7.1961. (iv) (a) one ploughing and 2 harrowings for 60 (114) ; 2 harrowings for other. (b) Drilling. (c) 11.2 Kg/ha. (d) 46 cm. between rows. (e) N. A. (v) 12.4 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Unirrigated. (viii) 2 weedings. (ix) 47 cm. ; 56 cm. (x) 15.11.1960 ; 31.10.61 ; 15.11.61.

#### 2. TREATMENTS :

##### Main-plot treatments

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.
- (3) 3 varieties : V<sub>1</sub>=Local, V<sub>2</sub>=E56 A and V<sub>3</sub>=S. 231.

##### Sub-plot treatments

2 levels of K<sub>2</sub>O as Pot. Sul : K<sub>0</sub>=0 and K<sub>1</sub>=44.8 Kg/ha.

#### 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main plots/block ; 2 sub-plots/main-plot ; 3 blocks/replication. (b) 38.4 m. × 32.9 m. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Below normal due to lack of rains. (ii) Nil. (iii) Grain yield. (iv) (a) 1960—61. (b) No. (c) Nil. (v) Jam-Khambalia. (vi) Nil. (vii) Sub-plot error variances are heterogeneous and therefore individual years results are presented below.

#### 5. RESULTS :

##### 60(114)

(i) 116 Kg/ha. (ii) (a) 76.3 Kg/ha. (b) 31.4 Kg/ha. (iii) Main effect of V alone is significant. (iv) Av. yield grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
K <sub>0</sub>	115	128	105	119	134	96	80	102	167	116
K <sub>1</sub>	115	131	99	100	137	110	84	99	162	115
Mean	115	130	101	109	135	103	82	100	164	116
V <sub>1</sub>	81	67	99	71	104	72				
V <sub>2</sub>	99	119	84	99	77	126				
V <sub>3</sub>	170	203	121	157	225	113				
P <sub>0</sub>	62	156	109							
P <sub>1</sub>	173	110	124							
P <sub>2</sub>	115	123	71							

C.D. for V marginal means=62.2 Kg/ha.

61 (86)

(i) 193 Kg/ha. (ii) (a) 111.3 Kg/ha. (b) 68.2 Kg/ha. (iii) Main effect of N is highly significant and that of V is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
K <sub>0</sub>	84	199	284	158	196	212	135	283	149	189
K <sub>1</sub>	125	170	298	142	187	264	142	279	172	198
Mean	104	184	291	150	192	238	138	281	160	193
V <sub>1</sub>	49	122	243	31	134	249				
V <sub>2</sub>	166	255	422	281	264	298				
V <sub>3</sub>	98	176	207	137	177	167				
P <sub>0</sub>	35	226	189							
P <sub>1</sub>	93	141	342							
P <sub>2</sub>	185	187	342							

C.D. for N or V marginal means=90.8 Kg/ha.

**Crop :- Jowar (Kharif).**

**Site :- Agri. Res. Stn., Deesa.**

**Ref. :- Gj. 61(62).**

**Type :- 'C'.**

**Object :-** To find out the optimum no. ploughings and no. of interculturings required for Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra. (c) Nil. (ii) Sandy-yellowish brown. (iii) (a) 16.8.1961. (b) As per treatments. (b) Drilling. (c) 22.4 Kg/ha. (d) 61 cm. between rows. (e) N. A. (v) Nil. (vi) Local Malvan. (vii) Unirrigated. (viii) As per treatments. (ix) 94.1 cm. (x) 2.1.1962.

**2. TREATMENTS :**

**Main-plot treatments**

No. of ploughings : P<sub>0</sub>=0, P<sub>1</sub>=2, P<sub>2</sub>=4 and P<sub>3</sub>=6 ploughings.

**Sub-plot treatments**

No. of interculturings : C<sub>0</sub>=0, C<sub>1</sub>=1 and C<sub>2</sub>=2 interculturings.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/block, 3 sub-plots/main plot. (b) N. A. (iii) 6. (iv) (a) 7.9 m × 11.6 m. (b) 5.5 m × 9.1 m. (v) 1.2 m × 1.2 m. (vi) Yes.

**4. GENERAL :**

(i) Due to heavy rains the crop suffered. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1959-1961. (b) No. (c) Nil. (v) N. A. (vi) Heavy rains. (vii) Nil.

**5. RESULTS :**

(i) 156 Kg/ha. (ii) (a) 37.3 Kg/ha. (b) 123.8 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
C <sub>0</sub>	103	189	81	137	127
C <sub>1</sub>	178	159	175	111	156
C	120	177	193	252	185
Mean	134	175	150	167	156

C. D. for P marginal means = 26.4 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref. :- Gj. 60(45).**

**Site :- Agri. Res. Farm, Halvad.**

**Type :- 'C'.**

Object :- To study the comparative residual effect of desi Cotton strains on uniform crop of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Cotton. (c) N. A. (ii) Medium black. (iii) 30.6.1960. (iv) (a) 1 Ploughing and 2 harrowings. (b) Drilling. (c) 16.8 Kg/ha. (d) and (e) N. A. (v) Nil. (vi) E. 56 A. (vii) Irrigated. (viii) Two interculturings. (ix) 28.2 cm. (x) 3.10.1960.

**2. TREATMENTS :**

6 Varieties of Cotton sown prior to Jowar crop.

V<sub>1</sub>=K-394, V<sub>2</sub>=597-B, V<sub>3</sub>=S-797, V<sub>4</sub>=Kalyan, V<sub>5</sub>=Wagad and V<sub>6</sub>=C. J. 73.

**3. DESIGN :**

(i) R. B. D. (ii) (a) 6. (b) N. A. (iii) 4. (iv) (a) 12.2 m. × 4.3 m. (b) 10.4 m. × 2.3 m. (v) 91.5 cm. × 99 cm. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory. (ii) Attack of top shoot borer. (iii) Grain and fodder yield. (iv) (a) and (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 729 Kg/ha. (ii) 141.7 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of grain in Kg/ha.

Treatment	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>	V <sub>6</sub>
Av. yield	690	678	798	717	820	672

**Crop :- Jowar (Kharif).**

**Ref :- Gj-62(177).**

**Site :- Dry Farming Res. Stn., Jam-Khambalia.**

**Type :- 'C'.**

Object :- To study the effect of different interculturings on Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) **Medium black**. (iii) 10.7.1962. (iv) (a) 3 horrowings. (b) Drilling. (c) 11 Kg/ha. (d) 46 cm. **Between rows** (e) —. (v) 12.4 C.L./ha. of F. Y. M. (vi) E-56-A (early). (vii) Irrigated. (viii) 3 weedings. (ix) 54 cm. (x) 8.10.1962.

## 2. TREATMENTS :

4 Cultural treatments :  $T_0$ =No interculturing  $T_1$ =1 interculturing 6 weeks after sowings  $T_2$ =2 interculturing 4 and 6 weeks after sowings and  $T_3$ =3 interculturings 4, 6 and 8 weeks after sowings.

## 3. DESIGN :

(i) R. B. D. (ii) (a) 4. (b) N. A. (iii) 6. (iv) (a) 9.1 m × 7.3 m. (b) 7.3 m × 5.5 m. (v) 9 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satis factory. (ii) Nil. (iii) Grain 9 fodder yield. (iv) (a) 1959-1962. (b) No. (c) Nil. (v) Rajkot. (vi) Un-even rain fall. (vii) Expt. failed, in 1959. 1960 and 1961.

## 5. RESULTS :

(i) 251 Kg/ha. (ii) 87.3 Kg/ha. (iii) Treatments defferences are highly significant (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$
Av. yield	148	219	269	366

C. D.=107.4 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref. :- Gj. 61(50).**

**Site :- Agri. Res. Farm, Halwad**

**Type :- 'C'.**

Object :—To study the after effect of Desi Cotton strains on the yield of Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—*Jowar*. (b) Cotton. (c) Nil. (ii) **Medium black**. (iii) 28.6.61. (iv) (a) One ploughing and one harrowing. (b) Drilling. (c) 11.2 Kg/ha. (d) 45.7 cm. between rows. (e) —. (v) Nil. (vi) E 56 A. (vii) unirrigated. (viii) Nil. (ix) 20 cm —60 cm. (x) 7.10.61

## 2. TREATMENTS :

8 varieties of previous cotton crop :  $V_1$ =S 394,  $V_2$ =S 597 B,  $V_3$ =S 797,  $V_4$ =Kalyan,  $V_5$ =Local,  $V_6$ =Wagad,  $V_7$ =C.J. 73 and  $V_8$ =CO<sub>2</sub> 170.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) and (b) 13.0 m. × 4.3 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain Yield. (iv) (a) 1959—1961. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 291 Kg/ha. (ii) 55.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$V_1$	$V_2$	$V_3$	$V_4$	$V_5$	$V_6$	$V_7$	$V_8$
Av. yield	305	306	269	267	299	301	298	286



**Crop :- Jowar (Kharif).****Ref. :- Gj. 64(125), 65(76).****Site :- Dry Farming Res. Stn., Jam-Khambalia.****Type :- 'C'.**

Object :—To study the effect of different interculturings on Jowar.

**1. BASAL CONDITIONS ;**

- (i) (a) Nil. (b) Sesamum ; Cotton. (c) 12.4 C.L./ha. of F.Y.M. ; 24.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ .  
 (ii) Medium black. (iii) 5.7.64 ; 27.7.65. (iv) (a) 1 ploughing ; 1 ploughing+1 harrowing. (b) Drilling.  
 (c) 11 Kg/ha. ; 9.9 Kg/ha. (d) 46 cm. between rows. (e) —. (v) 12.4 C.L./ha. of F.Y.M. (vi) E—56 A.  
 (vii) Unirrigated. (viii) As per treatments. (ix) 48 cm. ; 29 cm. (x) 21.10.64 ; 3.11.65.

**2. TREATMENTS :**

4 cultural treatments ;  $T_0$ =Control (no interculturing),  $T_1$ =One interculturing,  $T_2$ =Two interculturings and  $T_3$ =Three interculturings.

**3. DESIGN :**

- (i) R.B.D. (ii) (a) 4. (b) —. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm.  
 (vi) Yes.

**4. GENERAL :**

- (i) Satisfactory for 64(125) and below normal for the expt. 65(76). (ii) Nil. (iii) Fodder yield ; grain yield. (iv) (a) 1964—65. (b) No. (c) Nil. (v) Rajkot. (vi) Nil. (vii) Errors are heterogeneous and interaction is absent.

**5. RESULTS :****64(125)**

- (i) 4682 Kg/ha. (ii) 1117.9 Kg/ha. (iii) Treatment differences are not significant, (iv) Av. yield of fodder in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$
Av. yield	4348	5170	4792	4418

**65(76)**

- (i) 88 Kg/ha. (ii) 21.3 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$
Av. yield	71	70	96	116

C.D.=26.2 Kg/ha.

**Crop :- Jowar (Kharif).****Ref :- Gj. 65(77).****Site :- Dry Farming Res. Stn., Jam Khambalia.****Type :- 'C'.**

Object ;—To study the effect of different spacings and seed rates on Jowar.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Cotton. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 30.7.65  
 (iv) (a) 1 ploughing, and 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) —. (v) 12.3 C.L./ha. of F.Y.M. (vi) E—56-A. (vii) Un-irrigated. (viii) 1 interculturing. (ix) 29 cm. (x) 31.10.65.

**2. TREATMENTS :****Main plot treatments**

3 spacings between row to row

 $S_1=45.7$  cm.,  $S_2=68.7$  cm. and  $S_3=91.5$  cm.**Sub-plot treatments**

3 seed rates

 $R_1=9.8$ ,  $R_2=12.4$  and  $R_3=14.8$  Kg/ha.

## 3. DESIGN ;

(i) Split plot. (ii) (a) 3 main-plots/Replication, 3 sub-plots/main-plot. (b) —. (iii) 6. (iv) (a) 13.7 m. × 9.1 m. (b) 11.0 m. × 7.3 m. (v) 137.2 cm. × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Crop was affected by absence of late rains. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 152 Kg/ha. (ii) (a) 111.2 Kg/ha. (b) 41.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	139	112	162	138
R <sub>2</sub>	151	135	167	151
R <sub>3</sub>	152	138	209	166
Mean	148	128	179	

**Crop :- Jowar.**

**Ref :- Gj. 62(176)**

**Site :- Dry farming. Res. Stn. Jam khambalia.**

**Type :- 'C'**

**Object :-** To find out the suitable seedrate and spacing for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 10.7.1962. (iv) (a) 3 Harrowings. (b) Drilling (c) and (d) As per treatments. (e) —. (v) 12.4 C.L./ha. of F. Y. M. (vi) E-56-A (early). (vii) Un-irrigated. (viii) 3 weedings. (ix) 55 cm. (x) 8.10.1962.

## 2. TREATMENTS :

**Main-plot treatments**

3 spacing between rows : S<sub>1</sub>=45.7 cm. S<sub>2</sub>=68.6 cm. and S<sub>3</sub>=91.5 cm.

**Sub-plot treatments**

3 seed rates : R<sub>1</sub>=9.0. R<sub>2</sub>=11.2 and R<sub>3</sub>=13.5 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main plots/Replication ; 3 sub-plots/main plot. (b) N. A. (iii) 6. (iv) (a) 13.7 m × 9.1 m. (b) 11.0 m × 7.3 m. (v) 1.4 m × 1.0 m. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Red rot disease. (iii) Grain and fodder yield. (iv) (a) and (b) No. (c) Nil. (v) Rajkot. (vi) Uneven rain fall. (vii) Nil.

## 5. RESULTS :

(i) 121 Kg/ha. (ii) (a) 84.1 Kg/ha. (b) 55.5 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	134	138	124	132
S <sub>2</sub>	82	123	110	105
S <sub>3</sub>	99	130	150	126
Mean	105	130	128	121

**Crop :- Jowar (Kharif.)****Ref :- Gj. 63(158), 64(90), 65(238)****Site :- Trial-cum-Demons. Farm Kholwad Type :- 'C'**

Object :- To study the effect of transplanting on Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil ; cotton- Jowar for 65 (238). (b) Sugarcane for 63 (158) ; cotton for 64 (90), 65 (238). (c) 134.5 Kg/ha. of N+24.7 C. L./ha. of F. Y. M. ; Nil ; 49.4 Kg/ha. of N+24.7 Kg/ha. of P<sub>2</sub> O<sub>5</sub>. (ii) Medium-black. (iii) 27.8.63 ; 24.8.64 and 12.9.64 ; 19.8.65 and 3.9.1965. (iv) (a) 3 ploughings for 63 (158) ; 2 ploughings and 2 harrowings for 64 (90) and 65 (238). (b) As per treatments. (c) 11.2 Kg/ha. for 63 (158) and 64 (90) ; 24.7 Kg/ha. for 65 (238). (d) 91 cm. × 33 cm. for 63 (158) and 64 (90) ; 61 cm. between rows for 65 (238). (e) —. (v) 12.4 C. L./ha. of F. Y. M. + 22.4 + 22.4 Kg/ha. of P<sub>2</sub> O<sub>5</sub> for 63 (158) and 64 (90) 12.4 C.L./ha. of F.Y.M. for 65 (238). (vi) B.P. 53. (vii) Irrigated. (viii) 2 weedings and 1 to 3 intercluturings. (ix) 124 cm. ; 191 cm. ; 99 cm. (x) 5.2.64 ; 22.1.65 ; 26.12.1965.

**2. TREATMENTS :**

3 cultural treatments : C<sub>0</sub>=seed drilled (Normal sowing time), C<sub>1</sub>=Transplanting at the time of drilling and C<sub>2</sub>=Transplanting 15 days after drilling.

**3. DESIGN :**

(i) R. B. D. (ii) (a) 3. (b) N. A. (iii) 6. (iv) (a) and (b) 10.0 m. for 63 (158) and 64 (90) ; 11.0 m. × 9.1 m ; 9.8 m. × 7.9 m. for 65 (238). (v) Nil ; 61 cm. × 61 cm. for 65 (238). (vi) yes.

**4. GENERAL :**

(i) Good ; Due to heavy rains treatments C<sub>1</sub> and C<sub>2</sub> were not fully established ; good. (ii) Slight attack of stem-borer for 63 (158) and 64 (90) ; Nil. (iii) grain and fodder yield. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) and (vii) Nil.

**5. RESULTS :****63 (158)**

(i) 2299 Kg/ha. (ii) 220.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>
Av. yield ;	2204	2562	2130

C. D.=283.2 Kg/ha.

**64(90)**

(i) 544 Kg/ha. (ii) 218.7 Kg/ha. (iii) Treatment differences are highly significant (iv) Av. yield of grain in Kg/ha.

Treatment :	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>
Av. yield :	1105	180	346

C. D.=398.0 Kg/ha.

**65(238)**

(i) 2083 Kg/ha. (ii) 521 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>
Av. yield :	2281	2735	1234

C. D.=670.4Kg/ha.

**Crop :- Jowar (Kharif.)****Ref :- Gj.60(101), 61(75).****Site :- Dry farming Res. Stn., Rajkot.****Type :- 'C'.**

Object :- To study effect of interculturing on the yield of Jowar.

**BASAL CONDITIONS :**

- (i) (a) Groundnut-Bajra-Jowar or Cotton. (b) Bajra. (c) Nil (ii) Medlum black (iii) 27.6.60 ; 11.7.1961.  
 (iv) (a) Oneploughing and 3 harrowings. (b) Drilling. (c) 11.2 Kg/ha. (d) 46 cm. between rows, (e) —.  
 (v) 12.4 C. L. of F. Y. M./ha. ; 5 C.L./ha. of F. Y. M. (vi) E-56A (early) ; S-231 (Mid-late).  
 (vii) Unirrigated (viii) 2 weedings. (ix) 47.5 cm. ; 56 cm. (x) 29.10.60 ; 24.11.1961.

**2. TREATMENTS :**

4 cultural treatments :

$C_0$ =control,  $C_1$ =1 harrowing,  $C_2$ =2 harrowings, and  $C_3$ =3 harrowings.

**3. DESIGN :**

- (i) R. B. D. (ii) (a) 4. (b) 29.3 m. × 9.1 m. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) yes.

**4. GENERAL ;**

- (i) Below normal. (ii) Nil (iii) yield of grain. (iv) (a) 1960 to 1961. (b) No. (c) The results of pooled analysis are presented under 5. Results. (v) Jam-Khambalia. (vi) Nil. (vii) Variances are homogeneous and interaction is absent.

**5. RESULTS :**

- (i) 360 Kg/ha. (ii) 79.4 Kg/ha. (33 d. f. made up of pooled error and treatments × years interaction).  
 (iii) Treatments differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	$C_0$	$C_1$	$C_2$	$C_3$
Av. yield :	355	340	360	386

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 62(103), 63(108), 64(40).**

**Site :- Dry Farming Res. Stn., Rajkot.**

**Type :- 'C'**

**Object :-** To determine whether interculturing are necessary to the Jowar crop under dry farming conditions.

**1. BASAL CONDITIONS :**

- (i) (a) Groundnut—Jowar. (b) Groundnut for 62(103) and 63(108), Jowar for 64(40). (c) Nil. (ii) Medinm black (iii) 16.7.62 ; 14.7.63 ; 7.7.64. (iv) (a) 1 ploughing and 2 harrowings, (b) Drilling. (c) 11.2 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) E-56 A. (vii) Unirrigated. (viii) 3 weedings. (ix) 40 cm. ; 50 cm. ; 76 cm. (x) 11.10.62 ; 25.10.63 ; 11.10.64.

**2. TREATMENTS :**

4 Cultural treatments :  $C_0$ =Control (no interculturing),  $C_1$ =1,  $C_2$ =2 and  $C_3$ =3 interculturings.

**3. DESIGN :**

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL**

- (i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962 to 1964. (b) No. (c) Nil. (v) Jam-Khambalia. (vi) Nil. (vii) As the error variances are heterogeneous and (Treatment × year) interaction is absent, the results of the individual experiments are given below.

**5. RESULTS :****62(103)**

- (i) 165 Kg/ha. (ii) 42.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatments	$C_0$	$C_1$	$C_2$	$C_3$
Av. yield	163	161	169	161

63(108)

(i) 494 Kg/ha. (ii) 179.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatments	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	544	470	521	441

64(40)

(i) 460 kg/ha. (ii) 75.0 kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	457	433	466	485

**Crop :- Jowar ( Kharif ).**

**Ref :- Gj. 62 (102), 63 (107), 64 (39).**

**Site :- Dry Farming Res. Stn., Rajkot. Type :- 'C'.**

Object :- To find out the suitable spacing and seedrate for Jowar.

1. BASAL CONDITIONS :

(i) (a) Groundnut-Jowar, Bajra-Cotton. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 16/17.7.62 ; 10.7.63 ; 5.6.64. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) —. (v) Nil. (vi) E-56-A (early). (vii) Unirrigated. (viii) 3 weedings. (ix) 40 cm. ; 50 cm. ; 76 cm. (x) 12.10.62 ; 27.10.63 ; 20.10.64.

2. TREATMENTS :

**Main-plot treatments**

3 spacings between rows S<sub>1</sub>=45.7, S<sub>2</sub>=68.6 and S<sub>3</sub>=91.4 cm.

**Sub-plot treatments**

3 seed rates :- R<sub>1</sub>=9.0, R<sub>2</sub>=11.2 and R<sub>3</sub>=13.5 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) 3 Main-plot/replication, 3 Sub-plot/main-plot. (b) N.A. (iii) 6. (iv) (a) 13.7 m. × 9.1 m. (b) 11.0 m × 7.3 m. (v) 137 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1960 to 1964 (experiment failed in 1960 and 1961). (b) No. (c) Results of Combined analysis are presented under 5. Results. (v) Jam-Khambalia. (vi) Nil. (vii) Variances are homogeneous and interaction is absent.

5. RESULTS :

(i) 599 Kg/ha. (ii) (a) 117.4 Kg/ha. (36 d.f. made up of pooled error and Treatments × years interaction). (b) 187.0 Kg/ha. [12 d.f. made up of interaction of treatments with years]. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	649	578	628	618
S <sub>2</sub>	620	552	620	597
S <sub>3</sub>	594	572	584	583
	621	567	610	599

**Crop :- Jowar ( Kharif ).****Ref :- Gj. 63 (137), 64 (81), 65 (263).****Site :- Agri. Res. Stn., Surat.****Type :- 'C'.**

Object :—To study the effect of transplanting Vs. drilling method of Jowar sowing.

**1. BASAL CONDITIONS :**

(i) (a) Jowar-Cotton for 63 (137) ; Cotton-Jowar for 64 (81) ; Nil for 65 (263). (b) Jowar for 63 (137) ; Cotton for 64 (81) ; Jowar and *Tur* for 65 (263). (c) Nil for 63 (137), 65 (263) ; 44.8 Kg/ha. of N for 64 (81). (ii) Deep black soil. (iii) 17.8.1963 ; 20.8.64, 8.9.64 ; 15.7.1965. (iv) (a) 1 harrowing for 63 (137) ; 1 to 2 ploughings and 2 harrowings for others. (b) As per treatments. (c) 11.2 Kg/ha. (d) 91 cm × 30 cm. for 63 (137), 65 (263) ; 91 cm. × 23 cm. for 64 (81). (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N + 11.2 Kg/ha. of  $P_2O_5$  for 63 (137) ; 12.4 C.L./ha. of F.Y.M. for 64 (81) ; 22.4 Kg/ha. of N + 11.2 Kg/ha. of  $P_2O_5$  for 65 (263). (vi) B.P. 55(vii) Irrigated for 63 (137) ; 65 (263) ; Unirrigated for 64 (81). (viii) 2 interculturings for 63 (137) ; 3 weedings and 4 harrowings for 64 (81) ; 2 interculturings and 2 weedings for 65 (263). (ix) 119.9 cm. ; 212.7 cm. ; 88.9 cm. (x) 5.2.1964 ; 16.2.1965 ; 27.1.1966.

**2. TREATMENTS :**

3 methods of sowing of Jowar :

$M_1$  = Drilling of seeds,  $M_2$  = Transplanting (at the time of drilling treatments) and  $M_3$  = Transplanting (after 15 days of drilling treatments)

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 7.3 m. × 12.2 m. for 63 (137) ; 11.0 m. × 5.5 m. for 64 (81) ; 12.2 m. × 5.5 m. for 65 (263). (b) 5.5 m. × 11.0 m. for 63 (137) ; 9.8 m. × 3.7 m. for 64 (81) ; 11.0 m. × 3.7 m. for 65 (263). (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal for 63 (137) and 65 (263) ; Below normal for 64 (81) Nil for 63 (137) ; stem borer attack for 64 (81) controlled by spraying Endrin ; Nil for 65 (263). (iii) Yield of grain and fodder. (iv) (a) 1963—1965. (b) No. (c) results of combined analysis grain under 5. (v) N.A. (vi) Nil for 63 (137) ; Heavy rains during growth and sowing period for 64 (81) ; shortage of rains for 65 (263). (vii) variances are heterogeneous and interaction is present.

**5. RESULTS :**

(i) 679 Kg/ha. (ii) 90.0 Kg/ha. [4 d.f. made up of interaction of Treatments with years]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$M_1$	$M_2$	$M_3$
Av. yield	612	684	742

**Crop :- Jowar (Kharif).****Ref. :- Gj. 62(42)****Site :- Trial-cum-Demons. Farm, Chanasma.****Type :- 'CM'**

Object :—To find out the optimum dose of fertilizers, seed rate and spacing for Jowar under local conditions.

**1. BASAL CNNDITIONS :**

(i) (a) Nil. (b) Bringal and cumicri. (c) Nil. (ii) Light goradu (sandy loam). (iii) 3.9.62. (iv) (a) 1 ploughing, 2 harrowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) Malvan. (vii) Unirrigated. (viii) 2 interculturings. (ix) 32.9 cm. (x) 23.12.62.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 spacing between rows ;  $S_1=46$ ,  $S_2=91$  and  $S_3=137$  cm.(2) 3 seed rates :  $R_1=6$ ,  $R_2=11$  and  $R_3=17$  Kg/ha,(3) 3 levels of fertilizers :  $F_0=0$ ,  $F_1=11.2$  Kg/ha. of N + 5.6 Kg/ha. of  $P_2O_5$  and  $F_2=22.4$  Kg/ha. of N + 11.2 Kg/ha. of  $P_2O_5$ .N applied as A/S and  $P_2O_5$  as Super.

## 3. DESIGN :

- (i) 3<sup>2</sup> fact. (ii) 27. (b) N.A. (iii) 2. (iv) (a) 12.0 m. × 8.2 m. (b) 9.1 m. × 5.5 m. (v) 137.2 cm. × 137.2 cm. (vi) Yes.

## 4. GENERALS :

- (i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962—N.A. (b) No. (c) Nil. (v) to (vii) .Nil

## 5. RESULT :

- (i) 1765 Kg/ha. (ii) 329.9 Kg/ha. (iii) Main effect of R and S are highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
S <sub>1</sub>	1696	2309	2417	2002	2272	2148	2141
S <sub>2</sub>	972	1409	1857	1307	1538	1393	1413
S <sub>3</sub>	1302	1757	2171	1917	1480	1833	1743
Mean	1323	1825	2148	1742	1763	1791	1765
F <sub>0</sub>	1287	1806	2133				
F <sub>1</sub>	1186	1762	2342				
F <sub>2</sub>	1497	1397	1970				

C.D. for R or S marginal means = 226.1

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 62(90), 63(93), 94(197).**

**Site :- Agri. Res, Stn., Deesa.**

**Type :- 'CM'.**

**Object :-** To find out the optimum seed rate spacing and fertilizers dose for Jowar.

## 1. BASAL CONDITIONS :

- (i) (a) Cereal—Legume. (b) Mung for 62(90) ; Guar for 63(93) ; Sann hemp for 64(197). (c) Nil. (ii) Sandy soil. (iii) 27.8.62 ; 8.8.63 ; 26.8.64. (iv) (a) 1 harrowing, 1 to 2 ploughings. (b) Drilling. (c) and (d) As per treatments. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. for 62(90) ; Nil for 63(93). Sann hemp as G.M. for 64(197). (vi) Malwan (medium). (vii) Unirrigated (viii) 1 interculturing for 62(90), 63(93) and 1 interculturing and weeding for 64(197). (ix) 26.3 cm. ; 54.6 cm. ; 44 cm. (x) 20.12.62 ; 11 to 14.12.63 ; 7.1.65.

## 2. TREATMENT :

All combinations of (1), (2) and (3)

(1) 3 spacing between rows : S<sub>1</sub> = 30, S<sub>2</sub> = 38 and S<sub>3</sub> = 46 cm.

(2) 3 seed rates : R<sub>1</sub> = 9, R<sub>2</sub> = 13, and R<sub>3</sub> = 18 Kg/ha.

(3) 3 levels of fertilizers : F<sub>0</sub> = 0, F<sub>1</sub> = 11.2 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub> = 22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

## 3. DESIGN :

- (i) 3<sup>2</sup> Conf. [SR<sup>2</sup>F<sup>2</sup> conf. in 62(90), 63(93) and SR<sup>2</sup>F, SRF<sup>2</sup> conf. in 64(197). (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Nil for 62(90) ; N.A. for 63(93) ; Attack of white ants and stem borer ; Addrin and Endrin sprayed for 64(197). (iii) Grain and fodder yield. (iv) (a) 1962—64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Variances are heterogeneous and interaction is present.

## 5. RESULT :

(i) 423 Kg/ha. (ii) 88.4 Kg/ha. [28 d.f. made of various components of Treatments  $\times$  years interaction excluding  $R \times S \times$  years interaction]. (iii) Main effect of F alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
R <sub>1</sub>	364	410	452	327	437	462	409
R <sub>2</sub>	377	413	487	285	451	542	426
R <sub>3</sub>	398	481	424	347	462	494	434
Mean	380	435	454	320	450	499	423
F <sub>0</sub>	289	311	358				
F <sub>1</sub>	386	501	463				
F <sub>2</sub>	464	493	541				

C.D. for F marginal means = 49.2 Kg/ha

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 61(63).**

**Site :- Agri. Res. Stn., Deesa.**

**Type :- 'CM'.**

Object :—To study the response to N, P, K fertilizers along with spacing and seed rate for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar—Guar.* (b) *Guar.* (c) Nil. (ii) Sandy. (iii) 18, 20, 8.61. (iv) (a) 4 ploughings and 1 harrowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) Local malvan. (vii) Unirrigated. (viii) 1 interculturing. (ix) 94.1 cm. (x) 27 to 30.12.61.

## 2. TREATMENTS :

**Main-plot treatments**

All combinations of (1), (2), (3) and (4)

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.
- (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.
- (3) 3 spacing between rows :  $S_1=30.5$ ,  $S_2=45.7$  and  $S_3=61.0$  cm.
- (4) 3 seed rates :  $R_1=11.2$ ,  $R_2=22.4$  and  $R_3=33.6$  Kg/ha.

**Sub-plot treatments**

2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=44.8$  Kg/ha.

Fertilizers applied on 19.8.1961.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block : 9 blocks/replication 2 sub-plots/main-plot (b) N.A. (iii) 1. (iv) (a) 7.3 m.  $\times$  11.0 m. (b) 5.5 m.  $\times$  9.1 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Crop suffered due to heavy rains lodging in September. (ii) Nil. (iii) Grainyield. (iv) (a) 1959—1961 (failed in 1960). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 244 Kg/ha. (ii) (a) 186.7 Kg/ha. (b) 81.8 Kg/ha. (iii) Only the main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.



	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
K <sub>0</sub>	176	225	316	225	237	255	249	231	238	230	257	230	239
K <sub>1</sub>	156	254	338	241	247	260	242	226	280	275	262		249
Mean	166	240	327	233	242	257	245	228	259	253	259	220	244
R <sub>1</sub>	194	225	339	259	190	309	266	212	280				
R <sub>2</sub>	98	326	355	252	291	236	242	281	257				
R <sub>3</sub>	206	168	287	188	245	228	228	192	241				
S <sub>1</sub>	186	212	338	203	276	256							
S <sub>2</sub>	154	236	295	248	187	250							
S <sub>3</sub>	158	271	348	248	263	266							
P <sub>0</sub>	157	259	283										
P <sub>1</sub>	182	206	339										
P <sub>2</sub>	159	253	360										

C.D. for N marginal means=76.1 Kg/ha.

**Crop :- Jowar (Semi-Rabi).**

**Ref :- Gj. 62(91).**

**Site :- Agri. Res. Stn., Deesa.**

**Type :- 'GM'.**

Object : To study the effect of different cultural practices on Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra*. (c) Nil. (ii) Sandy soil. (iii) 15.8.62. (iv) (a) As per treatments. (b) Drilling. (c) 22.4 Kg/ha. (d) 30.5 cm. between rows. (e) Nil. (v) 12.3 C.L./ha of F.Y.M. (vi) Malwan (medium). (vii) Unirrigated. (viii) 1 interculturing. (ix) 26.3 cm. (x) 2.1.63.

**2. TREATMENTS :**

**Main-plot treatments**

6 cultural treatments : C<sub>1</sub>=Continuous shallow ploughing in January every year, C<sub>2</sub>=Continuous shallow ploughing in January every alternative year. C<sub>3</sub>=Shallow ploughing in furrows in January followed by 1 harrowing in May, C<sub>4</sub>=1 harrowing in January, C<sub>5</sub>=2 harrowings and C<sub>6</sub>=3 harrowings.

**Sub-plot treatments:**

2 methods of applications of 12.4 C.L./ha. of F.Y.M. : M<sub>1</sub>=In furrows and M<sub>2</sub>=Broadcasting.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 6 main-plots/replication ; 2 sub-plots/main-plot. (b) 51.2 m. × 27.4 m. (iii) 4. (iv) (a) 13.7 m. × 7.3 m. (b) 12.2 m. × 5.4 m. (v) 76.2 cm. × 91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962. (b) Yes. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1071 Kg/ha. (ii) (a) 84.6 Kg/ha. (b) 96.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>1</sub>	1004	1133	1050	1091	1115	1089	1089
M <sub>2</sub>	1066	1061	963	1157	1069	1003	1054
Mean	1035	1097	1006	1124	1092	1046	1071

**Crop :- Jowar (Kharif.)**

**Ref :- Gj.60(19), 61(13), 62(198)**

**Site :- Agri. Res. Farm, Halvad.**

**Type -- 'CM'**

**Object :-** To assess the best combination of spacing, seed rates and optimum dose of N and P for Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 62 (198) ; Legume-Cereal-Cotton for others. (b) Cotton. (c) 22.4 Kg/ha. of manure mixture for 61 (13) and Nil for others. (ii) Medium black. (iii) 23.6.60 ; 26, 27.6.61 ; 25.7.1962. (iv) (a) 1 ploughing + 1 to 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) —. (v) Nil. (vi) E-56A (vii) Irrigated for 60 (19) ; Unirrigated for others. (viii) 1 to 3 interculturings. (ix) 22 cm., 51 cm., 35 cm. (x) 15.10.1960 ; 6.10.1961 ; 22.10.1962.

**2. TREATMENTS :**

All combination of (1), (2) and (3).

(1) 3 manurial treatments : M<sub>0</sub>=control, M<sub>1</sub>=11.2 Kg/ha. of N+5.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=2M<sub>1</sub>.

(2) 3 row spacings : S<sub>1</sub>=46, S<sub>2</sub>=91 and S<sub>3</sub>=137 cm.

(3) 3 seed rates : R<sub>1</sub>=6, R<sub>2</sub>=11 and R<sub>3</sub>=17 Kg/ha.

**3. DESIGN :**

(i) 3<sup>3</sup> confd. for 60 (19), 61 (13) ; 3<sup>3</sup> fact in R. B. D. for 62 (198). (ii) (a) 27 for 62 (198) ; 9 plots/block and 3 blocks/replication for others. (b) N. A. (iii) 2. (iv) (a) 12.2 m. × 5.5 m. (b) 10.4 m. × 2.7 m. (v) 91 cm. × 137 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of top shoot borer for 60 (19) ; severe attack of smut and strige for 61 (13) ; No incidence for 62 (198). (iii) Yield of grain. (iv) (a) 1958-1962 (modified in 59). (b) No. (c) Nil. (v) Junagadh, Jamnagar and Umralla. (vi) Due to continuous rains the setting of grains was not satisfactory for 61 (13). (vii) Error variances are heterogeneous and interaction is absent, therefore individual years results are presented below.

**5. RESULTS :**

**60(19)**

(i) 156 Kg/ha. (ii) 70.1 Kg/ha. (iii) Main effect of R is highly significant and that of S is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	135	66	142	195	83	65	114
S <sub>2</sub>	115	203	200	190	190	138	173
S <sub>3</sub>	183	138	221	217	159	166	181
Mean	144	135	188	200	144	123	156
R <sub>1</sub>	195	149	258				
R <sub>2</sub>	106	146	180				
R <sub>3</sub>	132	112	125				

C. D. for S or R marginal means = 48.5 Kg/ha.

61(13)

- (i) 93 Kg/ha. (ii) 58.4 Kg/ha. (iii) Main effect of M is highly significant and that of R is significant.  
 (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	63	68	119	108	85	57	83
S <sub>2</sub>	67	82	134	104	129	50	94
S <sub>3</sub>	38	109	155	133	101	68	101
Mean	56	86	136	115	105	58	93
R <sub>1</sub>	56	97	192				
R <sub>2</sub>	62	109	144				
R <sub>3</sub>	50	53	72				

C. D. for M or R marginal means = 40.4 Kg/ha.

62(198)

- (i) 721 Kg/ha. (ii) 128.7 Kg/ha. (iii) Main effect of F alone is highly significant (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	611	736	928	813	777	685	758
S <sub>2</sub>	522	673	776	750	655	566	657
S <sub>3</sub>	618	787	835	760	739	742	747
Mean	584	732	846	774	724	664	721
R <sub>1</sub>	648	789	886				
R <sub>2</sub>	594	739	838				
R <sub>3</sub>	509	668	816				

C. D. for F marginal means = 88.2 Kg/ha.

**Crop :- Jowar (Kharif.)**

**Ref :- Gj. 60(58)**

**Site :- Agri. Res. Stn., Jamnagar.**

**Type :- 'CM'**

To study the effect of fertilizers in combination with spacings and seed rates on the yield of Jowar.

#### 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 30.6.1960. (iv) (a) 2 ploughings. (b) Drilling. (c) and (d) As per treatments. (e) N. A. (v) Nil. (vi) E-56. (vii) Unirrigated. (viii) —. (ix) 28.0 cm. (x) 1.10.1960.

#### 2. TREATMENTS

All combinations of (1), (2) and (3).

- (1) 3 levels of fertilizers : F<sub>0</sub>=0, F<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 (2) 3 spacings between rows : S<sub>1</sub>=45.7, S<sub>2</sub>=91.4 and S<sub>3</sub>=137.2 Kg/ha.  
 (3) 3 seed rates : R<sub>1</sub>=5.6, R<sub>2</sub>=11.2 and R<sub>3</sub>=16.8 Kg/ha.

## 3. DESIGN :

(i) fact in R.B.D. (ii) (a) 27. (b) N. A. (iii) 2. (iv) (a) 12.2 m. × 5.5m. (b) 10.4 m. × 2.8 m. (v) 91.5 cm. × 137.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) yield of grain. (iv) (a) 1958-60. (b) No. (c) Nil. (v) N. A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 565 Kg/ha. (ii) 181.7 Kg/ha. (iii) Main effects of R, S and F are significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
R <sub>1</sub>	706	750	548	570	658	776	668
R <sub>2</sub>	744	707	414	512	598	745	622
R <sub>3</sub>	504	410	299	385	345	483	404
Mean	651	622	420	492	534	668	565
F <sub>0</sub>	573	540	364				
F <sub>1</sub>	582	607	412				
F <sub>2</sub>	799	720	484				

C. D. for F, S or R marginal means = 125.7 Kg/ha.

**Crop : Jowar (Kharif-)**

**Ref :- Gj. 60(36), 61(184)**

**Site :- Central Exptl. Stn. ; Junagadh**

**Type :- 'CM'**

**Object :-** To assess the effect of different spacings and seed rates with N and P on Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton for 60 (36) ; Groundnut for 61 (184). (c) 664.5 Kg/ha. of Nitrophosphate to whole crop for 60 (36) ; 56.0 Kg/ha. of N for 61 (184). (ii) Medium black. (iii) 30.6.1960, 25.6.1961. (iv) (a) N. A. (b) Drilling for 60 (36) ; Hand sowing for 61 (184). (c) and (d) As per treatments. (e) —. (v) Nil. (vi) S-213. (vii) Unirrigated. (viii) Nil for 60(36) ; 3 interculturings for 61(184). (ix) N. A., 59 cm. (x) N. A., 20.11.1961.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 row spacings ; S<sub>1</sub>=46, S<sub>2</sub>=91 and S<sub>3</sub>=137 cm.

(2) 3 seed rates : R<sub>1</sub>=6, R<sub>2</sub>=11 and R<sub>3</sub>=17 Kg/ha.

(3) 3 Manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=22.4 Kg/ha. of N as A/S+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=2 M<sub>1</sub>.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N. A. (iii) 2. (iv) (a) 12.2 m. × 5.5 m. (b) 10.4 m. × 2.8 m. (v) 91 cm. × 137 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) No incidence for 60 (36) Attack of stem borer for 61 (134). (iii) Yield of grain. (iv) (a) 1958-1961. (b) No. (c) Results of combinid analysis given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. nos. 58 (81) and 59 (73) have also been included for giving combined results. Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

(i) 1003 Kg/ha. (ii) 149.2 Kg/ha. (54 d. f. made up of various components of Treatments  $\times$  years interaction). (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
R <sub>1</sub>	1067	939	940	872	1008	1066	982
R <sub>2</sub>	1028	989	1016	914	1027	1092	1011
R <sub>3</sub>	1040	1048	960	917	1052	1079	1016
Mean	1045	992	972	901	1029	1079	1003
M <sub>0</sub>	929	933	841				
M <sub>1</sub>	1071	997	1019				
M <sub>2</sub>	1135	1046	1056				

C. D. for M marginal means = 70.7 Kg/ha.

**Crop :- Jowar (Rabi)**

**Ref :- 60(120), 61(162)**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'CM'**

**Object :-** To find out optimum spacing and manurial dose for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N. A. (c) N. A. (ii) Medium black. (iii) 11.10.1960, 9.10.1961. (iv) (a) 2 harrowings for 60 (120); ploughing + 3 harrowings for 61 (162). (b) Drilling. (c) 9 Kg/ha. (d) As per treatments. (e) 3 to 4. (v) 12.4 C. L./ha. of F. Y. M. (vi) M-35-1. (vii) Irrigated. (viii) N. A. for 60 (120); 7 interculturations for 61 (162). (ix) 103 cm.; 108 cm. (x) 5.3.1961; 28.3.1962.

## 2. TREATMENTS :

All combinations of (1), (2) and (3) :

- (1) 3 row spacings : S<sub>1</sub>=61, S<sub>2</sub>=91 and S<sub>3</sub>=122 cm.
- (2) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.
- (3) 3 levels of P<sub>2</sub> O<sub>5</sub> as Super : P<sub>0</sub>=0, 22.4 and P<sub>1</sub>=44.8 Kg/ha.

## 3. DESIGN :

(i) 3<sup>3</sup> Confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N. A. for 60 (120); 22.6 m  $\times$  33.5 m. for 61 (126). (iii) 2. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 9.1 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  183 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 60 (120); Good for 61 (162). (ii) Attack of stem borer for 60 (120); No incidence for 61 (162) but Endrex was sprayed. (iii) Yield of grain. (iv) (a) 1959-1961, (b) No. (c) Nil. (v) N. A. (vi) Nil. (vii) Variances are heterogeneous and interaction is absent. Therefore individual years results are presented below.

## 5. RESULTS :

## 60(120)

(i) 355 Kg/ha. (ii) 132.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
S <sub>1</sub>	338	373	398	378	304	427	370
S <sub>2</sub>	338	353	383	314	388	372	358
S <sub>3</sub>	348	373	289	308	353	349	337
Mean	342	366	357	333	348	383	355
P <sub>0</sub>	288	398	314				
P <sub>1</sub>	314	383	348				
P <sub>2</sub>	422	318	408				

61(162)

(i) 1116 Kg/ha. (ii) 319.3 Kg/ha. (iii) Main effect of S is highly significant and that of N is significant (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
S <sub>1</sub>	1226	1196	1535	1318	1016	1400	1539
S <sub>2</sub>	1016	1001	1270	1096	1151	852	1286
S <sub>3</sub>	867	867	1061	932	937	882	976
Mean	1036	1021	1289	1116	1035	1045	1267
P <sub>0</sub>	1036	1032	1036				
P <sub>1</sub>	897	1051	1186				
P <sub>2</sub>	1176	981	1644				

C. D. for S or N marginal means = 220.7 Kg/ha.

**Crop :- Jowar ( Kharif ).**

**Ref :- Gj. 61 (29), 62 (58), 64 (207), 65 (154).**

**Site :- Agri. Res. Stn., Kothara.**

**Type :- 'CM'.**

Object :—To find out the optimum spacing, seedrate and manurial dose for Jowar.

#### 1. BASAL CONDITIONS :

(i) (a) Nil for 61 (29) ; Groundnut-Cotton-Jowar for 62 (58) ; Jowar or Bajra-Groundnut-Gram or sesamum for 64 (207) ; Jowar sesamum-Cotton for 65 (154). (b) Groundnut for 61 (29) ; Cotton for 62 (58) ; sesamum for 64 (207) ; Cotton for 65 (154). 24.7 C.L./ha. of F.Y.M. for 61 (29) ; 12.4 C.L./ha. of F.Y.M.-+44 Kg/ha. of N+22 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62 (58) ; Nil for 64 (207) ; 24.7 C.L./ha. of F.Y.M.+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of N for 65 (154). (ii) Medium black to sandy for 61 (29), 62 (58) ; Sandy loam for others. (iii) 26.7.1961 ; 13.8.1962 ; 16.7.1964 ; 26.7.1965. (iv) (a) 1 to 2 ploughings and 2 to 3 harrowings. (b) Drilling for 61 (29), 65 (154) ; Hand sowing for 62 (58) and 64 (207). (c) As per treatments. (d) As per treatments. (e) N.A. (v) Nil for 61 (29) ; 64 (207) ; 65 (154) ; 12.4 C.L./ha. of F.Y.M. for 62 (58). (vi) S-210 (Medium). (vii) Unirrigated. (viii) 1 weeding, 1 to 2 interculturings. (ix) 87 cm. ; 28 cm. ; 37 cm. ; 33 cm. (x) 5.12.1961 ; 29.11.1962 ; 25.11.1964 ; 12.11.1965.

#### 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 spacings between rows : S<sub>1</sub>=46 c. S<sub>2</sub>=91 c. and S<sub>3</sub>=137 cm.

(2) 3 seed rates : R<sub>1</sub>=5.6, R<sub>2</sub>=11.2 and R<sub>3</sub>=16.8 Kg/ha.

(3) 3 manurial doses : F<sub>0</sub>=0, F<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=44.8 Kg/ha.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S applied in furrows, 1/2 at sowing and 1/2 one months later. P<sub>2</sub>O<sub>5</sub> as Super applied at sowing.

## 3. DESIGN :

(i) 3<sup>rd</sup> Confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 8.2m. × 9.1 m. (b) 5.5 m. × 7.3 m. (v) 137 cm × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1960-65 (Expt. failed is 60 and not-conducted in 63). (b) No. (c) Results of the pooled analysis are given under 5. (v) N.A. (vi) Heavy rains in vept affected the crop for 61 (29); due to less rains and prolonged drought-conditions in the beginning of season heavily affected the crop and damage by wild animal for 62 (58) ; Nil for 64(207) ; No rains in September and October for 65 (154). (vii) Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

(i) 143 Kg/ha. (ii) 63.2 Kg/ha. [42 d.f. made up of interaction of R,S,F, S×F, and R×F with years]. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
R <sub>1</sub>	171	158	141	118	178	174	157
R <sub>2</sub>	162	130	123	120	136	156	138
R <sub>3</sub>	139	134	132	127	141	137	135
Mean	157	141	132	122	152	156	143
F <sub>0</sub>	132	118	116				
F <sub>1</sub>	166	156	133				
F <sub>2</sub>	174	148	147				

**Crop :- Jowar ( Kharif ).**

**Ref :- Gj. 62 (224).**

**Site :- Irrigation-cum-Demons. Farm, Kukda.**

**Type :- 'CM'.**

Object :—To findout the optimum seedrate, spacing and manurial dose of N and P for Jowar.

## 1. BASAL CONDITIONS :

(i) Nil. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 10.7.62. (iv) (a) 3 harrowings, (b) Drilling. (c) and (d) as per treatments. (e) —. (v) Nil. (vi) S-210. (vii) Un-irrigated. (viii) Nil. (ix) 16 cm. (x) 16.11.62.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 spacings between rows : R<sub>1</sub>=46, R<sub>2</sub>=91 and R<sub>3</sub>=137 cm.

(2) 3 seed rates : S<sub>1</sub>=6, S<sub>2</sub>=11 and S<sub>3</sub>=17 Kg/ha.

(3) 3 fertlizer levels : F<sub>0</sub>=No fertlizer, F<sub>1</sub>=11.2 Kg/ha. of N+5.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>  
N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

## 3. DESIGN :

(i) 3<sup>rd</sup> confd. (ii) (a) 9 plots/block. 3 blocks/replications. (b) N.A. (iii) 2. (iv) (a) 11.0 m. × 8.2 m. (b) 9.1 m. × 5.5 m. (vi) 91 cm. × 137 cm. (viii) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962. (b) No. (c) Nil. (vi) (a) N.A. (v) (b) Nil. (vii) For want of sufficient rains the grain formation was poor. (viii) Expt. failed in 1963 and 1964.

## 5. RESULTS :

(i) 363 Kg/ha. (ii) 112.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
S <sub>1</sub>	432	421	360	429	377	407	404
S <sub>2</sub>	391	331	388	332	394	334	353
S <sub>3</sub>	289	330	372	350	322	319	330
Mean	370	361	357	370	364	354	363
F <sub>0</sub>	334	391	386				
F <sub>1</sub>	398	370	325				
F <sub>2</sub>	380	321	359				

**Crop :- Jowar ( Kharif ).**

**Ref :- Gj-65 (187).**

**Site :- Model Agro. Centre, Manund.**

**Type :- 'CM'.**

Object :- To find out the best method of application and level of nitrogen for Jowar.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Mustard and Castor. (c) Nil. (ii) sandy loam. (iii) 2-9-65. (iv) (a) 3 ploughings. (b) Drilling. (c) 24.7 Kg/ha. (d) 50 cm. × 10 cm. (e) —. (v) Nil. (vi) Malvan (medium). (vii) Irrigated. (viii) 1 weeding. (ix) Nil. (v) 8.12.65.

2. TREATMENTS :

All combinations of (1) and (2)+one control.

(1) 3 levels of Nitrogen as A/S at sowing : N<sub>1</sub>=35, N<sub>2</sub>=52 and N<sub>3</sub>=70 Kg/ha.

(2) 3 methods of application of Nitrogen : M<sub>1</sub>=Broadcasting at sowing, M<sub>2</sub>=Drilled 6.4 cm. below the seeds and M<sub>3</sub>=Side band placement at about 5.1 cm. to 7.7 cm. on either side of seed.

3. DESIGN :

(i) Fact in R.B.D. (ii) 10. (b) N.A. (iii) 4. (iv) (a) and (b) 10 m. × 5m. (v) 50 cm. on either side. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Attack of stem borers. (iii) Grain and fodder yield. (iv) (a) 1965. (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 762 Kg/ha. (ii) 348.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha. Control mean=784 Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
M <sub>1</sub>	679	904	671	751
M <sub>2</sub>	686	678	690	685
M <sub>3</sub>	962	857	709	843
Mean	776	813	690	760



**Crop :- Jowar (Kharif).****Ref :- Gj. 61 (94), 62 (2).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'CM'.**

Object :—To study the optimum dose of manure along with spacing and seed rate for Jowar.

**1. BASAL CONDITIONS :**

(i) Nil. (b) *Bajra* for 61 (94); Cotton for 62 (2). (c) Nil for 61 (94); 12.4 C.L./ha. of F.Y.M.+67.2 Kg/ha of N+44.8 Kg/ha. of  $P_2O_5$  for 62 (2). (ii) Sandy loam. (iii) 20.8.1961; 28.8.1962. (iv) (a) 7 ploughings for 61 (94); 4 ploughings+1 harrowing for 62 (2). (b) Drilling. (c) and (d) As per treatments. (e) —. (v) 12.4 C.L./ha. of F.Y.M. for 61 (94); G.M. (Sann) for 62 (2). (vi) Malvan. (vii) Irrigated for 61 (94); Un-irrigated for 62 (2). (viii) 2 interculturings. (ix) 65 cm.; 61 cm. (x) 23.12.1961; 24.12.1962.

**2. TREATMENTS :**

All combinations of (1), (2) and (3).

(1) 3 row spacings :  $S_1=30$ ,  $S_2=38$  and  $S_3=46$  cm.(2) 3 seed rates :  $R_1=9$ ,  $R_2=13$  and  $R_3=18$  Kg/ha.(3) 3 manurial treatments :  $M_0$ =Control (no manure),  $M_1=11.2$  Kg/ha. of N as A/S+11.2 Kg/ha. of  $P_2O_5$  as Super and  $M_2=2M_1$ .**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2 (one replication was dropped from expt. 61 (94) for analysis purpose). (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal for 61 (94); Good for 62 (2). (ii) Attack of stem borer and red rot disease. (iii) Yield of grain. (iv) (a) 1961-1962. (b) No. (c) Results of combined analysis given under 5. (v) N. A. (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 1562 Kg/ha. (ii) 264.7 Kg/ha. (46 d.f. made up of various components of Treatments×years interaction and pooled error). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$R_1$	$R_2$	$R_3$	$M_0$	$M_1$	$M_2$	Mean
$S_1$	1352	1471	1596	1523	1560	1336	1473
$S_2$	1508	7744	1584	1586	1645	1605	1612
$S_3$	1613	1591	1599	1619	1595	1589	1601
Mean	1491	1602	1593	1576	1600	1510	1562
$M_0$	1540	1509	1679				
$M_1$	1540	1683	1577				
$M_2$	1393	1614	1523				

**Crop :- Jowar (Rabi).****Ref :- Gj. 65(188).****Site :- Agri. Res. Stn., Tancha.****Type :- 'CM'.**

Object :—To assess the response of Jowar to different spacings and fertilizer doses.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 5.10.65. (iv) (a) 3 harrowings. (b) Drillings. (c) 12.4 Kg./ha. (d) 61 cm. between rows. (e) 1 (v) Nil. (vi) Malvan (medium). (vii) Un-irrigated. (viii) 1 interculturing. (ix) 68 cm. (x) 15.2.66.

## 2. TREATMENTS :

**Main-plot treatments :**

3 spacings between plants :  $S_1=10.2$ ,  $S_2=20.4$  and  $S_3=30.5$  cm. spacing between plants.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 3 levels of N as A/S,  $N_1=11.21$ ,  $N_2=33.6$  and  $N_3=56.04$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=22.42$  Kg/ha.

Fertilizers drilled at sowing ( $\frac{1}{2}$  N at sowing,  $\frac{1}{2}$  N at 30 days after).

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a)  $8.6 \text{ m.} \times 4.9 \text{ m.}$  (b)  $7.3 \text{ m.} \times 3.7 \text{ m.}$  (v)  $61.0 \text{ cm.} \times 61.0 \text{ cm.}$  (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 852 Kg/ha. (ii) (a) 308.3 Kg/ha. (b) 97.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$P_0$	$P_1$	Mean
$S_1$	945	818	885	882	884	883
$S_2$	841	838	877	842	862	852
$S_3$	789	857	822	785	860	823
Mean	858	838	861	836	868	852
$K_0$	806	826	877			
$K_1$	911	849	846			

**Crop :- Jowar (Kharif).**

**Site :- Agri. Res. Farm, Umrjala.**

**Ref :- Gj. 60(79).**

**Type :- 'CM'.**

Object :—To find out the optimum spacing, fertilizer and seed rate for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) 26.6.60. (iv) (a) N.A. (b) Hand drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) E-56. (vii) Unirrigated. (viii) Nil. (ix) 44 cm. (x) 3.10.60.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 spacings between rows :  $S_1=46$ ,  $S_2=91$  and  $S_3=137$  cm.

(2) 3 seed rates :  $R_1=6$ ,  $R_2=11$  and  $R_3=17$  Kg/ha.

(3) 3 manurial treatments :  $M_0$ =Control,  $M_1=22.4$  Kg/ha. of N as A/S+11.2 Kg/ha. of  $P_2O_5$  as Super and  $M_2$ =Twice  $M_1$ .

## 3. DESIGN :

(i)  $3^3$  confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a)  $12.2 \text{ m.} \times 5.5 \text{ m.}$  (b)  $10.4 \text{ m.} \times 2.7 \text{ m.}$  (v)  $91 \text{ cm.} \times 137 \text{ cm.}$

## 4. GENERAL :

(i) Not satisfactory. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1658-60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 247 Kg/ha. (ii) 76.0 Kg/ha. (iii) R effect is highly significant. Interactions S×F and R×F are significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
R <sub>1</sub>	215	181	164	223	164	173	187
R <sub>2</sub>	266	236	245	256	251	240	249
R <sub>3</sub>	284	286	350	233	316	371	307
Mean	255	234	253	237	244	261	247
F <sub>0</sub>	194	254	264				
F <sub>1</sub>	244	207	280				
F <sub>2</sub>	327	242	215				

C.D. for R marginal means = 52.5 Kg/ha.  
C.D. for means in the body of S×F and R×F table = 90.8 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 61(101), 62(51), 63(48), 64(7).**

**Site :- Dry Farming Res. Stn., Vallabhipur. Type :- 'CM'.**

Object :- To find out the optimum dose of N, P along with spacing and seed rate for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 11.2 Kg/ha. of N for 61(101); 9.0 Kg/ha. of N for 62(51); 24.7 C.L./ha. of compost for 63(48); Nil for 64(7). (ii) Medium black. (iii) 1.7.1961; 13.7.1962; 15.7.1963; 16.7.1964. (a) 1 ploughing+4 harrowings for 64(7); 2 to 4 harrowings for others. (b) Drilling. (c) and (d) As per treatments. (e) —. (v) 12.4 C.L./ha. of F.Y.M. (vi) Local. (vii) Un-irrigated. (viii) 1 weeding+1 to 2 interculturings. (ix) 60 cm., 53 cm., 60 cm., 83 cm. (x) 20.9.1961; 6.10.1962; 5.10.1963; 13.10.1964.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 row spacings : S<sub>1</sub>=46, S<sub>2</sub>=91 and S<sub>3</sub>=137 cm.

(2) 3 seed rates : R<sub>1</sub>=6, R<sub>2</sub>=11 and R<sub>3</sub>=17 Kg/ha.

(3) 3 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=11.2 Kg/ha. of N as A/S+5.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=2M<sub>1</sub>.

## 3. DESIGN :

(i) 3<sup>3</sup> fact. in R.B.D. for 62(51); 3<sup>3</sup> confd. for others. (ii) (a) 27 for 62(51); 9 plots/block and 3 blocks/replication for others. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×8.2 m. (b) 7.6 m.×5.5 m. for 62(51); 7.3 m.×5.5 m. for others. (v) 76 cm.×137 cm. for 62(51); 91 cm.×137 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Normal; Lodging to some extent due to last rains for 61(101). (ii) Attack of long smut for 61(101); Attack of army worm and stem borer for 64(7) for which BHC dust was sprayed; No incidence for others. (iii) Yield of grain. (iv) (a) 1961-1964. (b) No. (c) Results for combined analysis given under 5. (v) (a) N.A. (b) Nil. (vi) Irregular and uneven rainfall affected the crop for 62(51). (vii) Errors are heterogeneous and interaction of treatments in F×S and R×S table with years is present.

## 5. RESULTS :

(i) 518 Kg/ha. (ii) 201.3 Kg/ha. [42 d.f. made up of interaction of F, S, F×S, R, R×F with years]. (iii) Main effects of F and R are highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
R <sub>1</sub>	555	616	614	437	627	721	595
R <sub>2</sub>	492	492	519	395	483	625	501
R <sub>3</sub>	402	491	481	389	444	541	458
Mean	483	533	538	407	518	629	518
M <sub>0</sub>	343	432	446				
M <sub>1</sub>	486	530	538				
M <sub>2</sub>	620	637	630				

C.D. for F or R marginal means=67.7 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 61(199), 62(52), 65(201).**

**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Type :- 'CM'.**

Object :-To study the effect of different cultural practices on the yield of Jowar.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut for 61(199) ; Jowar for 62(52) and 65(201). (c) Nil ; 12.4 C.L./ha. of F.Y.M. for 62(52) and 65(201). (ii) Medium black. (iii) 5.7.61 ; 14.7.62 ; 19.7.65. (iv) (a) As per treatments. (b) Drilling. (c) 11.2 Kg/ha. (d) 46 cm. between rows. (e) —. (v) As per treatments. (vi) Local. (vii) Unirrigated. (viii) 2 interculturings. (ix) 60 cm. ; 53 cm. ; 40 cm. (x) 13.10.61 ; 10.10.62 ; 13.10.65.

2. TREATMENTS :

**Main-plot treatments :**

C<sub>1</sub>=Continuous shallow ploughing in Jan. every year, C<sub>2</sub>=Continuous shallow ploughing in Jan. in alternative years, C<sub>3</sub>=Continuous shallow ploughing in Jan. after every third year, C<sub>4</sub>=Shallow ploughing in Jan. followed by one harrowing in May, C<sub>5</sub>=One harrowing in Jan., C<sub>6</sub>=Two harrowings 1st in Jan., and 2nd in May and C<sub>7</sub>=Three harrowings, 1st in Jan., 2nd in Feb. and third in May.

**Sub-plot treatments :**

12.4 C.L./ha. of F.Y.M. applied as : M<sub>1</sub>=Application in Furrows and M<sub>2</sub>=Broadcast application.

3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14.6 m. × 7.3 m. (b) 12.2 m. × 5.5 m. (v) 122 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961-contd. [experiment failed in 1963 and 1964]. (b) Yes. (c) Nil, (v) N.A. (vi) Nil. (vii) As the Experiment is continued beyond 1965, the individual results are given below.

5. RESULTS :

**61(199)**

(i) 354 Kg/ha. (ii) (a) 136.0 Kg/ha. (b) 95.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub> +C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	333	383	266	318	313	450	349
M <sub>2</sub>	360	405	365	294	330	348	358
Mean	346	394	316	306	322	399	354

62(52)

(i) 478 Kg/ha. (ii) (a) 119.2 Kg/ha. (b) 78.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Man
M <sub>1</sub>	506	518	499	466	501	472	472	491
M <sub>2</sub>	395	536	557	439	476	386	461	464
Mean	451	527	528	453	489	429	467	478

65(201)

(i) 406 Kg/ha. (ii) (a) 143.3 Kg/ha. (b) 66.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	395	329	416	406	355	477	511	413
M <sub>2</sub>	297	364	452	424	395	401	456	399
Mean	346	346	434	415	375	439	484	406

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 63(200), 64(164).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'CM'.**

**Object :-** To find out the optimum spacing, seed rate and fertilizer requirement for Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 3.8.1963 ; 20.7.1964. (iv) (a) 5 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) —. (v) Nil. (vi) C-10-2 (medium) (vii) Un-irrigated. (viii) 4 interculturings for 63(200) ; 2 interculturing + 1 weeding for 64(164). (ix) 56 cm. 47 cm. (x) 31.10.1963 ; 20.10.1964.

**2. TREATMENTS :**

**Main-plot treatments :**

3 row spacings : S<sub>1</sub>=30, S<sub>2</sub>=38 and S<sub>3</sub>=46 cm.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 3 seed rates : R<sub>1</sub>=18, R<sub>2</sub>=27 and R<sub>3</sub>=36 Kg/ha.

(2) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.

N applied by broadcast.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 3 (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 5.5 m. (v) 9.1 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) yield of grain. (iv) (a) 1963-64. (b) No. (c) Result of combined analysis given under 5. (v) N.A. (vi) Sowing for 63(200) was late due to inadequate rains in the beginning. (vii) Main-plot error variances are homogenous and Treatments $\times$ years interaction is absent. Sub-plot error variances are homogenous but Treatments $\times$ years interaction is present.

## 5. RESULTS :

(i) 192.2 Kg/ha. (ii) (a) 49.1 Kg/ha. (10 d.f. made up of pooled error and Treatments $\times$ years interaction). (b) 34.4 Kg/ha. (16 d.f. made up of various components of Treatments $\times$ years interaction). (iii) Main effects of S and R are significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
R <sub>1</sub>	209	216	202	196	214	217	209
R <sub>2</sub>	236	161	179	177	199	200	192
R <sub>3</sub>	179	172	174	182	163	180	175
Mean	208	183	185	185	192	199	192
N <sub>0</sub>	206	177	172				
N <sub>1</sub>	194	197	185				
N <sub>2</sub>	224	175	198				

C.D. for S marginal means=20.9 Kg/ha.

C.D. for R marginal means=24.4 Kg/ha.

**Crop :- Jowar.**

**Site :- MAE Centre, Chathan.**

**Ref :- 63 and 64 (MAE)**

**Type :- 'CM'.**

Object :—Type viii. To study the effect of different levels of N, P and row spacings on the yield of Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sann for green manuring. (c) N.A. (ii) Medium black. (iii) 19.9.63 ; 3, 4.10.64. (iv) (a) 2-3 ploughings and harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) As per treatments. (e) N.A. (v) Sann green manuring before sowing. (vi) BP—53. (vii) Irrigated. (viii) 3 weedings. (ix) 121 cm. ; 193 cm. (x) 21.2.64 ; 18, 19.2.65.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 spacings between rows : S<sub>1</sub>=91, S<sub>2</sub>=61 and S<sub>3</sub>=30 cm.

(2) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(3) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.0 m.  $\times$  4.6 m. (b) 9.1 m.  $\times$  3.1 m. (v) 91 cm.  $\times$  76 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of stem borer (iii) yield of Grain. (iv) (a) 1963—1964. (b) No. (c) Result of combined analysis are presented under 5. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 860 Kg/ha. (ii) 114.6 Kg/ha. (with 44 d.f. made up of pooled error). (iii) Main effects of S and N are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
S <sub>1</sub>	425	798	1112	797	715	824	778
S <sub>2</sub>	548	934	1106	874	864	850	863
S <sub>3</sub>	632	965	1219	872	959	985	939
Mean	535	899	1146	848	846	886	860
P <sub>0</sub>	532	864	1147				
P <sub>1</sub>	520	902	1116				
P <sub>2</sub>	552	932	1175				

C.D. for N or S marginal means = 54.5 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref. :- Gj. 60(M.A.E.).**

**Site :- M.A.E. Centre Umralla.**

**Type :- 'CM'.**

Object :— Type VIII—To study the effect of different levels of N, P and spacings on the yield of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Medium black. (iii) to (x) N.A.

**2. TREATMENTS :**

All combinations of (1) (2) and (3)

(1) 3 spacings between rows : S<sub>1</sub>=15, S<sub>2</sub>=30 and S<sub>3</sub>=46 cm,

(2) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(3) 3 levels of P<sub>0</sub>, P<sub>1</sub>, P<sub>2</sub> = P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

**3. DESIGN :**

(i) 3<sup>rd</sup> Fact. Conf. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) and (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) to (vii) N.A.

**5. RESULTS :**

(i) 173 Kg/ha. (ii) 84.2 Kg/ha. (iii) Main effects of P and interactions S×N, S×N×P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
S <sub>1</sub>	73	249	229	87	184	271	184
S <sub>2</sub>	156	72	257	94	179	213	162
S <sub>3</sub>	256	143	124	121	152	249	174
Mean	162	155	203	101	175	244	173
P <sub>0</sub>	96	80	126				
P <sub>1</sub>	118	184	223				
P <sub>2</sub>	272	201	259				

C.D. of P marginal means = 58.1 Kg/ha.

C.D. of body of S×N table = 100.9 Kg/ha.

**Crop :- Jowar (Rabi).**  
**Site :- Agri. Res. Stn., Tancha.**

**Ref :- Gj. 60(153), 61(55), 62(125).**  
**Type :- 'CMV'.**

Object :—To find out suitable seed rate, spacing and manurial dose for different varieties of Jowar.

1. **BASAL CONDITIONS :**

(i) (a) Nil. (b) *Sann* (G.M.) for 60(153); *Gram* for 61(55); N.A. for 62(125). (c) 44.8 Kg/ha. of Super for 60(153); Nil for 61(55); N.A. for 62(125). (ii) Black soil. (iii) 8.10.1960; 18.10.1961; 2.10.1962. (iv) (a) 1 ploughing+2 to 5 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) —. (v) GM. for 60(153); Nil for others. (vi) As per treatments. (vii) Un-irrigated. (viii) 2 to 3 interculturings. (ix) Nil for 60(153) and 61(55); 52 cm. for the year 1962. (x) 18.3.1961; 7.4.1962; 6.2.1963.

2. **TREATMENTS :**

All combinations of (1), (2), (3) and (4)

- (1) 2 varieties :  $V_1$ =No. 8 and  $V_2$ =C-16.  
 (2) 2 seed rates :  $R_1$ =4.5 and  $R_2$ =6.7 Kg/ha.  
 (3) 2 row spacings :  $S_1$ =46 and  $S_2$ =61 cm.  
 (4) 2 levels of N as A/S :  $N_0$ =0 and  $N_1$ =11.2 Kg/ha.

3. **DESIGN :**

(i)  $2^4$  fact. confd. (VRSN is confd.). (ii) (a) 8 plots/block; 2 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 8.5 m.×4.6 m. for  $S_1$ ; 8.5 m.×4.9 m. for  $S_2$ . (b) 7.3 m.×3.7 m. (v) 61 cm.×46 cm. for  $S_1$ ; 61 cm.×61 cm. for  $S_2$ . (vi) Yes.

4. **GENERAL :**

(i) Un-satisfactory for 60(153); Normal for others. (ii) Severe attack of aphids at milk stage for 61(55); Slight attack of stem borer for others. 5% BHC was dusted for 62(125). (iii) Grain yield. (iv) (a) 1960-1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) The last rain was inadequate so the lack of moisture was observed at the time of emergence of earheads. The high temperature at this stage and rain at the time of maturity affected the crop yield. (vii) The land was newly acquired and fertility was very low. Hence it is also one of the reasons for lower yield. Error variances are heterogeneous and interaction is present.

5. **RESULTS :**

(i) 980 Kg/ha. (ii) 120.7 Kg/ha. (20 d.f. made up of various components of Treatments×years interaction.) (iii) None of the effect is significant. (iv) Mean and differential response in Kg/ha.

Mean response	Differential response							
	V		R		S		N	
	—	+	—	+	—	+	—	+
V — 69	—	—	—79	—59	—79	—59	—86	—52
R 15	5	25	—	—	12	18	35	—5
S — 43	—53	—33	—46	—40	—	—	—16	—70
N 123	106	140	143	103	150	96	—	—

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 62(158), 63(159), 64(91).**

**Site :- Trial-cum-Demons. Farm, Kholwad. Type :- 'I'.**

Object :—To find out the number of irrigations required for Jowar.

i. **BASAL CONDITIONS :**

(i) (a) Nil. (b) Sugarcane for 63(159); Cotton for others. (c) 134.5 Kg/ha. of N+24.7 C.L./ha. of F.Y.M. for 63(159); N.A. for others. (ii) Medium black. (iii) 1.8.1962, 2.9.1963, 31.7.1964. (iv) (a) Nil for 62(158); 3 ploughings for 63(159); 2 ploughings+2 harrowings for 64(91). (b) Drilling for 62(158); Dibbling for others. (c) 11 Kg/ha. (d) 91 cm.×15 cm. for 62(158); 91 cm.×30 cm. for others. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) BP-53. (vii) As per treatments. (viii) 1 to 2 interculturings. (ix) 84 cm., 124 cm., 191 cm. (x) 14.2.1963; 7.2.1964; 10.1.1965.



## 2. TREATMENTS :

4 levels of irrigation :  $I_0=0$  (no irrigation),  $I_1=1$ ,  $I_2=3$  and  $I_3=5$  irrigations.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 8.5 m.  $\times$  4.9 m. for 63(159); 9.1 m.  $\times$  5.5 m. for others. (vi) 122 cm.  $\times$  122 cm. for 63(159); 91 cm.  $\times$  91 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) No incidence for 62(158); slight attack of stem borer for others. (iii) Yield of grain. (iv) (a) 1962-1964. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

## 62(158)

(i) 1137 Kg/ha. (ii) 292.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$	$I_3$
Av. yield	1073	1123	1267	1084

## 63(159)

(i) 1888 Kg/ha. (ii) 579.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$	$I_3$
Av. yield	1841	2087	1708	1916

## 64(91)

(i) 1834 Kg/ha. (ii) 249.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$	$I_3$
Av. yield	1894	1913	1776	1753

**Crop :- Jowar (Kharif).**

**Ref :- GJ. 64(121).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'P'.**

Object :—To find out the optimum number of irrigations for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 33.6 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 8.10.64. (iv) (a) 2 ploughings+2 harrowings. (b) Drilling. (c) 9 Kg/ha. (d) 61 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) BP-53. (vii) As per treatments. (viii) 3 interculturings. (ix) N.A. (x) 3.3.65.

## 2. TREATMENTS :

4 irrigational treatments :  $I_0=0$ ,  $I_1=1$ ,  $I_2=3$  and  $I_3=5$  irrigations.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 9.1 m.  $\times$  5.5 m. (v) 92 cm.  $\times$  92 cm. (vi) Yes.

## 4. GENERAL :

(i) Poor yield. (ii) Nil. Insecticides were applied. (iii) Grain and fodder yield. (iv) (a) 1964. (b) No. (c) Nil. (v) N.A. (vi) Late sowing and early end of monsoon. (vii) Nil.

## 5. RESULTS :

(i) 1635 Kg/ha. (ii) 307.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	1544	1614	1640	1741

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 61(93), 62(1).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Type :- 'P'.**

Object :—To study the optimum number of irrigations required for Jowar.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra* for 61(93); Cotton for 62(1). (c) N.A. for 61(93); 12.4 C.L./ha. of F.Y.M. + 67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(1). (ii) Sandy loam. (iii) 19.8.1961; 24.8.1962. (iv) (a) 7 ploughings for 61(93); 3 ploughings+6 harrowings for 62(1). (b) Drilling. (c) 17 Kg./ha. (d) 46 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Malwan. (vii) As per treatments. (viii) 2 interculturings. (ix) 65 cm.; 61 cm. (x) 22.12.1961; 23.12.1962.

2. TREATMENTS :

3 levels of irrigation : I<sub>1</sub>=1, I<sub>2</sub>=2 and I<sub>3</sub>=3 irrigations.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) 11.9 m.×11.9 m. (b) 10.1 m.×10.1 m. (v) 91 cm.×91 cm. (vi) Yes.

4. GENERAL :

(i) Normal for 61(93); Good for 62(1). (ii) Attack of stem borer and red rot disease for 61(93); Attack of stem borer for 62(1). (iii) Yield of grain. (iv) (a) 1961-1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is absent.

5. RESULTS :

61(93)

(i) 806 Kg/ha. (ii) 58.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	755	773	891

C.D. =101.8 Kg/ha.

62(1)

(i) 1893 Kg/ha. (ii) 218.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	1809	1890	1979

**Crop :- Jowar (Kharif).**

**Ref :- Gj. 63(112), 64(42), 65(127).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'ICM'.**

Object :—To find out the economic spacing, no. of irrigations and requirements of fertilizers for Jowar.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 63(112), 64(42); Cotton-Jowar for 65(127). (b) Sugarcane for 63(112), 64(42); Cotton for 65(127). (c) 134.5 Kg/ha. of N for 63(112); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 64(42); 49.4 Kg/ha. of N+24.7 Kg/ha. of each of  $P_2O_5$  and  $K_2O$  for 65(127). (ii) Clay loam for 63(112), 64(42); Black soil for 65(127). (iii) 21.9.1963; 2.8.1964; 8.8.1965. (iv) (a) 1 harrowing for 63(112); Nil for 65(42); 2 ploughings, harrowings and plankings. (b) Drilling. (c) 15 Kg/ha. for 63(112), 64(42); 49.4 Kg/ha. for 65(127). (d) As per treatments. (e) N.A. (v) 11.2 Kg/ha. of  $P_2O_5$  for 63(112); 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of  $P_2O_5$  for 64(42); 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of  $P_2O_5$  for 65(127). (vi) B.P.-53 late. (vii) Irrigated. (viii) 2 weedings for 63(112); Nil for 64(42); 2 weedings and interculturings for 65(127). (ix) 139 cm.; 224 cm.; 106 cm. (x) 14.4.1964; 3.3.1965; 30.1.1966.

## 2. TREATMENTS :

## Main-plot treatments :

3 no. of irrigations :  $I_0=0$ ,  $I_1=1$  and  $I_2=2$  irrigations.

## Sub-plot treatments :

All combinations of (1) and (2).

(1) 3 levels of N as A/S :  $N_1=11.2$ ,  $N_2=22.4$  and  $N_3=33.6$  Kg/ha.

(2) 2 spacings :  $S_1=61$  cm.  $\times$  15 cm. and  $S_2=61$  cm.  $\times$  30 cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 5.2 m.  $\times$  10.4 m. (b) 4.6 m.  $\times$  9.1 m. (v) 30 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil but Endrex was sprayed for 63(112) only. (iii) Grain and fodder yield. (iv) (a) 1963-65. (b) and (c) No. (v) N.A. (vi) Sowing was late due to heavy and continuous rains in August and September for 63(112). (vii) Results have been presented individually because error variances for sub-plot are heterogeneous.

## 5. RESULTS :

## 63(112)

(i) 677 Kg/ha. (ii) (a) 487.2 Kg/ha. (b) 222.8 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$S_1$	$S_2$	Mean
$I_0$	579	558	736	636	613	624
$I_1$	645	635	731	658	682	670
$I_2$	594	669	950	740	736	738
Mean	606	621	806	678	677	677
$S_1$	638	616	780			
$S_2$	574	626	832			

C.D. for N marginal means = 103.7 Kg/ha.

## 64(42)

(i) 756 Kg/ha. (ii) (a) 179.9 Kg/ha. (b) 234.1 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>0</sub>	888	662	732	673	849	761
I <sub>1</sub>	775	761	730	731	779	755
I <sub>2</sub>	669	728	857	705	797	751
Mean	777	717	773	703	808	756
S <sub>1</sub>	721	702	686			
S <sub>2</sub>	833	731	861			

C.D. for S marginal means = 88.9 Kg/ha.

65(127)

(i) 1664 Kg/ha. (ii) (a) 430.1 Kg/ha. (b) 303.8 Kg/ha. (iii) Interaction I × S alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>0</sub>	1526	1574	1540	1600	1494	1547
I <sub>1</sub>	1734	1686	1720	1686	1740	1713
I <sub>2</sub>	1616	1678	1907	1580	1887	1734
Mean	1625	1646	1722	1622	1706	1664
S <sub>1</sub>	1579	1635	1653			
S <sub>2</sub>	1672	1657	1791			

C.D. for S means at the same level of I = 202.1 Kg/ha.  
C.D. for I means at the same level of S = 258.9 Kg/ha.

**Crop :- Jowar (Kharif).**

**Site :- T. C. D. F., Chanasura.**

**Ref :- GJ. 63(35), 64(3), 65(140).**

**Type :- 'ICM'.**

Object :- To find out the economic spacing, no. of irrigation and fertilizer requirements of Jowar crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (ii) (b) Bajra in *Kharif* and Cumin in *Rabi* for 63 (35); Cotton for 64 (3) and 65 (140). (c) Nil for 63 (35), 64 (3); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(140). (ii) Sandy loam. (iii) 23.8.1963; 26.8.1964; 18.8.1965. (iv) (a) 1 to 3 ploughings and 3 harrowings (b) Dibbling. (c) N. A. (d) As per treatments (e) N.A. for 63 (35), 64 (3); 2 to 3 seedlings/hill for 65 (140). (v) 12.4 C. L./ha. of F.Y.M. (vi) Malvan. (vii) As per treatments. (viii) 1 interculturing for 63 (35), 63 (3); Nil for 65 (140). (ix) 59 cm.; 44 cm.; 35 cm. (x) 18.12.1963; 22.12.1964; 5.12.1965.

**2. TREATMENTS :**

**Main plot treatments**

3 no. of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=1 and I<sub>2</sub>=2 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 spacings : S<sub>1</sub>=30 cm. × 15 cm. and S<sub>2</sub>=30 cm. × 23 cm.

(2) 2 levels of manures : M<sub>1</sub>=22.2 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=44.4 Kg/ha. of N+22.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

## 3. DESIGN :

(i) Split-plot. (ii) 3 Main-plots/replication ; 4 sub-plots/main-plot. (b) N. A. (iii) 4. (iv) 8.5 m. × 6.4 m. (v) 7.3 m. × 5.5 m. (vi) 61 cm. × 46 cm. (vii) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963-65. (b) No. (c) Nil. (v) N. A. (vi) Nil. (vii) Results have been presented individually because error variances for sub-plot are heterogeneous.

## 5. RESULTS :

63(35)

(i) 1232 Kg/ha. (ii) (a) 168.4 Kg/ha. (b) 150.0 Kg/ha. (iii) Main effect of I and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	1182	1160	1454	1215	1316	1266
S <sub>2</sub>	1094	1164	1334	1116	1280	1198
Mean	1138	1162	1394	1166	1298	1232
M <sub>1</sub>	1072	1072	1352			
M <sub>2</sub>	1205	1252	1437			

C. D. for I marginal means = 145.7 Kg/ha.

C. D. for M marginal means = 88.8 Kg/ha.

64(3)

(i) 1430 Kg/ha. (ii) (a) 125.0 Kg/ha. (b) 129.1 Kg/ha. (iii) Main effects of I and M are highly significant and S effect is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1292	1473	1650	1410	1537	1473
S <sub>2</sub>	1213	1460	1490	1331	1445	1388
Mean	1253	1466	1570	1370	1491	1430
M <sub>1</sub>	1216	1431	1459			
M <sub>2</sub>	1290	1502	1682			

C. D. for I marginal means = 108.1 Kg/ha.

C. D. for M marginal means = 76.5 Kg/ha.

C. D. for S marginal means = 76.5 Kg/ha.

65(140)

(i) 2140 Kg/ha. (ii) (a) 31.9 Kg/ha. (b) 276.0 Kg/ha. (iii) Main effects of I and S are significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	2070	2249	2438	2209	2296	2252
S <sub>2</sub>	1833	2001	2249	2060	1996	2028
Mean	1951	2125	2344	2134	2146	2140
M <sub>1</sub>	1878	2065	2461			
M <sub>2</sub>	2024	2185	2227			

C. D. for I marginal means = 278.4 Kg/ha.

C. D. for S marginal means = 316.5 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref :- Gj.63(157), 64(89).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'ICM'.**

**Object :-** To find out the economic spacing, number of irrigations and requirement of fertilizer for Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) N. A. (ii) Medium black. (iii) 5.9.1963 ; 31.7.1964. (iv) (a) 2 to 3 ploughings+3 harrowings. (b) Dibbling. (c) 11 Kg/ha. (d) As per treatments. (e) -. (v) 12.4 C. L./ha. of F. Y. M.+11.2 Kg/ha. of  $P_2O_5$ . (vi) BP-53. (vii) As per treatments. (viii) 2 to 3 interculturings. (ix) 124 cm. ; 191 cm. (x) 6.2.1964 ; 11.1.1965.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigation :  $I_0=0$ ,  $I_1=1$  and  $I_2=2$  irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 spacings :  $S_1=61$  cm.  $\times$  15 cm. and  $S_2=61$  cm.  $\times$  30 cm.

(2) 3 levels of N as A/S :  $N_1=11.2$ ,  $N_2=22.4$  and  $N_3=33.6$  Kg/ha.

**3. DESIGN :**

(i) Spilt-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N. A. (iii) 6. (iv) (a) 10.4 m.  $\times$  5.2 m. (b) 9.1 m.  $\times$  4.6m. (v) 61 cm.  $\times$  30 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (2) Attack of stem borer. (iii) Yield of grain. (iv) (a) 1963-1964. (b) No. (c) Results of combined analysis given under 5. (v) N. A. (vi) Due to heavy rains after sowing, germination was not even and proper for 64 (89). (vii) Sub-plot error variances are heterogeneous and therefore individual years results are presented below.

**5. RESULTS :**

(i) 2186 Kg/ha. (ii) (a) 75.5 Kg/ha. (2 d. f. made up of Treatments  $\times$  years interaction). (b) 171.0 Kg/ha. (11 d. f. made up of various components of Treatments  $\times$  years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

**63(157)**

(i) 2218 Kg/ha. (ii) (a) 337.0 Kg/ha. (b) 268.6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$N_1$	2109	1999	2084	2041	2087	2064
$N_2$	2233	2262	2237	2247	2241	2244
$N_3$	2354	2330	2354	2426	2266	2346
Mean	2232	2197	2225	2238	2198	2218
$S_1$	2206	2285	2223			
$S_2$	2258	2109	2227			

C. D. for N marginal means=125.3 Kg/ha.

**64(89)**

(i) 2153 Kg/ha. (ii) (a) 1102 Kg/ha. (b) 442.9 Kg/ha. (iii) No effect is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
N <sub>1</sub>	2170	2160	2202	2232	2122	2177
N <sub>2</sub>	2236	2112	2186	2235	2121	2178
N <sub>3</sub>	2142	1978	2197	2106	2106	2106
Mean	2182	2083	2195	2191	2116	2153
S <sub>1</sub>	2239	2161	2173			
S <sub>2</sub>	2125	2006	2217			

**Crop :- Jowar (Kharif).**

**Ref :- GJ.65(237).**

**Site :- Tril-cum-Demons. Farm, Kholwad.**

**Type :- 'ICM'.**

**Object :-** To find out the irrigational and manurial requirements and suitable spacing for Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Cotton—Jowar. (b) Cotton. (c) 49.4 Kg/ha. of N+24.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black soil. (iii) 20.8.1965. (iv) (a) 2 ploughings, 2 harrowings. (b) Drilling. (c) 24.7 Kg/ha. (d) As per treatments. (e) One plant/hill. (v) 12.4 C. L. of F.Y.M./ha. (vi) B. P.-53. (vii) As per treatments. (viii) 2 weedings+2 interculturings. (ix) 991.8 cm. (x) 18.1.1966.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 5 levels of irrigation : Irrigations to be given at I<sub>1</sub>=60% available moisture in soil, I<sub>2</sub>=40% available moisture in soil, I<sub>3</sub>=20% available moisture in soil, I<sub>4</sub>=No irrigation and I<sub>5</sub>=Irrigation when the crown leaves drop at noon between 12-00 to 14-00.

(2) 3 levels of Nitrogen as A/S.

N<sub>1</sub>=37.0, N<sub>2</sub>=74.1 and N<sub>3</sub>=111.1 Kg/ha. of N.

**Sub-plot treatments :**

3 spacings : Row to Row C<sub>1</sub>=61.0 cm., C<sub>2</sub>=76.2 cm. and C<sub>3</sub>=91.5 cm.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 15 main-plots/replication; 3 sub-plots/main-plot. (b) N. A. (iii) 2. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91.5 cm. × 61.0 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 3288 Kg/ha. (ii) (a) 2685.4 Kg/ha. (b) 2778.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	Mean
I <sub>1</sub>	3326	3223	3870	3862	3846	2712	3473
I <sub>2</sub>	3011	3451	2919	3837	2998	2546	3127
I <sub>3</sub>	3002	2774	7218	3044	6989	2961	4331
I <sub>4</sub>	2807	2728	2695	2824	3019	2388	2744
I <sub>5</sub>	2355	2645	3293	2799	2824	2670	2764
Mean	2900	2964	3999	3273	3935	2655	3288
C <sub>1</sub>	3207	3217	3396				
C <sub>2</sub>	3112	2890	5803				
C <sub>3</sub>	2382	2786	2798				

**Crop :- Jowar (Kharif).****Ref :- Gj.63(187), 64(122).****Site :- Trial-cum-Demons. Farm, Kim.****Type :- 'ICM'.**

Object :—To see the effect of irrigation cum spacing cum fertilizer on the yield of Jowar.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) 19 to 21.9.63 ; 6.10.1964. (iv) (a) 2 harrowings. (b) Dibbling. (c) 9 Kg/ha. (d) As per treatments. (e) N. A. (v) 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of  $P_2O_5$ . (vi) BP-53. (vii) As per treatments. (viii) 1 to 2 interculturings. (ix) N. A. (x) 20.2.1964 ; 1.3.1965.

**2. TREATMENTS :****Main-plot treatments :**3 irrigations :  $I_0$ =No irrigation,  $I_1$ =1 irrigation and  $I_2$ =2 irrigations.**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 spacings :  $S_1$ =61 cm.  $\times$  15 cm. and  $S_2$ =61 cm.  $\times$  30 cm.(2) 3 levels of N as A/S :  $N_1$ =11.2,  $N_2$ =22.4 and  $N_3$ =33.6 Kg/ha.

N applied by ring method.

**3. DESIGN :**

(i) Split-plot (ii) (a) 3 main-plots/replication. 6 sub-plots/main plot. (b) N. A. (iii) 6. (iv) (a) 10.4 m.  $\times$  5.2 m. (b) 9.1 m.  $\times$  3.7 m. (v) 61 cm.  $\times$  76 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal ; poor yield. (ii) Nil ; heavy attack of Jassids. (iii) Grain and fodder yield. (iv) (a) 1963 and 1964. (b) No. (c) Nil. (v) N. A. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous the results of the individual experiments are given below.

**5. RESULTS :****63(187)**

(i) 1253 Kg/ha. (ii) (a) 629.1 Kg/ha. (b) 345.0 Kg/ha. (iii) Only the main effect of S is highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$N_1$	1210	1150	1526	1404	1186	1295
$N_2$	1278	1267	1210	1452	1051	1252
$N_3$	1223	1174	1242	1411	1015	12.3
Mean	1237	1197	1326	1422	1084	1253
$S_1$	1331	1374	1563			
$S_2$	1143	1020	1090			

C. D. for S marginal means = 133.5 Kg/ha.

**64(122)**

(i) 632 Kg/ha. (ii) (a) 313.6 Kg/ha. (b) 166.2 Kg/ha. (iii) Main effect of S is highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$N_1$	574	603	666	643	585	614
$N_2$	584	598	813	723	607	665
$N_3$	519	622	709	667	566	616
Mean	559	608	729	678	586	632
$S_1$	607	659	767			
$S_2$	510	556	692			

C. D. for S marginal means = 64.3 Kg/ha.



**Crop :- Jowar ( Kharif ).****Ref :- GJ-65 (16).****Site :- Trial-cum-Demons. Farm, Kim.****Type :- 'ICM'.**

Object :—To find out the effects of Irrigation given on moisture regimes basis in combination with spacing and manures on *Jowar*.

**1. BASAL CONDITIONS :**

(i) Nil. (b) Cotton. (c) N.A. (ii) Medium black. (iii) 4.9.65. (iv) (a) 3 harrowings. (b) Drilling. (c) 9.9, 12.4 and 14.8 Kg/ha. (d) As per treatments. (e) —. (v) Sann hamp green manuring+16.8 Kg/ha. of  $P_2O_5$ . (vi) BP-53. (vii) As per treatments. (viii) 1 interculturing+1 weeding. (ix) N.A. (x) 8.2.66.

**2. TREATMENTS :****Main-plot treatments**

All combinations of (1) and (2)

(1) 5 irrigational treatments :  $I_1=3$  irrigations at 60% available moisture,  $I_2=2$  irrigations at 40% available moisture,  $I_3=1$  irrigation at 20% available moisture  $I_4=$ No irrigations and  $I_5=1$  irrigation when dropping of crown leaves at 12 to 13 hours.

(2) 3 levels of N as A/S :  $N_1=37.1$ ,  $N_2=74.2$ , and  $N_3=111.2$  Kg/ha. of N.

**Sub-plot treatments**

3 spacings between rows.  $S_1=61$ ,  $S_2=76.2$  and  $S_3=91.5$  cm.

**3. DESIGN :**

(i) Split plot. (ii) (a) 15 main plots/replication, 3 sub plots/main plot. (b) N.A. (iii) 2. (iv) (a) 9.1m. x 7.3 m. (b) 7.3m. x 5.5 m. (v) 91.5 cm. x 91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1748 Kg/ha. (ii) (a) 777.9 Kg/ha. (b) 366.3 Kg/ha. (iii) Only the main effect of I is highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$S_1$	$S_2$	$S_3$	Mean
$N_1$	2132	1917	1898	984	1698	1673	1753	1751	1726
$N_2$	2165	2319	1520	1024	2230	1819	1862	1873	1851
$N_3$	2355	2066	1831	891	1198	1711	1770	1522	1668
Mean	2217	2101	1749	966	1709	1734	1795	1715	1748
$S_1$	2294	2065	1835	1001	1478				
$S_2$	2296	2085	1968	901	1725				
$S_3$	2061	2153	1445	997	1923				

C.D. for I marginal means = 556.2 Kg/ha.

**Crop :- Jowar (Kharif).****Ref :- GJ, 63 (233), 64 (213), 65(253).****Site :- Trial-cum-Demons. Farm,****Type :- 'ICM'.****Pilwai.**

Object :—To study the effect of irrigations, manuring and spacings on the yield of *Jowar*.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Jowar for 63 (233), 64 (213) ; Nil for 65 (253). (b) Wheat for 63 (233), 64 (213) ; Cumin for 65 (253). (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63 (233), 64 (213) ; 61.7 Kg/ha. of Super+111.2 Kg/ha. of A/S for 65 (253). (ii) Sandy loam. (i) 27.8.1963 ; 26.8.1964 ; 24.8.1965. (iv) (a) 2 ploughings and 2 to 3 harrowings. (b) Drilling. (c) 12 to 25 Kg/ha. (d) As per treatments. (e) N.A. for 63 (233) and 64 (213) ; 1 plant/hill for 65 (253). (v) 12.4 C.L./ha. of F.Y.M. (vi) Malwan. (vii) As per treatments. (viii) 1 to 2 weedings and 1 interculturing. (ix) 90 cm ; 47 cm ; 36 cm. (x) 16.12.1963 ; 6.12.1964 ; 29.11.1965.

## 2. TREATMENTS :

## Main-plot treatments

3 levels of irrigation :  $I_0=0$ ,  $I_1=1$  and  $I_2=2$  irrigations.

## Sub-plot treatments

All combinations of (1) and (2).

(1) 2 levels of fertilizers :  $F_1=22.4$  Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  and  $F_2=2 F_1$ .

(2) 2 spacings :  $S_1=30$  cm  $\times$  15 cm. and  $S_2=30$  cm  $\times$  23 cm. N as A/S and  $P_2O_5$  as Super drilled.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 8.5 m.  $\times$  6.4 m. (b) 7.3 m.  $\times$  5.5 m. (v) 61 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1963-1965. (b) No. (c) Nil. (v) N.A. (vi) Heavy rain at the time of germination for 63 (233) ; Nil for 64 (213) ; No rainfall after August for 65 (253). (vii) Since the error variances for sub-plot treatments are heterogeneous results of individual years are presented below.

## 5. RESULTS :

## 63 (233).

(i) 731 Kg/ha. (ii) (a) 74.8 Kg/ha. (b) 154.0 Kg/ha. (iii) Interaction of  $I \times F$  is highly significant. Interaction  $I \times S$  is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$F_1$	766	779	651	704	760	732
$F_2$	691	685	813	749	710	730
Mean	729	732	732	727	735	731
$S_1$	782	735	663			
$S_2$	676	729	800			

C.D. for two F or S means at the same level of  $I=158.0$  Kg/ha.

C.D. for I means at the same level of F or  $S=128.7$  Kg/ha.

## 64 (213)

(i) 1740 Kg/ha. (ii) (a) 436.0 Kg/ha. (b) 296.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$F_1$	1704	1635	1747	1638	1752	1695
$F_2$	1707	1719	1925	1720	1848	1784
Mean	1706	1677	1836	1679	1800	1740
$S_1$	1732	1545	1760			
$S_2$	1679	1809	1912			

65 (253)

(i) 1150 Kg/ha. (ii) (a) 253.2 Kg/ha. (b) 220.6 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	1046	1224	1252	1177	1171	1174
F <sub>2</sub>	866	1255	1258	1192	1061	1126
Mean	956	1239	1255	1184	1116	1150
S <sub>1</sub>	949	1299	1305			
S <sub>2</sub>	962	1180	1205			

C.D. for I marginal means = 219.1 Kg/ha.

**Crop :- Jowar (Kharif).**

**Ref. :- Gj. 60(53), 61(146), 62(129).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'ICM'.**

**Object :-** To find out the suitable dose of N and irrigation with suitable spacing for Jowar.

#### 1. BASAL CONDITIONS :

(i) (a) Cotton—Jowar. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(146); Nil for others. (ii) Deep black. (iii) 23.8.1960; 21.8.1961; 29.7.1962. (iv) (a) 1 to 2 harrowings. (b) Drilling. (c) 11 Kg/ha. (d) As per treatments. (e) —. (v) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(129); 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for others. (vi) (B.P.—53 (late). (vii) As per treatments. (viii) 3 interculturings+1 thinning for 60(53); 2 interculturings for others. (ix) N.A.; 122 cm; 62 cm. (x) 6.4.1961; 16.3.1962; 12.2.1963.

#### 2. TREATMENTS :

##### Main-plot treatments

All combinations of (1) and (2)

(1) 3 levels of irrigation : I<sub>0</sub>=0, I<sub>1</sub>=1 and I<sub>2</sub>=2 irrigations.

(2) 3 row-spacings : S<sub>1</sub>=46, S<sub>2</sub>=61 and S<sub>3</sub>=91 cm.

##### Sub-plot treatments

3 levels of N as A/S : N<sub>1</sub>=11.2, N<sub>2</sub>=22.4 and N<sub>3</sub>=33.6 Kg/ha.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication : 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 15.2 m. × 5.5 m. (b) 13.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal stunted growth for 61(146). (ii) Attack of top shoot borer at early stages for 61(146); no incidence for others. (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Due to continuous rains the sowing was delayed for 60(53) and 61(146). (vii) Error variances for main and sub-plots are homogeneous and interaction is absent in both.

#### 5. RESULTS :

(i) 1131 Kg/ha. (ii) (a) 179.4 Kg/ha. (40 d.f. made up of various components of Treatments × years interaction and pooled error). (b) 129.8 Kg/ha. (74 d.f. made up of various components of Treatments × years interaction and pooled error). (iii) Main effects of S and N are highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
S <sub>1</sub>	1071	1061	1060	965	1035	1192	1064
S <sub>2</sub>	1097	1156	1182	1023	1150	1262	1145
S <sub>3</sub>	1177	1152	1223	1087	1178	1287	1184
Mean	1115	1123	1155	1025	1121	1247	1131
N <sub>1</sub>	1038	1005	1032				
N <sub>2</sub>	1106	1102	1155				
N <sub>3</sub>	1201	1262	1278				

C.D. for S marginal means=79.6 Kg/ha.  
C.D. for N marginal means=52.5 Kg/ha.

**Crop:- Jowar (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 63(138).**  
**Type :- 'ICM'.**

Object :—To find out the optimum number of irrigations combined with suitable dose of manures and spacing for Jowar.

1. **BASAL CONDITIONS :**

(i) (a) Cotton—*Jowar*. (b) Cotton, (c) N.A. (ii) Deep black soil. (iii) 18.8.63. (iv) (a) 2 harrowings. (b) Drilling. (c) 11 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M.+11 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) BP—53 (late). (vii) As per treatments. (viii) 2 interculturations. (ix) 120 cm. (x) 9.2.64.

2. **TREATMENTS :**

**Main plot-treatments**

3 irrigational treatments : I<sub>0</sub>=0, I<sub>1</sub>=1 and I<sub>2</sub>=2 irrigations.

**Sub plot-treatments**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>1</sub>=11.2, N<sub>2</sub>=22.4 and N<sub>3</sub>=33.6 Kg/ha.

(2) 2 spacings : S<sub>1</sub>=61 cm. × 15 cm. and S<sub>2</sub>=61 cm. × 30 cm.

3. **DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 5.2 m, (b) 9.1 m. × 4.6 m. (v) 61 cm. × 30 cm. (vi) Yes.

4. **GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil.

5. **RESULTS :**

(i) 881 Kg/ha. (ii) (a) 223.5 Kg/ha. (b) 158.6 Kg/ha. (iii) Main effect of N is highly significant and N × I interaction is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
N <sub>1</sub>	827	709	724	763	743	753
N <sub>2</sub>	936	818	1014	930	915	923
N <sub>3</sub>	915	893	1093	997	936	967
Mean	893	807	934	897	865	881
S <sub>1</sub>	872	842	977			
S <sub>2</sub>	913	771	911			

C.D. for N marginal means = 74.6 Kg/ha.  
C.D. for N means at the same level of I = 129.2 Kg/ha.  
C.D. for I means at the same level of N = 157.5 Kg/ha.

**Crop :- Bajra.****Ref :- Gj. 58(133), 59(154), 60(179).****Site :- Agri. College Farm, Anand.****Type :- 'M'.****Object :-**To study the effect of N, P and K on hot weather *Bajra*.**1. BASAL CONDITIONS :**

(i) (a) *Bajra*-Tobacco. (b) Tobacco. (c) N.A. (ii) Sandy loam. (iii) Last week of February. (iv) (a) 1 to 2 ploughings and 1 harrowing. (b) Drilling. (c) 11 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) *Bajra*-207. (vii) Irrigated. (viii) 1 to 2 weedings and 1 interculturing. (ix) Nil. (x) Last week of May.

**2. TREATMENTS :**

10 manurial treatments :  $T_0=0$ ,  $T_1=33.6$  Kg/ha. of N,  $T_2=33.6$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ ,  $T_3=33.6$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ ,  $T_4=44.8$  Kg/ha. of N,  $T_5=44.8$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ ,  $T_6=44.8$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ ,  $T_7=67.2$  Kg/ha. of N,  $T_8=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  and  $T_9=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ .

N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Pot. Sul.**3. DESIGN :**

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3 for 1958 and 60, 4 for 1959. (iv) (a) —. (b) 2.3 m. × 7.3 m. for 1958 1.8 m. × 7.3 m. for 1959 and 60. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1958 (modified in 1961)-1964. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) Nil. (vii) Errors N.A. Treatments × years interaction taken as the error.

**5. RESULTS :**

(i) 2099 Kg/ha. (ii) 260.0 Kg/ha. (for 18 d.f. Treatments × years interaction). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$	$T_9$
Av. yield	1425	1827	2124	2070	2058	2366	2096	2178	2431	2418

C.D. = 446.0 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Gj. 63(262), 64(283), 65(51).****Site :- Agri. College Farm, Anand.****Type :- 'M'.****Object :-**To study the effect of C/N and A/S with and without F.Y.M. on *Bajra*.**1. BASAL CONDITIONS :**

(i) (a) *Bajra*-Tobacco. (b) Tobacco for 64(283), 65(51); *Bajra* for 63(262). (c) Nil for 63(262), 179.3 Kg/ha of N+12.4 C.L./ha. of F.Y.M. for others. (ii) Sandy loam. (iii) 26.2.1963; 27.2.1964; 25.2.1965. (iv) (a) 2 ploughings+one harrowing. (b) Drilling. (c) 11 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) *Bajra*-207. (vii) Irrigated. (viii) 1 to 2 interculturings. (ix) Nil. (x) 10.6.1963; 31.5.1964; 28.5.1965.

**2. TREATMENTS :**

All combinations of (1) and (2).

(1) 2 sources of N at 44.8 Kg/ha. :  $S_1=C/N$  and  $S_2=A/S$ .(2) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=12.35$  C.L./ha.

F.Y.M. applied at sowing. N applied in two doses : half at sowing by broadcast and half one month after sowing by placing in furrows.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 6.4 m. × 11.0 m. (b) 4.6 m. × 9.1 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL:

(i) Good. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-1968. (b) Yes. (c) Nil. (v) (a) N.A. (b) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

63(262)

(i) 2274 Kg/ha. (ii) 283.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	2325	2442	2384
F <sub>1</sub>	2079	2250	2164
Mean	2202	2346	2274

64(283)

(i) 2801 Kg/ha. (ii) 322.9 Kg/ha. (iii) Main effect of S is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	2691	3181	2936
F <sub>1</sub>	2328	3002	2665
Mean	2520	3092	2801

C.D. for S marginal means = 280.9 Kg/ha.

65(51)

(i) 1397 Kg/ha. (ii) 297.3 Kg/ha. (iii) Main effect of S is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	1193	1689	1441
F <sub>1</sub>	1239	1469	1354
Mean	1216	1579	1397

C.D. for S marginal means = 258.7 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(214), 62(236), 63(263), 64(278).**

**Site :- Agri. College Farm, Anand. Type :- 'M'.**

**Object :-** To study the effect of N, P and K on hot weather Bajra.

## 1. BASAL CONDITIONS :

(i) (a) *Bajra*-Tobacco. (b) Tobacco. (c) Nil. (ii) Sandy loam. (iii) Last week of Feb' 61, 21.2.1962, 26.2.1963, 23.2.64. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 11 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) S-207. (vii) Irrigated. (viii) 1 weeding and 1 interculturing. (ix) Nil. (x) 28.5.61, 30.5.62, 10.6.1963, 27.5.1964.

## 2. TREATMENTS :

15 manurial treatments :  $T_0$ =Control,  $T_1$ =33.6 Kg/ha. of N,  $T_2$ = $T_1$ +33.6 Kg/ha. of  $P_2O_5$ ,  $T_3$ = $T_2$ +33.6 Kg/ha. of  $K_2O$ ,  $T_4$ =44.8 Kg/ha. of N,  $T_5$ = $T_4$ +33.6 Kg/ha. of  $P_2O_5$ ,  $T_6$ = $T_5$ +33.6 Kg/ha. of  $K_2O$ ,  $T_7$ =67.2 Kg/ha. of N,  $T_8$ = $T_7$ +33.6 Kg/ha. of  $P_2O_5$ ,  $T_9$ = $T_8$ +33.6 Kg/ha. of  $K_2O$ ,  $T_{10}$ =100.9 Kg/ha. of N,  $T_{11}$ = $T_{10}$ +33.6 Kg/ha. of  $P_2O_5$ ,  $T_{12}$ = $T_{11}$ +33.6 Kg/ha. of  $K_2O$ ,  $T_{13}$ = $T_{10}$ +67.2 Kg/ha. of  $P_2O_5$  and  $T_{14}$ = $T_{13}$ +67.2 Kg/ha. of  $K_2O$ .

N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Pot. Sul. in two equal doses. 1st dose before sowing in furrows and 2nd one month after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) Nil. (iii) 6. (iv) (a) 4.6 m. × 7.3 m. (b) 2.8 m. × 4.9 m. (v) 91 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1958-(modified in 1961)-1964. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) Nil. (vii) Errors are homogeneous. Treatments × years Interaction present.

## 5. RESULTS :

(i) 2257 Kg/ha. (ii) 199.6 Kg/ha. (42 d.f. made up of Treatments × years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$
Av. yield	1786	2212	2102	1930	2214	2190	2145	2274
Treatment	$T_8$	$T_9$	$T_{10}$	$T_{11}$	$T_{12}$	$T_{13}$	$T_{14}$	
Av. yield	2180	2364	2518	2469	2467	2377	2628	

C.D. = 285.0 Kg/ha.

**Crop :- Bajra (Kharif).**

**Site :- Agri. Res. Stn., Bhachau.**

**Ref :- Gj. 60(170).**

**Type :- 'M'.**

Object ;—To study the effect of micronutrients on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sann and wheat. (c) Nil. (ii) Sandy soil. (iii) 7.7.60. (iv) (a) 2 ploughing and 2 harrowings. (b) Drilling. (c) N.A. (d) 46 cm. × 15 cm. (e) N.A. (v) 22.4 Kg/ha. of N as A/S. (vi) Local. (vii) Irrigated. (viii) 2 interculturings. (ix) 12 cm. (x) 13.10.1960.

## 2. TREATMENTS :

All combinations of (1), (2), (3), (4) and (5).

(1) 2 levels of Zn :  $A_0=0$  and  $A_1=Zn$ .

(2) 2 levels of Copper :  $B_0=0$  and  $B_1=Cu$ .

(3) 2 levels of Manganese :  $C_0=0$  and  $C_1=Mn$ .

(4) 2 levels of Boron :  $D_0=0$  and  $D_1=B$

(5) 2 levels of Molybdenium :  $E_0=0$  and  $E_1=Mo$

Details of doses of micronutrients and times of application are N.A.

## 3. DESIGN :

(i) 2<sup>5</sup> fact. (ii) (a) 32. (b) N.A. (iii) 3. (iv) (a) 9.1 cm. × 5.5 cm. (b) 7.3 cm. × 3.7 cm. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1960-61. (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains. (vii) Nil.

## 5. RESULTS :

(i) 1582 Kg/ha. (ii) 343.3 Kg/ha. (iii) Main effects of  $M_0$  is significant and interaction  $Mn \times B \times Mo$  is highly significant. (iv) Table of mean and differential response in Kg/ha.

Mean response		Zn		Mn		B		Cu		$M_0$	
		-	+	-	+	-	+	-	+	-	+
M	Zn-62	—	—	-103	-21	-95	-29	-145	21	-123	-1
Mn	Mn 67	26	108	—	—	-66	200	-25	159	-20	154
B	B 24	-9	57	-109	157	—	—	141	-93	-30	78
Cu	Cu 72	-11	155	-20	164	189	-45	—	—	37	107
$M_0$	$M_0$ -150	-211	-89	-237	-63	-204	-96	-185	-115	—	—
S.E.	70.084										

C.D. for  $M_0$  marginal means = 140.1 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref:- Gj. 64(180), 65(84).**

**Site :- Agri. Res. Stn., Jamnagar.**

**Type :- 'M'.**

Object :- To study the cumulative effect of different fertilizers and manures on Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Bajra-Groundnut. (b) Jowar; Groundnut. (c) Nil. (ii) Medium black. (iii) 11.7.64; 26.7.65. (iv) (a) 2 ploughings, 1-2 harrowings. (b) Drilling. (c) 7 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) Local-11. (vii) Un-irrigated. (viii) 2 interculturings, 1-2 weedings. (ix) 57 cm.; 34 cm. (x) 13.9.64; 12.10.65.

## 2. TREATMENTS :

7 manurial treatments :  $T_0$ =Control,  $T_1$ =12.4 C.L./ha. of F.Y.M.,  $T_2$ =6.2 C.L./ha. of F.Y.M.+N.P.K equivalent of 6.2 C.L./ha. of F.Y.M.,  $T_3$ =N, P and K equivalent of 12.4 C.L./ha. of F.Y.M.,  $T_4$ =12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N,  $T_5$ =N.P.K equivalent of 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N and  $T_6$ =22.4 Kg/ha. of N.

In N.P.K equivalents, N as A/S broadcasted,  $P_2O_5$  as Super and  $K_2O$  as Pot. Sol. drilled at sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 12.2 m.  $\times$  4.2 m. (b) 11.3 m.  $\times$  3.2 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1964-65. (b) Yes. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous. Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 928 Kg/ha. (ii) 353.8 Kg/ha. [based on 6 d.f. made up of Treatments  $\times$  years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	631	738	970	1202	839	1301	815



**Crop :- Bajra (Kharif).**  
**Site :- Agri. Res. Stn., Jamnagar.**

**Ref :- Gj. 60(135).**  
**Type :- 'M'.**

Object :—To find out the effect of N, P and K without F.Y.M. on the yield of Bajra.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 1.7.60. (iv) (a) 1 ploughing and 1 harrowing. (b) Hand sowing. (c) N.A. (d) 45.7 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Un-irrigated. (viii) 1 weeding and 2 interculturings. (ix) 31 cm. (x) 5.10.60.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=11.2$  and  $P_2=22.4$  Kg/ha.

(3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=22.4$  and  $K_2=44.8$  Kg/ha.

Fertilizers applied on 30th June, 1960.

3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication (b) N.A. (iii) 2. (iv) (a) 11.0 m. × 5.5 m. (b) 9.1 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Slight attack of blister beetle. (iii) Grain yield. (iv) (a) 1960-contd. (b) No. (c) Nil. (v) to (vii) N.A.

5. RESULTS :

(i) 221 Kg/ha. (ii) 38.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$K_0$	$K_1$	$K_2$	Mean
$P_0$	220	211	223	185	206	263	218
$P_1$	179	196	255	217	211	203	210
$P_2$	239	211	258	224	268	215	236
Mean	212	206	245	209	228	227	221
$K_0$	176	205	244				
$K_1$	235	186	264				
$K_2$	225	229	227				

**Crop :- Bajra (Kharif).**  
**Site :- Agri. Res. Stn., Jamnagar.**

**Ref :- Gj. 60(134).**  
**Type :- 'M'.**

Object :—To find out the effect of N, P and K with F.Y.M. on the yield of Bajra.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Medium Black. (iii) 1.7.60. (iv) (a) 1 ploughing and 1 harrowing. (b) Hand sowing. (c) N.A. (d) 46 cm. between rows. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) Local. (vii) Un-irrigated. (viii) 1 weeding and 2 interculturings. (ix) 31 cm. (x) 4.10.60.

2. TREATMENTS to 4. GENERAL :

Same as Expt. No. 60(135) above on page

5. RESULTS :

(i) 360 Kg/ha. (ii) 91.8 Kg/ha. (iii) Main effect of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	248	362	411	347	327	346	340
P <sub>1</sub>	238	313	370	324	301	296	307
P <sub>2</sub>	270	437	567	418	403	474	432
Mean	259	371	449	363	344	372	360
K <sub>0</sub>	256	356	477				
K <sub>1</sub>	245	368	418				
K <sub>2</sub>	276	388	453				

C.D. for N or P marginal means=44.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(65), 62(205).**

**Site :- Agri. Res. Stn., Jamnagar.**

**Type :- 'M'.**

Object :- To find out the effect of N, P and K with and without F.Y.M. on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar* for 61(65); *Cotton* for 62(205). (c) Nil for 61(65); 22.4 Kg/ha. of N for 62(205)  
(ii) Medium black. (iii) 26.6.1961; 12.7.1962. (iv) (a) 1 ploughing+2-3 harrowings. (b) Drilling.  
(c) 7 Kg/ha. (d) 91 cm. between rows. (e) —. (v) Nil. (vi) L-11. (vii) Un-irrigated. (viii) 2  
weedings+2 interculturings for 61(65); 3 interculturings for 62(205). (ix) 93 cm.; 28 cm. (x) 21.10.1961  
22.10.1962.

**2. TREATMENTS :**

**Main-plot treatments**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S; N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super; P<sub>0</sub>=0, P<sub>1</sub>=11.2 and P<sub>2</sub>=22.4 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Pot. Sul.; K<sub>0</sub>=0, K<sub>1</sub>=22.4 and K<sub>2</sub>=44.8 Kg/ha.

**Sub-plot treatments**

2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

**3. DESIGN :**

(i) Split-plot confd. (ii) 9 main-plots/block; 3 blocks/replication; 2 sub-plots/main-plot. (b) N.A.  
(iii) 1. (iv) (a) 9.1 m. × 5.5 m. (b) 8.0 m. × 2.8 m. (v) 61 cm. × 137 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of blister beetles. (iii) Yield of grain. (iv) (a) 1960-1962 (modified in 1961).  
(b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the error variances for sub-plot Treatments are hetero-  
geneous, therefore individual years results are presented below.

**5. RESULTS :**

**61(65)**

(i) 206 Kg/ha. (ii) (a) 92.7 Kg/ha. (b) 77.5 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av.  
yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	146	183	297	256	175	195	198	224	204	209
F <sub>1</sub>	154	202	257	225	233	155	189	215	209	204
Mean	150	192	277	241	204	175	194	220	206	206
K <sub>0</sub>	110	188	282	184	166	230				
K <sub>1</sub>	140	248	271	300	216	143				
K <sub>2</sub>	201	141	277	238	230	151				
P <sub>0</sub>	143	255	324							
P <sub>1</sub>	195	182	235							
P <sub>2</sub>	113	140	271							

C.D. for N marginal means = 75.6 Kg/ha.

62(205)

(i) 556 Kg/ha. (ii) (a) 62.1 Kg/ha. (b) 147.2 Kg/ha. (iii) Main effects of N, P and F are highly significant, K effect and interaction N×P are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	424	574	447	389	553	503	513	492	440	482
F <sub>1</sub>	497	673	720	602	648	640	623	680	587	630
Mean	460	623	583	495	600	572	568	586	513	556
K <sub>0</sub>	469	626	610	482	663	560				
K <sub>1</sub>	470	678	609	533	598	626				
K <sub>2</sub>	442	566	531	471	539	529				
P <sub>0</sub>	461	599	426							
P <sub>1</sub>	470	635	695							
P <sub>2</sub>	450	636	629							

C.D. for N, P or K marginal means = 50.7 Kg/ha.

C.D. for F marginal means = 92.5 Kg/ha.

C.D. for body of N×P table = 87.7 Kg/ha.

**Crop :- Bajri.**

**Site :- I.D.F. Jamnagar.**

**Ref :- Gj. 65(86).**

**Type :- 'M'.**

**Object :-**To find out the effect of different fertilizers on Bajra (Hybrid).

**1. BASAL CONDITIONS :**

(i) (a) to (c) Nil. (ii) Medium black. (iii) 24.7.65. (iv) (a) 2 ploughings and 2 harrowings. (b) Dibbling. (c) 5 Kg/ha. (d) 91 cm.×30 cm. (e) —. (v) Nil. (vi) Hybrid Bajra. (vii) Un-irrigated. (viii) 3 weedings. (ix) 34 cm. (x) 11.10.65.

## 2. TREATMENTS :

4 sources of fertilizers :  $S_0$ =Control,  $S_1$ =Diammonium Phos.,  $S_2$ =A/S/P and  $S_3$ =A/S+Super.  
Super drilled on 21.7.65. Diammonium Phos. broadcasted on 24.7.65. A/S/P and A/S broadcasted on 26.8.65. Fertilizers applied at 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ .

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 13.7 m.×11.0 m. (b) 12.2 m.×9.1 m. (v) 76 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 687 Kg/ha. (ii) 177.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$S_0$	$S_1$	$S_2$	$S_3$
Av. yield	393	763	823	771

C.D.=218.5 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 63(67), 64(249).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

**Object :** To study the effect of organic and inorganic manures on Bajra and its after effect on Groundnut crop in rotation.

## 1. BASAL CONDITIONS :

(i) (a) Bajra-Groundnut. (b) Jowar and Bajra for 63 (67), Groundnut for 64 (249). (c) Nil. (ii) Medium black. (iii) 30.6.63; 20.7.64. (iv) (a) 2 harrowings. (b) Hand sowing. (c) 11 Kg/ha. (d) 91 cm. between rows. (e) N. A. (v) Nil. (vi) N-28-15-2. (vii) Unirrigated. (viii) 2 interculturings. (ix) 57 cm.; 137 cm. (x) 23.10.63; 25.11.64.

## 2. TREATMENTS :

7 manurial treatments :  $T_0$ =Control,  $T_1$ =12.4 C.L./ha. of F.Y.M.,  $T_2$ =6.2 C.L./ha. of F.Y.M.+N, P and K equivalent to 6.2 C.L./ha. of F.Y.M.,  $T_3$ =N, P and K equivalent to 12.4 C.L./ha. of F.Y.M.,  $T_4$ =12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N,  $T_5$ =N, P and K equivalent to 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N and  $T_6$ =22.4 Kg/ha. of N.

N applied as A/s.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N. A. (iii) 4. (iv) (a) and (b) 9.2 m.×5.5 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Lodging occurred in 63 (67). Unsatisfactory in 64 (249). (ii) Ergot was observed to the extent of 40% in 64 (249). (iii) Yield of grain. (iv) (a) 1963-1964. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N. A. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is present.

## 5. RESULTS :

(i) 718 Kg/ha. (ii) 280.8 Kg/ha. (c) with 6 d.f. made up of interaction of Treatments with years. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	596	610	784	714	703	936	683

**Crop :- Bajra (Kharif).****Ref :- Gj. 61(177), 62(64).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'M'.**

Object :- To assess the effect of N, P, K and F.Y.M. on the yield of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 56.0 Kg/ha. of A/S/N for 61 (177) ; 12.4 C.L./ha. of F.Y.M. + 16.8 Kg/ha. of N + 20.2 Kg/ha. of  $P_2O_5$  for 62 (64). (ii) Medium black. (iii) 25.6.1961 ; 8.7.1962. (iv) (a) Nil. (b) Hand sowing. (c) 6 Kg/ha. (d) 91 cm.  $\times$  15 cm. (e) —. (v) Nil. (vi) Babapuri (late). (vii) Un-irrigated. (viii) 3 intercroppings. (ix) 59 cm. ; 60 cm. (x) 27.10.1961 ; 17.10.1962.

**2. TREATMENTS :****Main-plot treatments :**

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=11.2$  and  $P_2=22.4$  Kg/ha.  
 (3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=22.4$  and  $K_2=44.8$  Kg/ha.

**Sub-plot treatments**2 levels of F.Y.M. :  $F_0=0$  and  $F_1=12.4$  C.L./ha.**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 9 main-plots/black ; 3 blocks/replication and 2 sub-plots/main-plot. (b) N.A.  
 (iii) 1. (iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of blister beetle of Ergot. (iii) Yield of grain. (iv) (a) 1960-1962 (modified in 1961). (b) No. (c) Nil. (v) Umrala. (vi) Heavy rains affected the crop for 61 (177). (vii) Error variances for sub-plot treatments are heterogeneous, therefore individual years results are presented below.

**5. RESULTS :****61(177)**

(i) 399 Kg/ha. (ii) (a) 50.7 Kg/ha. (b) 58.1 Kg/ha. (iii) Main effect of N and F are highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$F_0$	313	359	401	355	365	353	382	353	337	358
$F_1$	394	449	476	448	456	415	471	444	404	440
Mean	354	404	438	401	411	384	427	399	371	390
$K_0$	367	420	493	421	426	433				
$K_1$	344	419	433	409	411	376				
$K_2$	350	375	388	374	395	343				
$P_0$	336	396	472							
$P_1$	378	430	425							
$P_2$	347	387	417							

C. D. for N marginal means = 41.4 Kg/ha.

C. D. for F marginal means = 36.4 Kg/ha.

**62(64)**

(i) 1267 Kg/ha. (ii) (a) 158.4 Kg/ha. (b) 120.0 Kg/ha. (iii) Main effect of F is highly significant and main effect of N is significant (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1078	1251	1206	1050	1224	1260	1189	1131	1214	1178
F <sub>1</sub>	1192	1396	1479	1332	1328	1407	1394	1305	1368	1356
Mean	1135	1324	1343	1191	1276	1333	1292	1218	1291	1267
K <sub>0</sub>	1140	1327	1406	1174	1378	1323				
K <sub>1</sub>	1117	1298	1240	1155	1199	1300				
K <sub>2</sub>	1147	1345	1382	1245	1251	1377				
P <sub>0</sub>	1086	1270	1218							
P <sub>1</sub>	1132	1327	1370							
P <sub>2</sub>	1186	1374	1440							

C. D. for N marginal means = 129.0 Kg/ha.

C. D. for F marginal means = 75.4 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60(119).**

**Site :- Reg. Sugarcane Res. Sub. Stn., Kodinar.**

**Type :- 'M'.**

Object :- To find out the optimum dose of N, P and K for *Bajra*, with and without F.Y.M.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N. A. (ii) Medium black. (iii) 2.8.1960. (iv) (a) One ploughing and 3 harrowings (b) to (e) N. A. (v) Nil. (vi) Eabapuri (late). (vii) Irrigated. (viii) 3 interculturings. (ix) 71 cm. (x) 2.11.1960.

**2. TREATMENTS :**

All combinations of (1), (2), (3) and (4).

(1) 3 levels of N : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of P<sub>2</sub> O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=11.2 and P<sub>2</sub>=22.4 Kg/ha.

(3) 3 levels of K<sub>2</sub> O : K<sub>0</sub>=0, K<sub>1</sub>=22.4 and K<sub>2</sub>=44.8 Kg/ha.

(4) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

Sources, time of applications of fertilizers are N. A.

**3. DESIGN :**

(i) 3<sup>3</sup> × 2 confd. (ii) (a) 9 plots/block ; 6 blocks/replication. (b) 67.7 m. × 41.1 m (iii) 2. (iv) (a) 11.3 m. × 4.6 m. (b) 9.4 m. × 2.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Due to scanty rains, the growth of crop was affected which resulted in low yields. (ii) Nil. (iii) B.H.C. (10%) was dusted on grains. (iv) (a) 1960-1961. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 288 Kg/ha. (ii) 88.6 Kg/ha. (iii) Main effects of F and P are highly significant and main effect of N and interactions N × P and P × K are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	198	296	243	208	282	253	261	223	246
P <sub>1</sub>	287	315	236	267	292	311	288	239	279
P <sub>2</sub>	290	328	401	287	393	315	298	406	340
Mean	258	313	294	254	322	293	282	289	288
K <sub>0</sub>	266	328	286	236	350				
K <sub>1</sub>	231	326	289	268	297				
K <sub>2</sub>	278	284	306	258	320				
F <sub>0</sub>	234	264	263						
F <sub>1</sub>	282	361	325						

C. D. for N, or P marginal means =41.8 Kg/ha.  
 C. D. for F marginal means =36.4 Kg/ha.  
 C. D. for the body of N×P and P×K table =72.3 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61 (154).**

**Site :- Reg. Sugarcane Res. Stn., Kodinar.**

**Type :- 'M'.**

**Object :-** To find out the optimum dose of N, P and K in combination with F.Y.M. for *Bajra*.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut and *Jowar*. (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for Groundnut and 22.4 Kg/ha. of N. (ii) Medium black. (iii) 14.7.61. (iv) (a) One ploughing and 1 harrowing. (b) Drilling. (c) 7 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) Nil. (vi) Babapuri (late). (vii) Unirrigated. (viii) 3 interculturings. (ix) 126 cm. (x) 18.11.61.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3).

- (1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=11.2 and P<sub>2</sub>=22.4 Kg/ha.
- (3) 3 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0, K<sub>1</sub>=22.4 and K<sub>2</sub>=44.8 Kg/ha.

**Sub-plot treatments :**

2 levels of F.Y.M. : F<sub>0</sub>=0, and F<sub>1</sub>=12.4 C.L./ha. of N, P and K were drilled at sowing.

**3. DESIGN :**

(i) Split plot-confd. (ii) (a) 9 main-plots/block ; 3 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) One. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1960-1961. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Design modified in 1961.

**5. RESULTS :**

(i) 289 Kg/ha. (ii) (a) 99.0 Kg/ha. (b) 59.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	244	280	346	303	323	243	295	293	282	290
F <sub>1</sub>	240	325	296	300	293	268	311	271	279	287
Mean	242	303	321	302	308	256	303	282	281	289
K <sub>0</sub>	211	317	381	302	283	324				
K <sub>1</sub>	253	289	304	356	300	190				
K <sub>2</sub>	262	302	278	248	341	253				
P <sub>0</sub>	228	314	363							
P <sub>1</sub>	280	323	321							
P <sub>2</sub>	218	271	278							

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61 (27), 62 (83), 64 (202), 65 (147).**

**Site :- Agri. Res. Stn., Kothara. Type :- 'M'.**

**Object :-** To find out the optimum dose of N, P, K and F.Y.M. in Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 61 (27); Groundnut-Cotton-Bajra for 62 (83); Cotton-Groundnut-Jowar-Bajra for 64 (202) and 65 (147). (b) Bajra for 61 (27); Cotton for 62 (83); Jowar for 64 (202); Groundnut for 65 (147). (c) Nil for 61 (27), 64 (202); 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64 (202); 12.4 Kg/ha. of N+24.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. for 65(147). (ii) Medium black to sandy. (iii) 28.6.1961; 27.7.1962; 3.7.1964; 20.7.65. (iv) (a) 1 to 2 ploughings and 1 to 2 harrowings (b) Drilling for 61 (27), 62 (83); Dibbling for 64 (202). N.A. for 65 (147) (c) 5 to 6 Kg/ha. (d) 46 cm. × 15 cm. for 61 (27), 62 (83); 46 cm. × 23 cm. for cm. others. (e) 1. (v) Nil. (vi) N-28-15-2 early for 65., N-28-15-2 (medium) for others. (vii) Unirrigated. (viii) One interculturing for 61 (27); 2 weedings and 3 interculturings for others. (ix) 87 cm.; 28 cm.; 37 cm.; 33 cm. (x) 17.12.1961; 11.11.1962; 3.10.1964; 14.10.65.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S: N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super: P<sub>0</sub>=0, P<sub>1</sub>=11.2 and P<sub>2</sub>=22.4 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Pot. Sul.: K<sub>0</sub>=0, K<sub>1</sub>=22.4 and K<sub>2</sub>=44.8 Kg/ha.

**Sub-plot treatments :**

2 levels of F.Y.M.: F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

**3. DESIGN :**

(i) Split-plot confd. for 61, 62, 64; Fact. in R.B.D. for 65. (ii) (a) 9 main-plots/block; 3 blocks/replication. and 2 sub-plots/main-plot; 54 for 65. (b) N.A. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (v) (b) 9.1 m. × 4.6 m. 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Unsatisfactory for 61 (27); Normal for others. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1961-1965 (not conducted in 63). (b) No. (c) Nil. (v) N.A. (vi) Due to continuous rains in July and August the crop suffered for 61 (27); the crop affected due to less rain and drought condition for 62 (83). (vii) Since sub-plot-error variances are heterogeneous, the results of individual years are presented below. Expt. 65 (147) has been analysed as Fact. in R.B.D. as the treatments are not allotted properly to blocks.



## 5. RESULTS :

61 (27)

(i) 214 Kg/ha. (ii) (a) 58.5 Kg/ha. (b) 32.5 Kg/ha. (iii) Main effects of N, F and interaction  $F \times N$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	86	212	307	167	237	211	181	213	202
P <sub>1</sub>	97	190	308	178	220	189	158	248	199
P <sub>2</sub>	120	240	365	220	262	234	222	269	242
Mean	101	214	326	188	240	212	187	244	214
K <sub>0</sub>	97	204	333	172	252				
K <sub>1</sub>	106	168	287	167	207				
K <sub>2</sub>	100	270	360	226	260				
F <sub>0</sub>	92	193	280						
F <sub>1</sub>	111	236	372						

C.D. for N marginal means = 47.7 Kg/ha.

C.D. for F marginal means = 20.4 Kg/ha.

C.D. for F means at the same level of N = 35.3 Kg/ha.

C.D. for N means at the same level of F = 53.0 Kg/ha.

62 (83)

(i) 598 Kg/ha. (ii) (a) 145.2 Kg/ha. (b) 59.8 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	472	450	726	523	576	616	567	465	549
P <sub>1</sub>	422	625	858	623	647	700	605	600	635
P <sub>2</sub>	474	615	738	625	593	675	489	663	609
Mean	456	563	774	590	605	663	554	576	598
K <sub>0</sub>	414	610	967	648	679				
K <sub>1</sub>	476	505	680	534	573				
K <sub>2</sub>	478	575	675	589	564				
F <sub>0</sub>	453	568	750						
F <sub>1</sub>	459	558	798						

C.D. for N marginal means = 118.4 Kg/ha.

64 (202) :

(i) 1165 Kg/ha. (ii) (a) 189.9 Kg/ha. (b) 196.4 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	927	1021	1324	1060	1121	1109	1059	1105	1091
P <sub>1</sub>	1077	1042	1452	1205	1176	1167	1189	1213	1190
P <sub>2</sub>	1118	1094	1425	1172	1253	1154	1309	1174	1212
Mean	1041	1052	1400	1146	1183	1144	1186	1164	1165
K <sub>0</sub>	945	1031	1435	1110	1177				
K <sub>1</sub>	1137	1044	1376	1187	1184				
K <sub>2</sub>	1040	1062	1390	1140	1189				
F <sub>0</sub>	988	1024	1425						
F <sub>1</sub>	1094	1080	1376						

C.D. for N marginal means=154.9 Kg/ha.

65 (147)

(i) 793 Kg/ha. (ii) 208.3 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	589	879	920	824	769	748	769	873	796
P <sub>1</sub>	485	776	995	736	768	752	783	721	752
P <sub>2</sub>	695	807	991	748	915	780	944	770	831
Mean	590	821	969	769	817	760	832	788	793
K <sub>0</sub>	518	856	906	746	774				
K <sub>1</sub>	642	862	992	743	921				
K <sub>2</sub>	611	744	1009	820	757				
F <sub>0</sub>	599	856	853						
F <sub>1</sub>	581	785	1085						

C.D. for N marginal means=142.1 Kg/ha.

Crop :- Bajra (*Kharif*).

Ref :- Gj. 65 (149)

Site :- Agri. Res. Stn., Kothara.

Type :- 'M'.

Object :—To study the rate of decomposition of organic matter and its build up in soil for Bajra.

#### 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar-Groundnut-Bajra. (b) Groundnut. (c) 12.4 Kg/ha. of N+24.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. (li) Sandy loam (iii) 7.7.65. (iv) (a) 2 ploughings 2 harrowings. (b) Drilling. (c) 4.9 Kg/ha. (d) 46 cm.×23 cm. (e) Nil. (v) 49.4 Kg/ha. of N+24.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub> (vi) N—207 early. (vii) Un-irrigated. (viii) 1 weeding, 2 interculturings. (ix) 32.7 cm. (x) 5.10.65.

## 2. TREATMENTS :

6 manurial treatments

$$T_0=0, T_1=12.4; T_2=24.7$$

$$T_3=61.8; T_4=123.5 \text{ and } T_5=247.0 \text{ C.L./ha. of F.Y.M.}$$

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N. A. (iii) 4. (iv) (a) 18.3 m.  $\times$  5.5 m. (b) 16.4 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of *Bajra* (iv) (a) 1965. (b) Yes. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 663 Kg/ha. (ii) 223.1 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Bajra* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	430	518	487	689	835	1018

$$\text{C.D.} = 336.2 \text{ Kg/ha.}$$

**Crop :- Bajra (*Kharif*).**

**Site :- Agri. Res. Stn., Talod.**

**Ref :- Gj. 65(45).**

**Type :- 'M'.**

Object :- To find out the requirements of N and P for Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Tur. (c) Nil. (ii) Sandy. (iii) 5.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 4.9 Kg/ha. (d) 61 cm.  $\times$  15 cm. (e) 1-2 plants/hill. (v) Nil. (vi) N-207. (vii) Un-irrigated. (viii) 3 weedings and 3 interculturings. (ix) 37.9 cm. (x) 5.10.65.

## 2. TREATMENTS :

All combinations of (1) and (2).

(1) 3 levels of N as A/S broadcasted after sowing :  $N_1=22.4$ ,  $N_2=44.8$  and  $N_3=67.3$  Kg/ha. of N.

(2) 2 levels of  $P_2O_5$  as Super broadcasted before :  $P_0=0$ ,  $P_1=22.4$  Kg/ha. of  $P_2O_5$ .

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 9.1 m.  $\times$  5.5 m. (b) 7.3 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1965. (b) No. (c) Nil. (v) N.A. (vi) For want of rains at germination and flowering, the crop was affected. (vii) Nil.

## 5. RESULTS :

(i) 820 Kg/ha. (ii) 202.9 Kg/ha. (iii) Only main effect of N is highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
P <sub>0</sub>	596	691	935	741
P <sub>1</sub>	672	836	1189	899
Mean	634	764	1062	820

$$\text{C.D. for N marginal means} = 216.2 \text{ Kg/ha.}$$

**Crop :- Bajra (Kharif).**  
**Site :- Agri. Res. Stn., Umrals.**

**Ref :- Gj. 64(20), 65(172).**  
**Type :- 'M'.**

**Object :-** To study the effect of N on the yield of Bajra.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Jowar for 64, Wheat for 65. (c) Nil for 64; 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ .  
(ii) Medium black soil. (iii) 10.7.64; 18.7.65. (iv) (a) 1 ploughing, 1 to 2 harrowings. (b) Drilling.  
(c) 7 Kg/ha. (d) 91 cm. between rows. (e) 1. (v) Nil. (vi) N 28-15-2 (medium). (vii) Unirrigated.  
(viii) 1 to 2 interculturings and 1 weeding. (ix) 95 cm. for 64 and 32 cm. for 65. (x) 20.10.64; 14.10.65.

**2. TREATMENTS :**

3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.  
N applied in two doses, 1st at sowing and 2nd one month after sowing.

**3. DESIGN :**

- (i) R.B.D. (ii) 3. (b) N.A. (iii) 6. (iv) (a) 8.5 m. × 6.4 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 46 cm.  
(vi) Yes.

**4. GENERAL :**

- (i) Below normal, crop lodged in 64; Normal, slight lodging on 22.9.65 due to stormy rains. (ii) Nil.  
(iii) Kapas and fodder yield (iv) (a) 1964-contd. (b) No. (c) Nil. (v) N.A. (vi) Heavy rains  
accompanied by storm from 15th to 18th Sept. 1964. (vii) Nil.

**5. RESULTS :**

**64 (20)**

- (i) 388 Kg/ha. (ii) 78.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain  
in Kg/ha.

Treatment	$N_0$	$N_1$	$N_2$
Av. yield	289	432	442
	C.D.	=101.4 Kg/ha.	

**65 (172)**

- (i) 732 Kg/ha. (ii) 106.0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain  
in Kg/ha.

Treatment	$N_0$	$N_1$	$N_2$
Av. yield	606	762	829
	C.D.	=136.1 Kg/ha.	

**Crop :- Bajra (Kharif).**  
**Site :- Agri. Res. Stn., Umrals.**

**Ref :- Gj. 64(85), 64(21), 65(171).**  
**Type :- 'M'.**

**Object :-** To find out the optimum dose of N for Bajra.

**1. BASAL CONDITIONS :**

- (i) (a) Bajra-Wheat-Cotton for 63 and 64; Nil for 65. (b) Cotton for 63 and 64; Wheat for 65.  
(c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  for 63 and 64; 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ .  
(ii) Medium black soil. (iii) 12.7.63; 13.7.64; 18.7.65. (iv) (a) 1 ploughing; 1 to 2 harrowings.  
(b) Drilling. (c) 7 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha.  
of  $P_2O_5$ . (vi) N 28-15-2 (medium). (vii) Unirrigated for 63, 64, Irrigated for 65. (viii) 1 to 2 interculturings,  
1 to 2 weedings and 1 thinning. (ix) 46 cm. for 63, 95 cm. for 64; 32 cm. for 65. (x) 13.10.63; 15.10.64;  
9.10.65.

## 2. TREATMENTS :

4 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$ ,  $N_2=22.4$  and  $N_3=53.6$  Kg/ha.  
N applied in 2 doses at sowing and one month after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. for 63 and 65  
6.4 m.  $\times$  4.6 m. for 64. (v) 91 cm.  $\times$  91 cm. for 63 and 65 ; 229 cm.  $\times$  91 cm. for 64. (vi) Yes.

## 4. GENERAL :

(i) Normal, slight lodging on 22nd Sept. 1965 due to strong rains. (ii) Nil. (iii) Grain and fodder yield.  
(iv) (a) 1963-1965. (b) No. (c) Results of combined analysis are given under 5. Results. (v) N.A.  
(vi) Heavy rainfall accompanied by storms was received between 15th Sept. to 18th Sept. 1964, which caused  
severe lodging and washing of pollens. (vii) Error variances are homogeneous and Treatments  $\times$  years  
interaction is present.

## 5. RESULTS :

(i) 1326 Kg/ha. (ii) 200.0 Kg/ha. (based on 6 d.f. made of Treatments  $\times$  years interaction). (iii) Treatment  
differences are highly significant. (iv) Av. yield of Kaps in Kg/ha.

Treatment	$N_0$	$N_1$	$N_2$	$N_3$
Av. yield	1138	1305	1430	1431

C.D. = 163.2 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60(83), 60(104).**

**Site :- Agri. Res. Stn., Umralla ; Central Exptl. Stn., Junagadh. Type :- 'M'.**

Object :- To find out the effect of N, P and K with and without F.Y.M. on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton for 60(83) ; Groundnut for 60(104). (c) 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of  
N + 11.2 Kg/ha. of  $P_2O_5$  for 60(83), Nil for 60(104). (ii) Medium black. (iii) 8.7.1960 for 60(83) ; 6.7.1960  
for 60(104). (iv) (a) One ploughing + one harrowing. (b) Drilling for 60(104) ; Hand sowing for other.  
(c) 6 Kg/ha. (d) 91 cm.  $\times$  15 cm. for 60(83) ; 91 cm. between rows for 60(104). (e) Nil. (v) Nil for series  
I ; 12.4 C.L./ha. of F.Y.M. for series II. (vi) *Batela Puri* for 60(83) ; N-28-15-2 for 60(104). (vii) Unirriga-  
ted. (viii) 2 intercroppings for 60(83) ; Nil for 60(104). (ix) 80 cm. ; N.A. (x) 31.10.1960 for 60(83) ;  
13 to 15.10.1960 for 60(104).

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

(3) 3 levels of  $K_2O$  :  $K_0=0$ ,  $K_1=22.4$  and  $K_2=44.8$  Kg/ha.

$K_2O$  was applied as Pot. Sul. for 60(83) and as Mur. Pot. for 60(104). Two separate expts. were conducted  
one without and one with a basal dose of 12.4 C.L./ha. of F.Y.M.

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.0 m.  $\times$  5.5 m. for  
60(83) ; 11.6 m.  $\times$  5.5 m. for 60(104). (b) 9.1 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. for 60(83) ; 121 cm.  $\times$  91 cm.  
for 60(104). (vi) Yes.

## 4. GENERAL :

(i) Normal for 60(83), Unsatisfactory for 60(104). (ii) Nil. (iii) Yield of grain. (iv) (a) 1960-1961(modified  
in 1961). (b) No. (c) Results of combined analysis given under 5. (v) Junagadh and Umralla. (vi) Crop  
for 60(104) was affected due to scarcity of rains in August and September. (vii) Variances are homogeneous  
and Treatments  $\times$  places interaction is absent.

## 5. RESULTS :

## Series I (without F.Y.M.)

(i) 482 Kg/ha. (ii) 104.4 Kg/ha. (62 d.f. made up of various components of Treatments  $\times$  places interaction and pooled error). (iii) Main effect of N is highly significant. Main effect of P and interaction N  $\times$  P are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	444	441	474	440	441	478	453
P <sub>1</sub>	390	468	546	438	493	473	468
P <sub>2</sub>	387	579	609	508	554	513	525
Mean	407	496	543	462	496	488	482
K <sub>0</sub>	372	496	518				
K <sub>1</sub>	408	513	567				
K <sub>2</sub>	441	479	544				

C.D. for N or P marginal means

=49.2 Kg/ha.

C.D. for the body of N  $\times$  P table

=85.1 Kg/ha.

## Series II (with F.Y.M.)

(i) 568 Kg/ha. (ii) 89.8 Kg/ha. (62 d.f. made up of various components of Treatments  $\times$  places interaction and pooled error. (iii) Main effects of N and P are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	453	529	563	483	550	512	515
P <sub>1</sub>	521	569	635	577	535	613	575
P <sub>2</sub>	556	624	662	584	658	600	614
Mean	510	574	620	548	581	575	568
K <sub>0</sub>	500	545	599				
K <sub>1</sub>	520	600	623				
K <sub>2</sub>	510	577	638				

C.D. for N or P marginal means

=42.4 Kg/ha.

**Crop :- Bajra (Kharif).**  
**Site :- Agri. Res. Stn., Umrjala.**

**Ref :- Gj. 61(79), 62(85).**  
**Type :- 'M'.**

Object :- To find out the effect of N, P, K and F.Y.M. on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i). (a) N.A. for 61 (79) ; Bajra-Wheat-Cotton for 62 (85). (b) Nil for 61 (79) ; Groundnut for 62 (85). (c) Nil. (ii) Medium black. (iii) 23.6.1961 ; 19.7.1962. (iv) (a) 1 ploughing+1 to 2 harrowings. (b) Drilling. (c) 6 Kg/ha. (d) 91 cm. between rows. (e) Nil. (v) Nil. (vi) N-28-15-2. (vii) Unirrigated. (viii) 4 weedings+2 to 3 interculturings. (ix) 40 cm. ; 33 cm. (x) 22.10.1961 ; 17.10.1962.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(2) 3 levels of  $P_2 O_5$  as Super :  $P_0=0$ ,  $P_1=11.2$  and  $P_2=22.4$  Kg/ha.

(3) 3 levels of  $K_2 O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=22.4$  and  $K_2=44.8$  Kg/ha.

## Sub-plot treatments :

2 levels of F.Y.M. :  $F_0=0$  and  $F_1=12.4$  C.L./ha.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block ; 3 blocks/ replication and 2 sub-plots/main-plot. (b) N.A.  
(iii) 1. (iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1962. (b) No. (c) Results of combined analysis given under 5. (v) N. A. (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 730 Kg/ha. (ii) (a) 233.7 Kg/ha. (30 d. f. made up of various components of Treatments  $\times$  years interaction and pooled error). (b) 198.4 Kg/ha. (7 d. f. made up of various components of Treatments  $\times$  years interaction). (iii) Main effect of P is highly significant and that of F is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$F_0$	749	671	623	548	729	766	763	657	623	681
$F_1$	767	851	773	664	833	894	837	791	763	797
Mean	758	761	698	606	781	830	800	724	693	739
$K_0$	832	903	665	629	901	870				
$K_1$	678	700	794	628	706	838				
$K_2$	764	680	635	561	736	782				
$P_0$	558	654	606							
$P_1$	832	763	748							
$P_2$	884	866	740							

C. D. for N marginal means = 112.5 Kg/ha.  
C. D. for F marginal means = 90.3 Kg/ha.

**Crop :- Bajri (Kharif).**

**Ref :- GJ. 64(293).**

**Site :- S.C.R.D. and T. Centre, Vasad.**

**Type :- 'M'.**

**Object :-** To study the effect of various green manure-cum-cover crops on yield of cotton and its residual effects on Bajri.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Bajri. (b) Cotton. (c) As per treatments. (ii) Sandy to clay loam soil. (iii) 1.7.64. (iv) (a) 2 harrowings. (b) Drilling. (c) 10.0 Kg/ha. (d) 45 cm. between rows. (e) 1 to 2. (v) Nil. (vi) 207-Bajri. (vii) Unirrigated. (viii) 2 weedings and 1 interculturing. (ix) N. A. (x) 29.9.64.

## 2. TREATMENTS :

T<sub>1</sub> = Cotton alone (without G. M.)+125Q/ha. F.Y.M. T<sub>2</sub> = Cotton with 20 Kg/ha. of N+cowpeas as G.M. T<sub>3</sub> = Cotton with 20 Kg/ha. of N+Sann hamp as G.M. T<sub>4</sub> = Cotton with 20 Kg/ha. of N+Guar hamp as G.M.

These treatments were applied to last years cotton crop. This year only the residual effect on Bajra is studied.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) —. (iii) 6. (iv) (a) and (b) 8'0 m. × 5'4 m. (v) Nil (vi) Yes.

## 4. GENERAL :

(i) Lodging of Bajra on 15.9.64. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964 only. (b) Yes. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 336 Kg/ha. (ii) 74'0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	305	366	349	324

**Crop :- Bajra (Kharif.)**

**Site :- Rajkot (c. f.)**

**Ref :- GJ. 62, 63, 64(S.F.T.)**

**Type - 'M'.**

Object : Type A—1—To study the response curves of important cereal, cash and oilseed crops to Nitrogen applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) (a) to (c) N. A. (ii) Deltaic Alluvium. (iii) and (iv) N. A. (v) (a) to (e) N. A. (vi) N. A. (vii) Irrigated. (viii) to (x) N. A.

## 2. TREATMENTS :

O=Control (No Manure).

N<sub>1</sub>=33'6 Kg/ha. of N as A/S.

N<sub>2</sub>=67'2 Kg/ha. of N as A/S.

P<sub>1</sub>=33'6 Kg/ha. of P<sub>2</sub> O<sub>5</sub> as super.

N<sub>1</sub> P<sub>1</sub>=33'6 Kg/ha. of N as A/S+33'6 Kg/ha. of P<sub>2</sub> O<sub>5</sub> as Super.

N<sub>2</sub> P<sub>1</sub>=67'2 Kg/ha. of N as A/S+33'6 Kg/ha. of P<sub>2</sub> O<sub>5</sub> as Super.

N<sub>2</sub> P<sub>2</sub>=67'2 Kg/ha. of N as A/S+67'2 Kg/ha. of P<sub>2</sub> O<sub>5</sub> as Super.

N<sub>2</sub> P<sub>2</sub> K<sub>1</sub>=67'2 Kg/ha. of N as A/S+67'2 Kg/ha. of P<sub>2</sub> O<sub>5</sub> as super+33'6 Kg/ha. of K<sub>2</sub> O as Mur. of Pot.

## 3. DESIGN

## 4. GENERAL :

(i) to (iii) N. A. (iv) (a) 1962 to 1966 [1965-N, A.] (b) and (c) N. A. (v) to (vii) N. A.

## 5. RESULTS :

## 62(SFT)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S. E.
Av. response in Kg/ha.	29	29	23	51	-40	139	225	(Not analysed)

Control mean=780 Kg/ha. ; No of trials=2

## 63(SFT)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S. E.
Av. response in Kg/ha.	181	187	159	306	337	531	664	111'0

Control mean=859 Kg/ha. ; No of trials=3



**64(SFT)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S. E.
Av. response of yield in Kg/ha.	105	190	118	196	272	290	496	98.8

Control mean : 1158 Kg/ha. ; No of trials = 10

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 62, 63, 65 (S.F.T.) for Rajkot and Gj.(65) S.F.T. for other centres.**

**Site :- Rajkot, Bhavnagar, Junagarh, Kaira and Mehsana. (c.f.).**

**Type :- 'M'.**

Object :—Type A<sub>1</sub>—To study the response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagarh and grey brown for Kaira and Mehsana. (iii) and (iv) N.A. (v) (a) to (e) N.A. (vi) N.A. (vii) Irrigated for Kaira and Un-irrigated for other centres. (viii) to (x) N.A.

**2. TREATMENTS :**

O=Control (no manure)  
 N<sub>1</sub>=33.6 Kg/ha. of N.  
 N<sub>2</sub>=67.2 Kg/ha. of N.  
 P<sub>1</sub>=33.6 Kg/ha. P<sub>2</sub> O<sub>5</sub>.  
 N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>1</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.  
 N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

**3. DESIGN :**

Same as in type A<sub>1</sub> (Bajra) at Rajkot on page 249.

**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1962 to 1966 in the case of Rajkot and 1965 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :****Rajkot****SFT (62)**

Treatment :	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S. E.
Av. response in Kg/ha.	—35	00	59	109	22	76	88	(not analysed)

Control mean=692 Kg/ha ; No. of trials=4

**SFT (63)**

Treatment :	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S. E.
Av. response of grain in Kg/ha.	125	133	66	165	182	179	187	48.0

Control mean=548 Kg/ha. ; No. of trials=7

## SFT (65)

Treatment :	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	63	114	110	129	121	282	378	59.2

Control mean=1271 Kg/ha. ; No. of trials=10

## Bhavnagar

## S.F.T. (65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	172	252	232	236	276	277	388	86.7

Control mean=1043 Kg/ha. ; No. of trials=9

## Junagarh

## S.F.T. (65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	251	322	323	407	513	621	736	79.3

Control mean=766 Kg/ha. ; No. of trials=9

## Kaira

## S.F.T. (65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	157	242	160	360	483	563	761	87.4

Control mean=1153 Kg/ha. ; No. of trials=12

## Mehsana

## S.F.T. (65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	135	50	146	172	163	211	202	66.5

Control mean=1535 Kg/ha. ; No. of trials=12

**Crop :- Bajra (Kharif).****Ref :- Gj. 62, 63 (S.F.T.).****Site :- Rajkot (c.f.)****Type :- 'M'.**

Object :- Type A<sub>2</sub>—To study the response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

7 fertilizer treatments :

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of NP<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>P<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>1</sub>P<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>ON applied as A/S, P<sub>2</sub>O<sub>5</sub> as super and K<sub>2</sub>O as mur. pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (Bajra) at Rajkot on page 249.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966. [1964 and 1965 N.A.] (b) and (c) N.A. (v) to (viii) N.A.

## 5. RESULTS :

## S.F.T. (62)

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	36	6	3	33	-30	131	180	60.9

Control mean=817 Kg/ha. No. of trials=3

## S.F.T. (63)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	202	183	367	313	423	442	619	101.0

Control mean=904 Kg/ha. ; No of trials=3

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 62, 63, 64, 65 (S.F.T.)  
for Rajkot and 65(S.F.T.)  
for other centres.**

**Site :- Rajkot, Bhavnagar, Junagarh, Kaira Type :- 'M'.  
and Mehsena (c.f.).**

Object :—Type A<sub>2</sub>-To study response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O=Control (no manure).

N<sub>1</sub>=33.6 Kg/ha. of N

P<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

P<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>1</sub>P<sub>1</sub>=33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>1</sub>P<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>2</sub>P<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=67.2 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as super and K<sub>2</sub>O as mur. pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (Bajra) at Rajkot on Page 250.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1965 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Rajkot

## S.F.T. (62)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	-43	-19	-55	-17	96	76	1	(not analysed)

Control mean=689 Kg/ha. ; No. of trials=4

## S.F.T. (63)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	110	77	104	72	137	174	137	38.0

Control mean=549 Kg/ha; No. of trials=7.

## S.F.T. (64)

Treatment	N <sub>2</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	236	172	201	336	363	547	646	71.1

Control mean=1151 Kg/ha ; No. of trials=10.

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	103	219	184	316	239	340	428	53.3

Control mean=1171 Kg/ha. ; No. of trials=9.

## Bhavnagar

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	182	182	90	206	168	230	410	103.0

Control mean=1081 Kg/ha. ; No. of trials=8.

## Junagarh

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	113	63	196	216	284	332	421	57.6

Control mean=1091 Kg/ha. ; No. of trials=9.

## Kaira

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha.	69	1	64	218	323	357	674	69.7

Control mean=1230 Kg/ha. ; No. of trials=11.

## Mehsana

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response in Kg/ha. —148		—134	6	56	54	123	208	60.5

Control mean=1718 Kg/ha. ; No. of trials=12.

Crop :- Bajra (Kharif).

Ref :- Gj. 62, 63, (S.F.T.).

Site :- Rajkot (c.f.).

Type :- 'M'.

Object :—Type A<sub>2</sub>-To study response curves of important cereal, cash and oilseed crops to potash applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

## 7 manurial treatments :

- O = Control (no manure)  
 $N_1$  = 33.6 Kg/ha. of N  
 $K_1$  = 33.6 Kg/ha. of  $K_2O$ .  
 $K_2$  = 67.2 Kg/ha. of  $K_2O$ .  
 $N_1K_1$  = 33.6 Kg/ha. of N + 33.6 Kg/ha. of  $K_2O$ .  
 $N_1K_2$  = 33.6 Kg/ha. of N + 67.2 Kg/ha. of  $K_2O$ .  
 $N_2K_2$  = 67.2 Kg/ha. of N + 67.2 Kg/ha. of  $K_2O$ .  
 $N_1P_1K_1$  = 33.6 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$  + 33.6 Kg/ha. of  $K_2O$ .  
 N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

Same as in Type  $A_1$  (Bajra) at Rajkot on page 249.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 [1964 and 1965 N.A.] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## S.F.T. (62)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response in Kg/ha.	7	25	121	160	54	123	272	135.9

Control mean=813 Kg/ha. ; No. of trial=3.

## S.F.T. (63)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response in Kg/ha.	201	32	53	256	287	359	493	90.0

Control mean=896 Kg/ha. ; No. of trials=3.

**Crop :- Bajra (Kharif).****Ref :- GJ. SFT(62), to (65) for Rajkot, (65) for other centres.****Site :- (District) Rajkot, Bhavnagar, Junagarh, Kaira and Mehsana (c.f.).****Type :- 'M'.**Object :—Type  $A_3$ —To study response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagarh and grey brown for Kaira and Mehsana. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

- O = Control (no manure).  
 $N_1$  = 33.6 Kg/ha. of N.  
 $K_1$  = 33.6 Kg/ha. of  $K_2O$ .  
 $K_2$  = 67.2 Kg/ha. of  $K_2O$ .  
 $N_1K_1$  = 33.6 Kg/ha. of N + 33.6 Kg/ha. of  $K_2O$ .  
 $N_1K_2$  = 33.6 Kg/ha. of N + 67.2 Kg/ha. of  $K_2O$ .  
 $N_2K_2$  = 67.2 Kg/ha. of N + 67.2 Kg/ha. of  $K_2O$ .  
 $N_1P_1K_1$  = 33.6 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$  + 33.6 Kg/ha. of  $K_2O$ .  
 N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> (*Bajra*) at Rajkot on page 250.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1965 to 1967 for others. (b) and (c) N.A. (v) to (vii) N.A..

## 5. RESULTS :

**Rajkot****S.F.T. (62)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	5	-56	-71	-40	18	47	195	111.5

Control mean=730 Kg/ha. ; No. of trials=5.

**S.F.T. (63)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of grain in Kg/ha.	122	90	129	188	135	208	187	41.0

Control mean=522 Kg/ha. ; No. of trials=7.

**S.F.T. (64)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	198	143	238	318	273	522	596	64.9

Control mean=1122 Kg/ha. ; No. of trials=8.

**S.F.T. (65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	116	93	187	168	214	306	339	40.1

Control mean=1197 Kg/ha. ; No. trials=10.

**Bhavnagar****S.F.T. (65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	154	117	95	183	205	201	298	85.5

Control mean=973 Kg/ha. ; No. of trials=9.

**Junagarh****S.F.T. (65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	117	191	294	293	409	423	470	99.4

Control mean=888 Kg/ha. ; No. of trials=11.

**Kaira****S.F.T. (65)**

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	1	12	-45	71	110	189	328	70.6

Control mean=1404 Kg/ha. ; No. of trials=12.

## Mehsana

S.F.S.(65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response in Kg/ha.	-46	25	5	45	168	195	256	55.5

Control mean=1630 Kg/ha.; No. of trials=12.

Crop :- Bajra.

Ref :- Gj. 62(183), 64(132), 65(144).

Site :- Dry Farming Res. Stn., Jamkhambalia.

Type :- 'MV',

Object : To find out the optimum dose of N, P and K for different varieties of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut for 62(183) and 65(144); Gram for 64(132). (b) Nil for 62(183); 12.6 C.L./ha. of F.Y.M for 64(132); 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(144). (ii) Medium black. (iii) 10.7.62; 1.7.64; 24.7.65. (iv) (a) Ploughing and harrowing. (b) Drilling. (c) 5 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 12.6 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Unirrigated. (viii) 3 weedings for 62(183), 1 interculturing for 64(132) 65(144). (ix) 54 cm.; 48 cm.; 29 cm. (x) 7.10.62; 17.10.64; 26.10.65.

## 2. TREATMENTS :

## Main-plot treatments

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.(3) 3 varieties : V<sub>1</sub>=local, V<sub>2</sub>=L-11 and V<sub>3</sub>=28-15-2.

## Sub-plot Treatments

2 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0 and K<sub>1</sub>=44.8 Kg/ha.

Manures applied by drilling and sowing.

## 3. DESIGN :

(i) Split-plot. (ii) 3 blocks/replications; 9 main-plots/blocks; 2 sub-plots/main-plot. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of blister beetle for 62(183). Nil for others. (iii) Yield of grain. (iv) (a) 1962-1965 (Not conducted in 1963). (b) No. (c) Nil. (v) Rajkot. (vi) Uneven rainfall for 62(183). Scanty rains for 64(132). Absence of late rains for 65(144). Error variances for sub-plot treatments are heterogeneous therefore individual years results presented below.

## 5. RESULTS :

## 62(183)

(i) 587 Kg/ha. (ii) (a) 184.8 Kg/ha. (b) 100.1 Kg/ha. (iii) Main effects of V and K are highly significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	496	520	466	508	407	567	435	553	494
V <sub>2</sub>	343	318	575	323	368	545	350	474	412
V <sub>3</sub>	850	854	858	723	950	889	818	890	854
Mean	563	564	633	518	575	667	534	639	587
K <sub>0</sub>	529	495	579	454	530	619			
K <sub>1</sub>	597	633	687	582	520	715			
P <sub>0</sub>	551	526	477						
P <sub>1</sub>	620	524	581						
P <sub>2</sub>	518	642	841						

C.D. for V marginal means = 150.7 Kg/ha.  
C.D. for K marginal means = 66.6 Kg/ha.

64(132)

(i) 455 Kg/ha. (ii) (a) 156.1 Kg/ha. (b) 134.6 Kg/ha. (iii) Main effect of N is highly significant and that of P is significant, (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	303	381	537	273	557	391	427	387	407
V <sub>2</sub>	325	370	604	389	439	471	450	416	433
V <sub>3</sub>	392	503	677	388	627	557	548	500	524
Mean	340	418	606	350	541	473	475	434	455
K <sub>0</sub>	343	435	648	358	549	518			
K <sub>1</sub>	337	401	564	342	533	428			
P <sub>0</sub>	242	362	446						
P <sub>1</sub>	340	555	728						
P <sub>2</sub>	438	337	644						

C.D. for N or P marginal means = 127.2 Kg/ha.

65(144)

(i) 549 Kg/ha. (ii) (a) 162.4 Kg/ha. (b) 69.2 Kg/ha. (iii) Main effects of N and interaction P×K are significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>0</sub>	492	450	658	586	507	505	528	538	533
V <sub>1</sub>	567	559	748	557	642	676	639	611	625
V <sub>2</sub>	475	395	600	311	511	648	485	491	489
Mean	511	468	669	485	553	610	551	548	549
K <sub>0</sub>	500	490	663	532	540	581			
K <sub>1</sub>	522	446	674	438	567	638			
P <sub>0</sub>	416	316	663						
P <sub>1</sub>	507	525	627						
P <sub>2</sub>	610	504	716						

C.D. for N marginal means = 132.3 Kg/ha.

C.D. for K means at the same level of P = 68.1 Kg/ha.

C.D. for P Means at the same level of K = 140.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Site :- Dry Farming Res. Stn., Jamkhabalia.**

**Ref :- Gj. 60(125).**

**Type :- 'MV'.**

**Object :-** To find out the optimum dose of N, P and K for different varieties of Bajra.

**1, BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton and *Jowar*. (c) Nil. (ii) Shallow. (iii) 6-7-60. (iv) (a) 2 ploughings and 2 harrowings. (b) Drilling. (c) Nil. (d) 91 cm. between rows. (e) N.A. (v) and (vi) As per treatments. (vii) Unirrigated. (viii) Nil. (ix) 68.6 cm. (x) 10.11.60.



## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 varieties :  $V_1$ =local,  $V_2$ =L-11 and  $V_3$ =28-15-2.(2) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.**Sub-plot treatments :**2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=44.8$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block ; 3 blocks/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 1.  
(iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Not good. (ii) Nil. (iii) Grain yield. (iv) (a) and (b) No. (c) Nil. (v) (a) Rajkot. (b) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 173 Kg/ha. (ii) (a) 199.2 Kg/ha. (b) 138.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$K_0$	$K_1$	$P_0$	$P_1$	$P_2$	Mean
$P_0$	118	99	106	101	113	91	140	91	107
$P_1$	109	159	241	149	190	223	174	113	170
$P_2$	178	224	323	279	204	171	285	270	242
Mean	135	161	223	176	169	162	200	158	173
$V_1$	139	129	216	137	186				
$V_2$	178	208	212	245	153				
$V_3$	87	144	241	147	168				
$K_0$	151	148	230						
$K_1$	119	174	216						

**Crop :- Bajra (Kharif).****Ref :- Gj. 62(189), 63(190), 64(134).****Site :- Dry Farming Res. Stn., Rajkot.****Type :- 'MV'.**

Object :- To find out the suitable dose of N, P, and K for suitable variety of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 16.7.1962 ; 13.7.1963 ; 7.7.1964. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 5.6 Kg/ha. (d) 91 cm.  $\times$  91 cm. (e) N.A. (v) Nil for 62 (189) and 63 (190) ; 12.3 C.L./ha. and F.Y.M. (vi) As per treatments. (vii) Un-irrigated. (viii) 3 weedings. (ix) 40.5 cm. for 62 (189) ; 50.5 cm. for 63 (190) and 76.5 cm. for 64 (134). (x) 18.10.1962 ; 20.10.1963 ; 21.10.1964.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super drilled at sowing :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.(3) 3 varieties of Bajra :  $V_1$ =local ;  $V_2$ =local-11 and  $V_3$ =N28-15-2**Sub-plot treatments :**2 levels of  $K_2O$  as sulphate of Potash drilled at sowing ;  $K_0=0$  and  $K_1=40$  Kg/ha

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block ; 3 blocks/replications ; 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960 to 1964 (1960 and 1961 N.A.) (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 738 Kg/ha. (ii) (a) 151.1 Kg/ha. [ 54 d.f. made up of pooled error and interaction of Treatments with years]. (b) 64.6 Kg/ha. [ 46 d.f. made up of pooled error and interaction of Treatments with years]. (iii) Main effects of V, N, P and interaction K × V are highly significant. Effect of interaction K × N is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	578	738	870	591	803	792	743	714	729
V <sub>2</sub>	581	672	836	644	716	729	668	725	696
V <sub>3</sub>	686	774	905	707	775	882	779	797	788
Mean	615	728	870	648	765	801	730	745	738
K <sub>0</sub>	622	714	854	644	765	782			
K <sub>1</sub>	608	742	886	651	765	820			
P <sub>0</sub>	620	599	724						
P <sub>1</sub>	609	771	914						
P <sub>2</sub>	616	814	972						

C.D. for V, N or P marginal means = 247.6 Kg/ha.

C.D. for K means at the same level of V or N = 106.1 Kg/ha.

C.D. for V or N means at the same level of K = 105.9 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 62(234), 63(261), 64(280).**

**Site :- Agri. College Farm, Anand.**

**Type :- 'C'.**

**Object :-** To study the effect of drilling, dibbling and transplanting of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Bajra-Tobacco. (b) Tobacco. (c) N.A. (ii) Sandy loam. (iii) 3.3.62, 2.3.1963/26.3.1963, 5.3.64/11.4.64. (iv) (a) 1 ploughing and 1 harrowing. (b) As per treatments. (c) 11 Kg/ha. (d) 8 cm. × 46 cm. for 62(234) and for others as per treatments. (e) 1. (v) 67.2 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) S-207. (vii) Irrigated. (viii) 1 weeding and 1 interculturing. (ix) Nil. (x) 5.6.62, 6.6.1963, 4.6.64.

## 2. TREATMENTS :

3 methods of sowing : M<sub>1</sub>=Drilling at 38 cm., M<sub>2</sub>=Dibbling at 38 cm. × 30 cm. and M<sub>3</sub>=Transplanting at 38 cm. × 30 cm.

[Treatment M<sub>2</sub> was not tried in 62(234). Spacing adopted in 62(234) was 8 cm. × 46 cm.]

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3 [2 in the case of 62(234)]. (b) N.A. (iii) 6 [5 in the case of 62(234)]. (iv) (a) 9.1 m. × 3.1 m. (b) 7.3 m. × 1.5 m. [(a) 11.0 m. × 5.5 m. (b) 9.1 m. × 3.7 m in the case of 62(234)]. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962 (modified in 1963)-1964. (b) No. (c) Results of combined analysis was given under 5. for 63(261) and 64(280) and individual analysis for 62(234). (v) and (vi) Nil. (vii) Errors are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1882 Kg/ha. (ii) 677.5 Kg/ha. [with 22 d.f. made up of Treatments  $\times$  years interaction and pooled error]. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	2190	2001	1454
	C.D. = 573.7 Kg/ha.		

## 62(234)

(i) 1478 Kg/ha. (ii) 266.6 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	1411	1545

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 62(235), 63(282), 64(281).**

**Site :- Agri. College Farm, Anand.**

**Type :- 'C'.**

Object :- To study the effect of different spacings on Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Bajra-Tobacco. (b) Tobacco. (c) N.A. (ii) Sandy loam. (iii) 24.2.62, 8.3.63, last week of Feb., 64. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 11 Kg/ha. (d) As per treatments. (e) Nil. (v) 67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) S-207. (vii) Irrigated. (viii) 1 interculturing. (ix) Nil. (x) 29.5.62, 11.6.1963, last week of May, 64.

## 2. TREATMENTS :

6 spacings : S<sub>1</sub>=15 cm. between rows, S<sub>2</sub>=30 cm. between rows, S<sub>3</sub>=46 cm. between rows, S<sub>4</sub>=46 cm.  $\times$  46 cm., S<sub>5</sub>=61 cm. between rows and S<sub>6</sub>=61 cm.  $\times$  61 cm.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) Nil. (iii) 6. (iv) (a) 11.0 m.  $\times$  5.5 m. (b) 9.1 m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1962-1964. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1674 Kg/ha. (ii) 305.0 Kg/ha. (made up of Treatments  $\times$  years interaction and pooled error with 60 d.f.). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
Av. yield	1514	1661	1677	1588	1817	1786
	C.D. = 203.4 Kg/ha.					

**Crop :- Bajra (Kharif).**  
**Site :- Dry Farming Res. Stn., Deesa.**

**Ref :- Gj. 60(15), 61(9).**  
**Type :- 'C'.**

Object :—To find out the tillage and cultural requirements of Bajra crop.

1. **BASAL CONDITIONS :**

(i) (a) Nil. (b) *Guwar* for 60(15), *Jowar* for 61(9). (c) Nil for 60(15); N, P, K applied to *Jowar* in previous expt. (ii) Sandy. (iii) 16.7.1960; 9.7.1961. (iv) (a) As per treatments. (b) Dibbling for 60(15); Drilling for 61(9). (c) 7 Kg/ha. (d) 46 cm. between rows. (e) Nil. (v) Nil. (vi) B-207. (vii) Unirrigated. (viii) As per treatments. (ix) N.A., 94 cm. (x) 13.10.1960; 27.10.1961.

2. **TREATMENTS :**

**Main-plot treatments :**

3 levels of ploughing :  $C_0=0$ ,  $C_1=1$  and  $C_2=2$  ploughings.

**Sub-plot treatments :**

4 levels of interculturing :  $T_0=0$ ,  $T_1=1$ ,  $T_2=2$  and  $T_3=3$  interculturings.

3. **DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 9.2 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

4. **GENERAL :**

(i) Normal, lodging during 2nd week of September, 1961. (ii) Nil. (iii) Yield of grain. (iv) (a) 1959-1961. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) The crops were affected due to scanty rains in 1960 and heavy rains in 1961. (vii) The expt. for the year 1959 is N.A. Error variances are homogeneous and Treatments  $\times$  years interaction is present.

5. **RESULTS :**

(i) 519 Kg/ha. (ii) (a) 168.3 Kg/ha. (2 d.f. made up of Treatments  $\times$  years interaction). (b) 100.3 Kg/ha. (99 d.f. made up of pooled error and various components of Treatments  $\times$  years interaction) (iii) Main effect of T alone is significant. (iv) Av. yield of grain in Kg/ha.

	$T_0$	$T_1$	$T_2$	$T_3$	Mean
$C_0$	461	480	528	512	495
$C_1$	517	499	490	512	504
$C_2$	516	494	576	648	559
Mean	498	491	531	527	519

C.D. for T marginal means = 46.9 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60(112), 62(184), 64(131).**

**Site :- Dry Farming Res. Stn., Jamkhambalia. Type :- 'C'.**

Object :—To study the effect of interculturing on the yield of Bajra.

1. **BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton; Groundnut, Gram. (c) Nil for 60(112) and 62(184), 12.35 C.L./ha. of F.Y.M. for 64(131). (ii) Medium black. (iii) 6.7.60; 27.7.62; 6.7.64. (iv) (a) 2 ploughings, 1 to 2 harrowings. (b) Drilling. (c) 4 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) Nil in 60(112), 12.3 C.L./ha. of F.Y.M. for other years. (vi) N 28-51-2. (vii) Unirrigated. (viii) As per treatments. (ix) 69 cm.; 54 cm.; 48 cm. (x) 9.10.60; 22.10.62; 28.10.64.

2. **TREATMENTS :**

4 cultural treatments :  $T_0=N_0$  interculturing,  $T_1=1$  interculturing 6 weeks after sowing,  $T_2=2$  interculturings 4 and 6 weeks after sowing and  $T_3=3$  interculturings 4, 6 and 8 weeks after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of bristle beetle. (iii) Grain yield. (iv) (a) 1959-contd. (b) No. (c) Nil. (v) Rajkot. (vi) Scanty rains in 64(131). (vii) Expt. failed in 1959, 61 and 63. Expt. continued beyond 1965.

## 5. RESULTS :

## 1960

(i) 128 Kg/ha. (ii) 83.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	125	118	121	149

## 1962

(i) 338 Kg/ha. (ii) 16.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	310	324	339	380

C.D.=19.9 Kg/ha.

## 1964

(i) 301 Kg/ha. (ii) 77.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	312	291	294	307

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60(111), 62(185), 64(130), 65(71).**

**Site :- Dry Farming Res. Stn., Jamkhambalia.**

**Type :- 'C'.**

Object :- To find out the suitable spacing and seed rate for Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton ; Groundnut ; Gram ; Groundnut respectively. (c) Nil for 60 and 62, 12.4 C.L./ha. of F.Y.M. in 64 (130) and 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65 (71). (ii) Medium black. (iii) 8.7.60 ; 9.7.62 ; 3.7.64 ; 26.7.65. (iv) (a) 1-2 ploughings, 1-3 harrowings. (b) Drilling. (c) and (d) As per treatments (e) —. (v) Nil in 60 (111) and 12.4 C.L./ha. of F.Y.M. for other years. (vi) 28-15-2 (medium). (vii) Unirrigated. (viii) 1-2 interculturings. (ix) 68 cm. ; 54 cm. ; 48 cm. 29 cm. (x) 7.10.60 ; 9.10.62 ; 14.10.64 ; 21.10.65.

## 2. TREATMENTS :

**Main-plot treatments**

3 spacings between rows : S<sub>1</sub>=46 cm, S<sub>2</sub>=91 cm. and S<sub>3</sub>=137 cm.

**Sub-plot treatments**

3 seed rates : R<sub>1</sub>=3.4, R<sub>2</sub>=4.5 and R<sub>3</sub>=5.6 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N. A. (iii) 6. (iv) (a) 13.7 m. × 9.1 m. for 60 (111), 13.7 m. × 9.1 m. for others. (b) 11.9 m. × 7.3 m. for 60 (111) ; 11.0 m × 7.3 m. for others. (v) 91 cm. × 91 cm. for 60 (111) ; 137 cm. × 91 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Attack of blister beetle. (iii) Grain-yield. (iv) (a) 1959-1966 modified in 66. (b) No. (c) Nil. (v) Rajkot. (vi) Uneven rainfall in 62 (185) and 64 (130). (vii) Expt. not conducted in 1961 and 1963. Sub-plot error variances are heterogeneous and hence the results of individual years are presented.

## 5. RESULTS :

## 1960

(i) 38 Kg/ha. (ii) (a) 31.3 Kg/ha. (b) 19.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	44	31	34	37
S <sub>2</sub>	41	28	28	28
S <sub>3</sub>	49	53	34	45
Mean	45	37	32	38

## 1962

(i) 216 Kg/ha. (ii) (a) 115.1 Kg/ha. (b) 86.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	173	248	175	199
S <sub>2</sub>	194	292	240	242
S <sub>3</sub>	220	189	211	207
Mean	196	243	209	216

## 1964

(i) 283 Kg/ha. (ii) (a) 94.5 Kg/ha. (b) 83.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	313	268	250	277
S <sub>2</sub>	310	314	281	302
S <sub>3</sub>	256	302	253	270
Mean	293	295	261	283

## 1965

(i) 225 Kg/ha. (ii) (a) 97.4 Kg/ha. (b) 69.7 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	228	241	192	220
S <sub>2</sub>	185	282	225	231
S <sub>3</sub>	215	242	212	223
Mean	209	255	210	225

**Crop :- Bajra (Kharif).****Ref :- Gj. 61(91), 62(3).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'C'**Object :- To find out the best method of sowing for *Bajra*.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra for 61 (91) ; Cotton for 62 (3). (c) N. A. for 61 (91) ; 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  for 62(3). (ii) Sandy loam. (iii) 2.7.1961/4.7.1961 ; 11.7.1962/8.8.1962. (iv) (a) 2 to 3 ploughings + one harrowing. (b) As per treatments. (c) 4.5 Kg/ha. (d) As per treatments. (e) -. (v) 12.4 C.L./ha. of F.Y.M. (vi) Bajra 207. (vii) Unirrigated for 61 (91) ; Irrigated for 62 (3) (viii) 2 interculturings. (ix) 65 cm. ; 61 cm. (x) 5.10.1961 ; 13.10.1962.

**2. TREATMENTS :**

4 cultural treatments :  $T_1$  = Drilling by local method (seed rate 9 Kg/ha. with spacing 30 cm. between rows),  $T_2$  = Drilling by local method and thinning at 23 cm. within line,  $T_3$  = Drilling at 46 cm.  $\times$  23 cm. and  $T_4$  = Transplanting at 46 cm.  $\times$  23 cm,

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.9 m  $\times$  11.9 m. (b) 10.1 m.  $\times$  10.1 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Crop was affected before harvesting by rains. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 1224 Kg/ha. (ii) 196.2 Kg/ha. (33 d.f. made up of pooled error and Treatments  $\times$  years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$
Av. yield	1230	1152	1218	1294

**Crop :- Bajra (Kharif).****Ref :- Gj. 60(95), 61(87), 62(100), 63(105), 64(37).****Site :- Dry Farming Res. Stn., Rajkot.****Type :- 'C'**Object :- To find out optimum spacing and seed rate for *Bajra*.**1. BASAL CONDITIONS :**

(i) (a) Groundnut-Bajra-Jowar and Cotton. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 24.7.1960; 8.7.1961 ; 14.7.1962 ; 10.7.1963 ; 4.7.1964. (iv) (a) 1 ploughing and 2-3 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) N. A. (v) 12.4 C.L./ha. of F.Y.M. for 60(95) and 61(87) ; Nil for others. (vi) N-28-15-2 (late). (vii) Unirrigated. (viii) 2-3 weedings. (ix) 47 cm. for 60 (95) ; 56 cm. for 61 (87) ; 40 cm. for 62(100) ; 50 cm. for 63 (105), 76 cm. for 64(37). (x) 30.10.60 ; 24.10.61 ; 21.22.10.62 ; 22.10.63 ; 20.10.1964.

**2. TREATMENTS :****Main-plot treatments :**

3 spacings between rows :  $S_1$  = 46 cm.,  $S_2$  = 91 cm. and  $S_3$  = 137 cm.

**Sub-plot treatments :**

3 seed rates :  $R_1$  = 3.4,  $R_2$  = 4.5 and  $R_3$  = 5.6 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) 41.1 m.  $\times$  27.4 m. for 60(95) and 61(87) ; Nil for others. (iii) 6. (iv) (a) 13.7 m  $\times$  9.1 m. (b) 11.0 m.  $\times$  7.3 m. (v) 137 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal to good. (ii) Ergot disease was noticed ; seeds soaked in salt solution as control measure for 60(95) ; Nil for others. (iii) Yield of grain. (iv) (a) 1960 to 1964. (b) No. (c) Nil. (v) Dry farming Research station, Jamkhambalia. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous, the individual years results are given below.

## 5. RESULTS :

## 60(95)

(i) 197 Kg/ha. (ii) (a) 78.5 Kg/ha. (b) 40.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	229	224	159	204
R <sub>2</sub>	188	208	175	190
R <sub>3</sub>	202	195	192	196
Mean	206	209	175	197

## 61(87)

(i) 233 Kg/ha. (ii) (a) 53.3 Kg/ha. (b) 71.9 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	214	244	241	233
R <sub>2</sub>	194	232	293	240
R <sub>3</sub>	212	218	247	226
Mean	207	231	260	233

C.D. for S marginal means = 39.7 Kg/ha.

## 62(100)

(i) 490 Kg/ha. (ii) (a) 97.5 Kg/ha. (b) 56.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	441	520	536	499
R <sub>2</sub>	479	492	511	494
R <sub>3</sub>	435	480	512	476
Mean	452	497	520	490

## 63(105)

(i) 758 Kg/ha. (ii) (a) 94.6 Kg/ha. (b) 62.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	754	754	776	765
R <sub>2</sub>	725	769	723	739
R <sub>3</sub>	703	812	739	769
Mean	727	782	764	758



64(37)

(i) 344 Kg/ha. (ii) (a) 133.3 Kg/ha. (b) 46.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	304	350	375	343
R <sub>2</sub>	276	371	420	356
R <sub>3</sub>	263	350	388	334
Mean	281	357	394	344

Coop :- Bajra Kharif.)

Ref :- Gj. 60(96), 61(76), 62(101), 63(106), 64(38).

Site :- Dry Farming Res. Stn., Rajkot.

Type :- 'C'

Object :- To study the effect of intercroppings on the yield of Bajra.

#### 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra-Jowar or Cotton. (b) Groundnut. (c) Nil for 60 (96) and 61 (76) ; 12.4 C.L./ha. of F. Y. M. for others. (ii) Medium black. (iii) 24.6.1960 ; 8.7.1961 ; 14.7.1962 ; 12.7.1963 ; 2.7.1964. (iv) (a) 1 ploughing and 2-3 harrowings, (b) Drilling. (c) 4.8 Kg/ha. for 60 (96) and 61 (76) ; 5.7 Kg/ha. for others. (d) 91 cm. × 15 cm. for 60 (96) and 61 (76) ; 91 cm. between rows for others. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 60 (96) and 61 (76) ; Nil for others. (vi) N. 28-15.2. (vii) Unirrigated. (viii) 2-3 weedings and interculturalures as per treatments. (ix) 47.5 cm. for 60 (96) ; 56.3 cm. for 61 (76), 40.5 cm. for 62 (101), 50 cm. for 63 (106) and 76 cm. for 64 (38). (x) 20.10.1960 ; 16.10.1961 ; 20.10.1962 ; 26.10.1963 ; 26.10.1964.

#### 2. TREATMENTS :

4 cultural treatments : T<sub>0</sub>=Control (no harrowing), T<sub>1</sub>=One harrowing 6 weeks after sowing, T<sub>2</sub>=Two harrowings 4 and 6 weeks after sowing and T<sub>3</sub>=3 harrowings 4, 6 and 8 weeks after sowing.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) 29.3 m. × 9.1 m. for 60 (96) and 61 (76) ; N.A. for others. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Ergot was noticed, seed soaked in salt solution for 60 (96), Nil for others. (iii) Yield of grain. (iv) (a) 1960 to 1964. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and interaction (Treatments × years) is absent, the results of individual years are presented below.

#### 5. RESULTS :

##### 60(96)

(i) 116 Kg/ha. (ii) 36.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	107	110	117	132

##### 61(76)

(i) 227 Kg/ha. (ii) 42.6 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of grain Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	190	235	243	241

##### 62(101)

(i) 436 Kg/ha. (ii) 68.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	468	461	381	433

63(106)

(i) 662 Kg/ha. (ii) 111.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	679	744	622	605

64(38)

(i) 670 Kg/ha. (ii) 87.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	636	684	676	683

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 64(294).**

**Site :- Soil Conservation Res. Demons. and Training Centre, Vasad. Type :- 'C'.**

Object :- To study the effect of different seedrates and spacings on Bajra yield.

1. BASAL CONDITIONS :

(i) (a) *Bajra-Bajra*. (b) *Bajra*. (c) 125 Q/ha. of F.Y.M. (ii) Sandy to clay loam. (iii) 8.7.64. (iv) (a) 2 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) Nil. (v) 125 Q/ha. F.Y.M. (vi) Bajra-207. (vii) Unirrigated. (viii) 2 weedings. (ix) N.A. (x) 22.9.64.

2. TREATMENTS :

**Main-plot treatments :**

4 seed rates : R<sub>1</sub>=4.5, R<sub>2</sub>=8.8, R<sub>3</sub>=9.1 and R<sub>4</sub>=11.3 Kg/ha.

**Sub-plot treatments :**

4 spacings : S<sub>1</sub>=30 cm. × 5 cm., S<sub>2</sub>=45 cm. × 5 cm., S<sub>3</sub>=30 cm. × 10 cm. and S<sub>4</sub>=45 cm. × 10 cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) and (b) 3.6 m. × 7.0 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1963-1964 (Expt. in 1963 vitiated totally and hence not collected). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

(i) 2607 Kg/ha. (ii) (a) 937.3 Kg/ha. (b) 708.5 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	Mean
R <sub>1</sub>	2009	2604	2703	2034	2338
R <sub>2</sub>	2803	3844	3100	2331	3019
R <sub>3</sub>	2778	2232	1885	2604	2375
R <sub>4</sub>	2306	3373	2455	2654	2697
Mean	2474	3013	2536	2406	2607

C.D. for S marginal means = 508.5 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Gj. 61(126), 61(172).****Site :- Agri. Res. Stn., Talod. Agri. Res. Stn., Vijapur.****Type :- 'C'.**

Object :—To study the effect of different methods of sowing on Bajra.

**1. BASAL CONDITIONS :**

(i) (a) *Til+Jowar-Bajra* for 61(126); Nil for 61(172). (b) *Til+Jowar* for 61(126); Castor for 61(172). (c) Nil for 61(126); 12.4 C.L./ha. of F.Y.M. for 61(172). (ii) Sandy. (iii) 23.6.1961/8 to 10.7.1961 for 61(126); 28.6.1961 for 61(172). (iv) (a) 1 ploughing+1 to 2 harrowings. (b) As per treatments. (c) N.A. for 61(126), 3 Kg/ha. for 61(172). (d) As per treatments. (e) Nil. (v) Nil for 61(26); 67.2 Kg/ha. of N+84.1 Kg/ha. of  $P_2O_5$  for 61(172). (vi) B-207 for 61(126); N-207 for 61(172). (vii) Unirrigated. (viii) 2 interculturings+2 weedings for 61(126); Nil for 61(172). (ix) 82 cm., 88 cm. (x) 14.10.1961 for 61(126); 2.10.1961 for 61(172).

**2. TREATMENTS :**

4 cultural treatments :  $T_1$ =Drilling by local method (seed rate 9 Kg/ha. with spacing 30 cm. between rows),  $T_2$ =Drilling by local method and thinning at 23 cm. within line,  $T_3$ =Dibbling at 46 cm.×23 cm. and  $T_4$ =Transplanting at 46 cm.×23 cm.

N applied in two equal doses,  $\frac{1}{2}$  at sowing and other  $\frac{1}{2}$  one month after and  $P_2O_5$  at sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6 for 61(126); 3 for 61(172). (iv) (a) 11.9 m.×11.9 m. (b) 10.1 m.×10.1 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of smut and Ergot for 61(126). No incidence for 61(172). (iii) Yield of grain. (iv) (a) For one year only. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) Talod and Vijapur. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

**5. RESULTS :**

(i) 637 Kg/ha. (ii) 182.2 Kg/ha. (24 d.f. made up of pooled error and Treatments×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$
Av. yield	612	638	728	569

**Crop :- Bajra (Kharif).****Ref :- Gj. 60(3).****Site :- Agri. Res. Stn., Amreli.****Type :- 'CM'.**

Object :—To study the Departmental v/s. local method of Bajra cultivation.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 40.4 Kg/ha. of manure mixture. (ii) Medium black. (iii) 20.6.1960. (iv) (a) Nil. (b) Drilling. (c) 2.2 Kg/ha. (d) 91.4 cm.×15.2 cm. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) N-28-15-2. (vii) Un-irrigated. (viii) 3 interculturings. (ix) 40.1 cm. (x) 15.10.1960.

**2. TREATMENTS :**

2 methods of cultivation :  $T_1$ =No manure (local method) and  $T_2$ =44.8 Kg/ha. of N as A/S and 22.4 Kg/ha. of  $P_2O_5$  as Super.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 12. (iv) (a) 22.9 m.×6.4 m. (b) 22.0 m.×4.6 m. (v) 45.7 cm.×91.4 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1956 to 1960. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 374 Kg/ha. (ii) 153.4 Kg/ha. (iii) Treatments do not differ significantly. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>
Av. yield	346	

Crop :- Bajra (*Kharif*).

Ref :- Gj. 62(233), 63(260), 64(279), 65(50).

Site :- Agri. College Farm, Anand. Type :- 'CM'.

Object :- To study the effect of Pulse crops as mixed cropping with Bajra on soil fertility.

## 1. BASAL CONDITIONS :

(i) (a) *Bajra-Bajra*. (b) *Bajra* for 62(233); As per treatments for others. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(233); As per treatments for others. (ii) Sandy loam. (iii) 25.7.1962; 4.7.1963; 3.7.1964; 22.7.1965. (iv) (a) 1 ploughing+1 harrowing. (b) Drilling. (c) 11 Kg/ha. for T<sub>2</sub>; for T<sub>1</sub>: 9 Kg/ha. of *Bajra*+2 Kg/ha. each of *Moth*, *Tur* and *Guar*+0.6 Kg/ha. of *Moong*. (d) 46 cm. between rows. (e) Nil. (v) Nil. (vi) S-207. (vii) Unirrigated. (viii) 1 weeding+1 interculturing. (ix) 81 cm., 88 cm., 58 cm., 58 cm. (x) 20.10.1962; 4.10.1963; 17.10.1964; 16.10.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 manurial treatments : M<sub>0</sub>=Control and M<sub>1</sub>=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

(2) 2 types of Bajra mixture : T<sub>1</sub>=Bajra mixture with moth, tur, guar and moong and T<sub>2</sub>=Bajra alone.

Half of the fertilizers applied at the time of preparation of land and half dose after 3 weeks of sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 18.3 m.×4.6 m. (b) 16.5 m.×2.8 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1962-contd. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) For treatment T<sub>1</sub> the yield of *Bajra* alone is taken for analysis purposes.

## 5. RESULTS :

62(233)

(i) 1144 Kg/ha. (ii) 247.4 Kg/ha. (iii) Main effects of M and T are significant. (iv) Av. yield of grain in Kg/ha

	M <sub>0</sub>	M <sub>1</sub>	Mean
T <sub>1</sub>	960	1052	1006
T <sub>2</sub>	1107	1458	1282
Mean	1034	1255	1144

C.D. for M or T marginal means=215.2 Kg/ha.

63(260)

(i) 838 Kg/ha. (ii) 156.9 Kg/ha. (iii) Main effects of M and T are highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	Mean
T <sub>1</sub>	490	870	680
T <sub>2</sub>	859	1135	997
Mean	674	1002	838

C.D. for M or T marginal means=138.3 Kg/ha.

64(279)

- (i) 1242 Kg/ha. (ii) 144.6 Kg/ha. (iii) Main effect of M is highly significant and that of T is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	Mean
T <sub>1</sub>	941	1345	1143
T <sub>2</sub>	1037	1644	1340
Mean	989	1494	1242

C.D. for M or T marginal means=125.7 Kg/ha.

65(50)

- (i) 1218 Kg/ha. (ii) 193.9 Kg/ha. (iii) Main effects of M and T are highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	Mean
T <sub>1</sub>	886	1292	1089
T <sub>2</sub>	1070	1624	1347
Mean	978	1458	1218

C.D. for M or T marginal means=168.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Site :- Agri. Res. Stn., Bhachau.**

**Ref :- Gj. 65(131).**

**Type :- 'CM'.**

**Object :-** To determine the optimum dose of fertilizer and spacing on irrigated Bajra.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Castor. (c) Nil. (ii) Sandy soil. (iii) 23.7.65. (iv) (a) 2 ploughings, 1 harrowing. (b) Drilling. (c) 12 Kg/ha. (d) As per treatments. (e) —. (v) 24.7 C.L./ha. of F.Y.M. (vi) Mahudo (late). (vii) Irrigated. (viii) 1 interculturing. (ix) 35 cm. (x) 1.11.65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 spacings between rows : S<sub>1</sub>=10 cm., S<sub>2</sub>=20 cm. and S<sub>3</sub>=30 cm.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N<sub>1</sub>=44.8, N<sub>2</sub>=67.2, N<sub>3</sub>=89.7 and N<sub>4</sub>=112.1 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 12 sub-plots/main-plot. (b) N. A. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) No lodging. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1480 Kg/ha. (ii) (a) 696.7 Kg/ha. (b) 432.1 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
S <sub>1</sub>	1403	1477	1234	1419	1502	1364	1284	1383
S <sub>2</sub>	1550	1721	1668	1497	1629	1518	1680	1609
S <sub>3</sub>	1283	1473	1460	1572	1496	1439	1406	1447
Mean	1412	1557	1454	1496	1542	1440	1456	1480
P <sub>0</sub>	1503	1724	1349	1594				
P <sub>1</sub>	1399	1447	1522	1394				
P <sub>2</sub>	1335	1500	1491	1500				

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(190), 62(27), 63(7).**

**Site :- Agri. Res. Stn., Bhachau.**

**Type :- 'CM'.**

Object :—To find out the optimum dose of manures and spacings for Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 61 (190) and 63 (7), Cotton for 62 (27). (c) 22.4 Kg/ha. of N for 61 (190) and 63 (7) 49.4 C. L./ha. of F.Y.M. + 22.4 Kg/ha. of N and 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62 (27). (ii) Sandy. (iii) 12.7.61 ; 24.7.62 ; 15.7.63. (iv) (a) 1-2 ploughings, 1-3 harrowings. (b) Drilling. (c) 9 Kg/ha. ; 11 Kg/ha. ; 8 Kg/ha. (d) As per treatments. (e) N. A. (v) Nil. (vi) Local. (vii) Unirrigated for 61 (190). Irrigated for others. (viii) 1-2 interculturations. (ix) 80 cm. ; 20 cm. ; 24 cm. (x) 26.10.61 ; 30.10.62 ; 7.9.63.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 spacings between rows : R<sub>1</sub>=30, R<sub>2</sub>=46 and R<sub>3</sub>=61 cm.

(2) 3 spacings between plants : P<sub>1</sub>=15, P<sub>2</sub>=23 and P<sub>3</sub>=30 cm.

(3) 3 manurial treatments : M<sub>0</sub>=Control (no manures), M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=2 M<sub>1</sub>

N applied as A/S on 13.7.61 and P<sub>2</sub>O<sub>5</sub> as Super on 28.7.61 for 61 (190). N.A. for 62 (27).

N and P applied on 19.7.63 and 9.9.63 respectively for 63 (7).

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 3 blocks/replication ; 9 plots/block. (b) N. A. (iii) 2. (iv) (a) 9.1 m. × 8.2 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 137 cm. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory for 61(190). Good for others. (ii) Slight attack of blister beetle for 61 (190) and 63 (7). Attack of striga for 62 (27). (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Nil. (v) N. A. (vi) As rain fall was sufficient, the irrigations were not necessary for 61(190). Shortage of rains for 62(27). (vii) Nil.

## 5. RESULTS :

(i) 1004 Kg/ha. (ii) 604.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
R <sub>1</sub>	1027	958	1032	951	1049	1018	1006
R <sub>2</sub>	1026	1046	1105	878	1085	1213	1059
R <sub>3</sub>	905	1064	876	906	887	1053	948
Mean	986	1022	1005	912	1007	1095	1004
M <sub>0</sub>	922	864	950				
M <sub>1</sub>	939	1028	1053				
M <sub>2</sub>	1097	1176	1011				

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 62(43).**

**Site :- Trial-cum-Demons. Farm, Chanasura.**

**Type :- 'CM'.**

Object :—To find out the optimum dose of fertilizer and spacing for Bajra under local conditions,

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar. (c) Nil. (ii) Sandy loam. (iii) 19.7.1962. (iv) (a) Ploughing and 2 harrowings. (b) Drilling. (c) 3 Kg/ha. (d) As per treatments. (e) N. A. (v) Nil. (vi) Bajra-207. (vii) Irrigated. (viii) 2 interculturings. (ix) 33 cm. (x) 20.10.1962.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 spacing between rows : A<sub>1</sub>=46 cm, A<sub>2</sub>=91 and A<sub>3</sub>=137 cm.

(2) 3 spacings between plants : B<sub>1</sub>=15, B<sub>2</sub>=23 and B<sub>3</sub>=30 cm.

(3) 3 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=11.2 Kg/ha of N+5.6 Kg/ha of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N was applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super. Time of application is N. A.

**3. DESIGN :**

(i) 3<sup>3</sup> Fact. confd. (ii) (a) 9 plots/black, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.9 m. × 8.2 m. (b) 9.1 m. × 5.5 m. (v) 137 cm. × 137 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1962 only. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 985 Kg/ha. (ii) 175.9 Kg/ha. (iii) Main effect of A is highly significant and main effects of B and M are significant. (iv) Av. yield of grain in Kg/ha.

	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
B <sub>1</sub>	1155	1075	1051	999	1075	1207	1094
B <sub>2</sub>	1226	757	828	842	917	1053	937
B <sub>3</sub>	1073	783	914	893	885	992	923
Mean	1151	1033	931	911	959	1084	985
M <sub>0</sub>	1065	766	903				
M <sub>1</sub>	1137	816	923				
M <sub>2</sub>	1251	1033	967				

C. D. for any marginal mean = 121.6 Kg./ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(58).**

**Site :- Dry Farming Res. Stn., Deesa.**

**Type :- 'CM'.**

Object :- To study the effect of N, P and K along with seed rate on Bajra crop.

1. **BASAL CONDITIONS :**

- (i) (a) Nil. (b) Jowar. (c) Nil. (ii) Sandy. (iii) 10.7.1961. (iv) (a) 4 ploughings and one harrowing. (b) Drilling. (c) Nil. (d) As per treatments. (e) N. A. (v) Nil. (vi) B-207. (vii) Unirrigated. (viii) 2 interculturings. (ix) 94.1 cm. (x) 25.10.1961.

2. **TREATMENTS :**

**Main-plot treatments**

All combinations of (1), (2), (3) and (4).

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(2) 3 levels of  $P_2 O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

(3) 3 spacings between rows:  $S_1=30.5$ ,  $S_2=45.0$  and  $S_3=61.0$  cm.

(4) 3 seed rates :  $R_1=4.5$ ,  $R_2=6.7$  and  $R_3=9.0$  Kg/ha.

**Sub-plot treatments**

2 levels of  $K_2O$  :  $K_0=0$  and  $K_1=44.8$  Kg/ha. Fertilizers applied in furrows in 3rd week of July.

3. **DESIGN :**

- (i) Split-plot confounded. (ii) (a) 9 main-plots/block, 2 sub-plots/main-plot (b) N. A. (iii) 1 (iv) (a) 7.3 m.  $\times$  11.0 m. (b) 5.5 m.  $\times$  9.1 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

4. **GENERAL :**

- (i) Due to heavy rains the crop suffered very much lodging in 2nd week of Sept. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1959-contd. (b) No. (c) Nil. (v) to (vii) Nil.

5. **RESULTS :**

- (i) 534 Kg/ha. (ii) (a) 136.8 Kg/ha. (b) 110.8 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$S_1$	$S_2$	$S_3$	$R_1$	$R_2$	$R_3$	Mean
$K_0$	443	574	569	505	534	546	525	517	544	507	535	544	529
$K_1$	429	560	627	489	563	565	562	494	560	537	537	542	539
Mean	436	567	598	497	548	556	543	506	552	522	536	543	534
$R_1$	453	516	597	506	531	531	511	514	542				
$R_2$	454	565	590	480	539	589	558	492	559				
$R_3$	400	621	608	506	575	547	561	511	556				
$S_1$	440	558	633	484	584	562							
$S_2$	410	535	572	478	516	523							
$S_3$	457	609	591	529	545	582							
$P_0$	407	528	557										
$P_1$	468	555	623										
$P_2$	433	619	615										

C. D. for N marginal means = 55.7 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61 (60), 62 (93), 63 (96).**

**Site :- Agri. Res. Stn., Deesa.**

**Type :- 'CM'.**

Object :- To find out the optimum spacing and fertilizer dose for Bajra crop.



## 1. BASAL CONDITIONS :

(i) (a) Nil for 61 (60); Cereal-Legume for others. (b) Sesamum for 61 (60); Castor for 62 (93); Fallow for 63 (96). (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 62 (93); Nil for others. (ii) Sandy. (iii) 9.7.1961; 24.7.1962; 11.7.1963. (iv) (a) 1 to 3 ploughings+1 harrowing. (b) Drilling. (c) 6 Kg/ha. (d) As per treatments. (e) Nil. (v) Nil for 61 (60); 12.4 C.L./ha. of F.Y.M. for others. (vi) N-207 (medium) (vii) Unirrigated. (viii) 1 to 2 interculturings. (ix) 107 cm.; 26 cm.; 55 cm. (x) 10.10.1961; 10.11.1962; 6.10.1963.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 row spacings :  $S_1=30$ ,  $S_2=38$  and  $S_3=46$  cm.

(2) 3 plant spacings :  $T_1$ =Not fixed (No thinning),  $T_2=15$  cm. by thinning and  $T_3=23$  cm. by thinning.

(3) 3 manurial treatments :  $M_0$ =Control (No manure),  $M_1=11.2$  Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  and  $M_2=2 M_1$ .

## 5. DESIGN :

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block; 3 blocks/replication. (b) N.A. for 61 (60) : 32.9 m. × 57.6 m. for others. (iii) 2. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. Lodging of crop for 61 (60) in 2nd week of September. (ii) Nil. (iii) Yield of grain. (iv) 1961-1963. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Due to heavy rains the crop suffered very much for 61 (60). (vii) Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

(i) 682 Kg/ha. (ii) 108.1 Kg/ha. (36 d.f. made up of various components of Treatments × years interactions). (iii) Main effect of M is highly significant and that of S is significant. (iv) Av. yield of grain in Kg/ha.

	$S_1$	$S_2$	$S_3$	$M_0$	$M_1$	$M_2$	Mean
$T_1$	666	674	664	523	667	484	668
$T_2$	742	719	642	547	734	822	701
$T_3$	752	683	599	553	696	785	678
Mean	720	692	635	541	699	697	682
$M_0$	559	551	513				
$M_1$	722	746	629				
$M_2$	879	779	763				

C.D. for M or S marginal means=59.7 Kg/ha.

**Crop :- Bajra (Kharif). Ref :- Gj. 61 (8), 62 (92), 63 (95), 64 (198), 69 (17).**  
**Site :- Dry Farming Res. Stn., Deesa. Type :- 'CMF'.**

Object :—To find out the effect of different cultural practices on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61 (8); Bajra-Bajra for others. (b) Jowar for 61 (8); Bajra for others. (c) N.A. for 61 (8); 12.4 C.L./ha. of F.Y.M. for 62 (92), 63 (95); 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  for others. (ii) Sandy soil. (iii) 9.7.1961; 15.7.1962; 10.7.1963; 10.7.1964; 19.7.1965. (iv) (a) As per treatments. (b) Drilling. (c) 7 Kg/ha. (d) 46 cm. between rows for 61 (8); 30 cm. between rows for others. (e) Nil. (v) Nil for 61 (8), 62 (92), 63 (95); 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  for others. (vi) Bajra-207 for 61 (8); N-207 (medium) for others. (vii) Unirrigated. (viii) 1 to 2 interculturings. (ix) 94 cm.; 26 cm.; 55 cm.; 44 cm.; 38 cm. (x) 27.10.1961; 17,18.10.1962; 10.10.1963; 8.10.1964; 10.11.1965.

## 1. TREATMENTS :

## Main-plot treatments

7 cultural practices :  $C_1$ =Continuous shallow ploughing in January every year,  $C_2$ =Continuous shallow ploughing in January every alternate year,  $C_3$ =Continuous shallow ploughing in January every third year,  $C_4$ =Shallow ploughing in January followed by one harrowing,  $C_5$ =One harrowing in May,  $C_6$ =2 harrowings in January and May and  $C_7$ =3 harrowings in January, February and May.

## Sub-plot treatments

2 methods of applying F.Y.M. at 12.4 C.L./ha :  $M_1$ =In furrows and  $M_2$ =Broadcasting.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication ; 2 sub-plots/main-plot. (b) 51.2 m.  $\times$  27.4 m. (iii) 4. (iv) (a) 13.7 m.  $\times$  7.3 m. (b) 12.2 m.  $\times$  5.5 m. (v) 76 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. Heavy lodging in 2nd week of September for 61 (8) only. (ii) Nil. (iii) Yield of grain. (vi) (a) 1961-contd. (b) Yes. (c) Nil. (v) N.A. (vi) Crop suffered due to heavy rains in September, 1961. (vii) Nil.

## 5. RESULTS :

## 61 (8)

(i) 370 Kg/ha. (ii) (a) 100.1 Kg/ha. (b) 75.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$	$C_7$	Mean
$M_1$	397	410	285	337	377	417	391	373
$M_2$	397	434	251	375	345	415	344	367
Mean	397	422	268	356	361	416	368	370

## 61 (92)

(i) 454 Kg/ha. (ii) (a) 117.1 Kg/ha. (b) 45.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$	$C_7$	Mean
$M_1$	459	463	426	494	389	468	490	456
$M_2$	450	503	414	464	440	478	424	453
Mean	454	483	420	479	414	473	457	454

## 63 (95)

(i) 485 Kg/ha. (ii) (a) 115.6 Kg/ha. (b) 102.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$	$C_7$	Mean
$M_1$	531	527	448	471	486	519	422	486
$M_2$	516	508	490	448	415	504	512	485
Mean	523	517	469	459	450	511	467	485

## 64 (198)

(i) 363 Kg/ha. (ii) (a) 141.6 Kg/ha. (b) 88.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	401	361	355	351	343	390	269	353
M <sub>2</sub>	361	461	340	398	345	364	336	372
Mean	381	411	348	375	344	377	303	363

65 (17)

(i) 269 Kg/ha. (ii) (a) 81.3 Kg/ha. (b) 75.5 Kg/ha. (iii) None of the the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	282	312	255	273	277	263	263	275
M <sub>2</sub>	290	247	222	363	281	277	170	264
Mean	286	279	238	318	279	270	216	269

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60 (21), 61 (12).**

**Site :- Agri. Res. Farm, Halvad.**

**Type :- 'CM'.**

**Object :-** To assess the effect of different spacings in combination with different doses of N and P on the yield of Bajra.

#### 1. BASAL CONDITIONS :

(i) (a) Legume-Cereal-Cotton for 60 (20) ; Nil for 61 (12). (b) Cotton for 60 (21) ; N.A. for 61 (12). (c) 13 C.L. compost for 60 (21) ; N.A. for 61 (12). (ii) Medium black. (iii) 23,24.6.1960 ; 27.6.1961. (iv) (a) 1 to 2 ploughings+1 to 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 4 to 5. (v) Nil. (vi) 28-15-2. (vii) Irrigated for 60 (21) ; Unirrigated for 61 (12). (viii) 2 to 3 interculturings. (ix) 21 cm. ; 50 cm. (x) 14.10.1960 ; 7.10.1961.

#### 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 row spacings : R<sub>1</sub>=46, R<sub>2</sub>=91 and R<sub>3</sub>=137 cm.

(2) 3 plant spacings : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.

(3) 3 manurial treatments : M<sub>0</sub>=Control (No manure), M<sub>1</sub>=11.2 Kg/ha. of N+5.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=2 M<sub>1</sub>.

#### 3. DESIGN :

(i) 3<sup>3</sup> confd. (ii) 9 plots/block and 3 blocks/replication. (a) N.A. (iii) 2. (iv) 12.2 m. × 5.5 m. (b) 10.4 m. × 3.7 m. (v) (a) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Unsatisfactory for 60 (21) ; Normal for 61 (12). (ii) Attack of blisters for 60 (21) ; No incidence for 61 (12). (iii) Yield of grain. (iv) (a) 1958-1961 (modified in 1959). (b) No. (c) Results of combined analysis are given under 5. (v) Junagadh and Umralla. (vi) The crop for 60 (21) suffered due to scanty rains. (vii) Results of expt. no. 59 (56) have also been included for giving combined results. Error variances are homogeneous and interaction is present.

#### 5. RESULTS :

(i) 289 Kg/ha. (ii) 53.8 Kg/ha. (36 d.f. made up of various components of Treatments × years interaction). (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	227	237	232	239	234	223	232
M <sub>1</sub>	271	298	307	297	303	276	292
M <sub>2</sub>	369	332	328	352	348	329	343
Mean	289	289	289	296	295	276	289
S <sub>1</sub>	283	304	301				
S <sub>2</sub>	312	296	277				
S <sub>3</sub>	272	267	289				

C.D. for M marginal means=29.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 64 (154), 65 (67).**

**Site :- Agri. Res. Stn., Halvad.**

**Type :- 'CM'.**

Object :—To study the effect of cultural treatments on prevention of hardening of soil after sowing of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 10.7.64; 9.8.65. (iv) (a) 1-2 harrowings. (b) Drilling. (c) 5-6 Kg/ha. (d) 46 cm. between rows. (e) Nil. (v) Nil. (vi) N-207. (vii) Unirrigated. (viii) 2 weedings. (ix) 46 cm.; 67 cm. (x) 12.11.64; 15.12.65.

**2. TREATMENTS :**

3 cultural manurial treatments : T<sub>1</sub>=Shallow sowing with higher seed rate, T<sub>2</sub>=Sowing in previously composted furrows at 12.4 C.L./ha. of F.Y.M. and T<sub>3</sub>=Local method of sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) and (b) 10.1 m. × 10.1 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (vi) (a) 1964-1965. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) and (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 189 Kg/ha. (ii) 28.8 Kg/ha. (22 d.f. made up of pooled error and interaction of Treatments with years). (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	158	226	182

C.D. = 24.4 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 62(182), 64(133), 65(72).**

**Site :- Dry Farming Res. Stn., Jamkhambalia.**

**Type :- 'CM'.**

Object :—To study the effect of cultural practices and F.Y.M. on Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Bajra-Bajra. (b) Bajra ; Fallow ; Bajra. (c) 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 13.7.62 ; 23.7.64 ; 23.7.65. (iv) (a) As per treatments. (b) Drilling. (c) 5 Kg/ha. (d) 91 cm. between rows (e) —. (v) 12.4 C.L./ha. of F.Y.M. (vi) N-28-15-2. (vii) Unirrigated. (viii) 2 interculturings for 65(72), Nil for others. (ix) 54 cm. ; 48 cm. ; 29 cm. (x) 19.10.62 ; 27.10.64 ; 3.11.65.

## 2. TREATMENTS :

## Main-plot treatments

7 cultural treatments :  $C_1$  = Continuous shallow ploughing in January every year,  $C_2$  = Continuous shallow ploughing in January every alternate year ;  $C_3$  = Continuous shallow ploughing in January every third year ;  $C_4$  = Shallow ploughing in furrows in January followed by one harrowing in May,  $C_5$  = One harrowing in January,  $C_6$  = 2 harrowings, 1st in January and 2nd in May and  $C_7$  = 3 harrowings 1st in January, 2nd in February and 3rd in May.

## Sub-plot treatments

2 methods of application of F.Y.M. :  $M_1$  = In furrows and  $M_2$  = by broadcast.  
F.Y.M. applied at 12.4 C.L./ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14.6 m. × 7.3 m. (b) 12.2 m. × 5.5 m. (v) 122 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Not-good. (ii) Attack of bristle beetle for 64(133), Nil for others. (iii) Grain and fodder yield. (iv) (a) 1962-1965 (Not conducted in 63). (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Uneven rainfall for 62(182). Due to heavy rains in the beginning the sowing was late. Also due to scanty rains the yield was very poor for 64(133). (vii) As sub-plot errors are heterogeneous the results of individual years are presented under 5. Results.

## 5. RESULTS :

## 62 (182)

(i) 103 Kg/ha. (ii) (a) 17.0 Kg/ha. (b) 14.7 Kg/ha. (iii) Main effect of C is highly significant (iv) Av. yield of grain in Kg/ha.

	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$	$C_7$	Mean
$M_1$	65	77	89	109	115	123	134	102
$M_2$	62	77	98	110	108	134	136	104
Mean	64	77	94	110	112	128	135	103

C.D. for C marginal means = 17.8 Kg/ha.

## 64 (133)

(i) 120 Kg/ha. (ii) (a) 35.6 Kg/ha. (b) 14.9 Kg/ha. (iii) Main effect of C is highly significant. Interaction C × M is significant. (iv) Av. yield of grain in Kg/ha.

	$C_1$	$C_2$	$C_3$	$C_4$	$C_5$	$C_6$	$C_7$	Mean
$M_1$	76	95	100	109	121	140	220	123
$M_2$	77	93	100	114	131	135	171	118
Mean	76	94	100	112	126	138	196	120

C.D. for C marginal means = 37.4 Kg/ha.

C.D. for M means at the same level of C = 21.8 Kg/ha.

C.D. for C means at the same level of M = 40.5 Kg/ha.

65 (72)

(i) 200 Kg/ha. (ii) (a) 99.0 Kg/ha. (b) 97.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	177	264	204	207	213	113	249	204
M <sub>2</sub>	243	165	194	207	141	251	175	196
Mean	210	214	199	207	177	182	212	200

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60(133), 61(66).**

**Site :- Agri. Res. Stn., Jamnagar.**

**Type :- 'CM'.**

**Object :-** To assess the effect of different spacings in combination with different doses of N and P on the yield of *Bajra*.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 60 (133); Groundnut for 61 (66). (c) N.A. for 60 (133); Nil for 61 (66). (ii) Medium black. (iii) 30.6.1960; 23.6.1961. (iv) (a) 1 ploughing+1 harrowing for 60 (133); 2 harrowings for 61(66). (b) Dibbling. (c) N.A. (d) As per treatments. (e) --. (v) Nil. (vi) Local for 60 (133); 11 for 61 (66). (vii) Unirrigated. (viii) 1 to 3 weedings+1 interculturing. (ix) 31 cm., 99 cm. (x) 1.10.1960; 30.9.1961.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 row spacings : R<sub>1</sub>=46, R<sub>2</sub>=91 and R<sub>3</sub>=137 cm.

(2) 3 plant spacings : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.

(3) 4 manurial treatments : M<sub>0</sub>=Control (No manure), M<sub>1</sub>=22.4 K/gha. of N as A/S+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=2 M<sub>1</sub>.

**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 12.2 m. × 5.5 m. (b) 10.4 m. × 2.7 m. (v) 91 cm. × 137 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Attack of blister beetle. (iii) Yield of grain. (iv) (a) 1958-1961. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. nos. 58 (116) and 59 (23) have also been included for giving combined results. Error variances are heterogeneous and interaction is present.

**5. RESULTS :**

(i) 392 Kg/ha. (ii) 118.7 Kg/ha. (54 d. f. made up of various components of Treatments × years interaction). (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	398	432	355	287	380	518	395
S <sub>2</sub>	377	414	361	285	334	533	384
S <sub>3</sub>	440	405	343	271	399	518	396
Mean	405	417	353	281	371	523	392
M <sub>0</sub>	304	290	249				
M <sub>1</sub>	388	389	336				
M <sub>2</sub>	523	572	474				

C.D. for M marginal means=56.2 Kg/ha.

**Broj :- Bajra (Kharif).**  
**Site :- Agri. Res. Stn., Junagadh.**

**Ref :- Gj. 60(47),**  
**Type :- 'CM'.**

**Object :-** To assess the effect of different spacing between and within rows with different combinations of N and P on Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 30.6.1960. (iv) (a) 1 ploughing. (b) Drilling. (c) 5.6 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) Baba-puri. (vii) Irrigated. (viii) 1 inter-culturing. (ix) N.A. (x) 11.11.1960.

**2. TREATMENTS and 3. DESIGN :**

Same as in Expt. No. 60 (133) on page 279.

**4. GENERAL :**

(i) N.A. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1958-60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1029 Kg/ha. (ii) 169.8 Kg/ha. (iii) Main effects of M are highly significant. (iv) Av. yield of grain in Kg/ha.

	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
B <sub>0</sub>	1095	1155	988	930	1059	1248	1079
B <sub>1</sub>	1050	1068	988	1010	978	1120	1036
B <sub>2</sub>	1052	1001	866	804	1041	1073	973
Mean	1066	1075	947	915	1026	1147	1029
M <sub>0</sub>	967	1018	759				
M <sub>1</sub>	1075	1034	969				
M <sub>2</sub>	1155	1172	1114				

C. D. for M marginal means=117.3 Kg/ha.

**Crop :- Bajra (Kharif).**  
**Site :- Central Exptl. Stn., Junagadh.**

**Ref :- Gj. 60(84), 61(178), 62(65).**  
**Type :- 'CM'.**

**Object :-** To study the residual effect of fertilizers and spacings applied to previous lucern crop on succeeding Bajra crop.

**1. BASAL CONDITIONS :**

(i) (a) Lucern—Bajra. (b) Lucern. (c) As per treatments. (ii) Medium black. (iii) 4.7.1960 ; 30.6.1991 (Resown on 12.7.1961) ; 10.7.1962. (iv) (a) 2 ploughings+1 to 2 harrowings. (b) Drilling. (c) 6 Kg/ha. (d) 91 cm. between rows. (e) Nil. (v) Nil. (vi) Baba-puri. (vii) Un-irrigated. (viii) 2 to 4 inter-culturings. (ix) 80 cm., 59 cm., 60 cm. (x) 30.10.1960 ; 2.11.1961 ; 25.10.1962.

**2. TREATMENTS :**

**Main-plot treatments :**

4 cultural treatments : S<sub>1</sub>=15 cm. between rows, S<sub>2</sub>=30 cm. between rows, S<sub>3</sub>=30 cm. ridges and furrows and S<sub>4</sub>=Broadcastings (seed).

**Sub-plot-treatments :**

4 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=56.0, P<sub>2</sub>=112.1 and P<sub>3</sub>=168.1 Kg/ha.

**Sub-sub-plot-treatments :**

2 levels of N : N<sub>0</sub>=0 and N<sub>1</sub>=22.4 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot and 2 sub-sub-plots/sub-plot. (b) N.A. (iii) 4 for 62(65) ; 2 for others. (iv) (a) 5.5 m. × 3.7 m. for 62(65) ; 7.3 m. × 5.5 m. for others. (b) 4.9 m. × 2.4 m. for 62(65) ; 6.1 m. × 3.7 m. for others. (v) 30 cm. × 61 cm. for 62(65) ; 61 cm. × 91 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Slight attack of Ergot for 61(178) ; No incidence for others. (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Results of combined analysis given under 5. (iv) N.A. (v) Heavy rains at about sowing affected the crop for 61(178) and therefore resowing was done. (vi) Error variances are homogeneous and interactions are absent.

## 5. RESULTS :

(i) 823 Kg/ha. (ii) (a) 200.7 Kg/ha. (21 d.f. made up of pooled error and Treatments × years interaction), (b) 178.1 Kg/ha. (84 d.f. made up of various components of Treatments × years interaction and pooled error). (c) 143.6 Kg/ha. (94 d.f. made up of pooled error and various components of Treatments × years interaction). (iii) None of the effects is significant, (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	792	772	781	838	789	802	796
P <sub>1</sub>	871	837	847	883	853	865	859
P <sub>2</sub>	822	766	821	857	816	818	817
P <sub>3</sub>	880	823	779	802	792	850	821
Mean	841	800	807	845	813	834	823
N <sub>0</sub>	814	820	779	838			
N <sub>1</sub>	868	780	835	833			

**Crop Bajra (Kharif).**

**Ref :- 60(78), 61(25), 62(59), 64(203), 65(148).**

**Site : Agra. Res. Stn., Kothara.**

**Type :- 'CM'.**

Object :—To find out the economic spacings and manurial doses for Bajra crop.

## 1. BASAL CONDITIONS:

(i) (a) Nil. (b) N.A. for 60(78), Bajra for 61(25), cotton for 62(59), Jowar for 64(203) and Groundnut for 65(148). (c) N.A. for 60(78), Nil for 61(25) 12.4 C.L./ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(59) ; Nil for 64(203) ; 12.4 C.L./ha. of F.Y.M. + 12.4 Kg/ha. of N + 24.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(148). (ii) Medium black to sandy for 60, 61 and 62 ; Sandy loam for others. (iii) 3.7.1960 ; 30.7.1961 24.7.1962 ; 22.7.1964 ; 24.7.1965. (iv) (a) 1 to 2 ploughings and 1 to 2 harrowings. (b) drilling. (c) N.A. for 60(78), 6 Kg/ha. of or 62(59), 61(25) ; 4.9 Kg/ha. for others. (d) As per treatments. (e) N.A. for 60(78), 61(25), 64(203), 65(148) ; 1 for 62(59). (v) 24.7 C.L./ha. of F.Y.M. for 60(78) ; 12.4 C.L./ha. of F.Y.M. for 62(59) ; Nil for others. (vi) N 28 -15-2. (vii) Unirrigated. (viii) Interculturings for 60(78), 61(25) ; 2 weedings and 2 interculturing for others. (ix) 19.2 cm. 8.7 cm ; 28 cm. ; 37 cm ; 33 cm. (x) 16.10.1960 ; 17.12.1961 ; 9.11.1962 ; 30.10.1964 ; 22.10.1965.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 spacings between rows : R<sub>1</sub>=46 cm., R<sub>2</sub>=91 cm. and R<sub>3</sub>=137 cm.

(2) 3 spacings between plants ; P<sub>1</sub>=15 cm, P<sub>2</sub>=23 cm. and P<sub>3</sub>=30 cm,

(3) 3 manurial levels : M<sub>0</sub>=Control (No manure), M<sub>1</sub>=11.2 Kg/ha. of N + 5.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super applied in furrows at the time of planting. In 1960(78) an extra level of manure M<sub>3</sub>(=M<sub>2</sub>) was applied in two doses while M<sub>1</sub> was applied in single dose.



## 3. DESIGN :

(i) Fact. in R.B.D. for 60(78) : 3<sup>3</sup> Fact. confd. for others. (ii) (a) 36 for 60(78) ; 9 plots/block and 3 blocks/replication for others. (b) N.A. (iii) 2. (iv) (a) 8.2 m. × 6.1 m. for 60(78) ; 8.2 m. × 9.1 for others. (b) 5.5 m. × 4.6 m. for 60(78) ; 5.5 m. × 7.3 m. for others. (v) 137 cm. × 76 cm. for 60(78) ; 137 cm. × 91 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1960-65 (modified in 1961). (b) No. (c) Nil. (v) N.A. (vi) Due to heavy rains in 60(78), 61(25), 62(59) the crop was affected. Expt. for 1963 was not conducted. (vii) Since the error variances are heterogeneous and the interaction of Treatments × years is absent. Therefore the individual years results are presented below.

## 5. RESULTS :

## 60(78)

(i) 760 Kg/ha. (ii) 162.9 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
R <sub>1</sub>	681	629	625	847	678	684	726	696
R <sub>2</sub>	802	897	858	745	827	771	879	826
R <sub>3</sub>	802	686	847	693	760	768	742	757
Mean	762	737	777	762	755	741	782	760
P <sub>1</sub>	715	742	798	764				
P <sub>2</sub>	795	764	662	742				
P <sub>3</sub>	775	704	870	780				

C.D. for R marginal means=95.6 Kg/ha.

## 61(25)

(i) 150 Kg/ha. (ii) 24.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
P <sub>1</sub>	139	153	157	96	160	193	150
P <sub>2</sub>	161	137	147	114	144	187	148
P <sub>3</sub>	167	134	153	110	157	187	151
Mean	156	141	152	107	154	189	150
M <sub>0</sub>	110	105	105				
M <sub>1</sub>	159	147	155				
M <sub>2</sub>	198	172	197				

C.D. for M marginal means=17.3 Kg/ha.

## 62(59)

(i) 515 Kg/ha. (ii) 166.1 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
P <sub>1</sub>	591	555	488	428	540	666	545
P <sub>2</sub>	510	442	526	484	441	553	493
P <sub>3</sub>	575	612	337	363	472	689	508
Mean	559	536	450	425	484	636	515
M <sub>0</sub>	420	445	410				
M <sub>1</sub>	570	522	361				
M <sub>2</sub>	686	642	580				

C.D. for M marginal means=115.0 Kg/ha.

64(203)

(i) 573 Kg/ha. (ii) 147.5 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
P <sub>1</sub>	611	554	601	577	553	636	589
P <sub>2</sub>	518	658	575	544	512	695	584
P <sub>3</sub>	616	573	451	405	578	657	547
Mean	582	595	542	509	548	663	573
M <sub>0</sub>	585	488	453				
M <sub>1</sub>	561	531	551				
M <sub>2</sub>	599	766	623				

C.D. for M marginal means=102.0 Kg/ha.

65(148)

(i) 632 Kg/ha. (ii) 139.3 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
P <sub>1</sub>	661	675	649	597	654	734	662
P <sub>2</sub>	634	695	542	584	597	690	624
P <sub>3</sub>	642	641	543	526	545	765	612
Mean	649	670	578	569	599	730	633
M <sub>0</sub>	613	643	451				
M <sub>1</sub>	616	642	538				
M <sub>2</sub>	719	725	745				

C.D. for M marginal means=96.2 Kg/ha.

**Crop : Bajra (Kharif).****Ref :- Gj. 61(26).****Site :- Agri. Res. Stn., Kothara.****Type :- 'CM'.**

Object:— Improved vs local method of Bajra cultivation.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra*. (c) Nil. (ii) Medium black to sandy. (iii) 27.6.1961. (iv) (a) 2 ploughings and 2 harrowings. (b) Drilling. (c) 5.6 Kg/ha. (d) 45.7 cm. × 15.2 cm. (e) N.A. (v) 5 C.L./ha of F.Y.M. (vi) N—28—15—2. (vii) Unirrigated. (viii) 1 interculturing. (ix) 87.0 cm. (x) 17.10.1961.

**2. TREATMENTS :**

2 methods of cultivation :  $T_0$  = No application of N and  $P_2O_5$  (Local method)  $T_1$  = 44.8 Kg/ha of N + 22.4 Kg/ha. of  $P_2O_5$  (Improved method)

N as A/S in two equal doses on 27.6.61 and 23.7.61 in furrows and at side of rows respectively and  $P_2O_5$  as Super at sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 12 (iv) (a) 6.1 m. × 11.0 m. (b) 4.6 m. × 9.1 m. (v) 76 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) and (b) No. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 334 Kg/ha. (ii) 99.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_0$	$T_1$
Av. yield	436	233

C.D. = 88.2 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Gj. 62(223), 63(237), 64(229).****Site :- Irrigation-cum-Demons. Farm, Kukda. Type :- 'CM'.**

Object :— To find out the optimum spacing and dose of N and P for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Groundnut-cotton-Bajra for 64(229) ; Nil for others. (b) Cotton. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  for 63(237) ; Nil for others. (ii) Medium black. (iii) 10.7.1962 ; 11.7.1963 ; 6.7.1964. (iv) (a) 2 ploughings + 2 harrowings for 64(229) ; 2 to 3 harrowings for others. (b) Drilling. (c) 6 Kg/ha. (d) As per treatments. (e) Nil. (v) Nil. (vi) N-207. (vii) Un-irrigated. (viii) Nil. (ix) 16 cm. ; 41 cm. ; 36 cm. (x) 20.10.1962 ; 21.10.1963 ; 9.10.1964.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 row spacings :  $R_1=46$ ,  $R_2=91$  and  $R_3=137$  cm.(2) 3 plant spacings :  $P_1=15$ ,  $P_2=23$  and  $P_3=30$  cm.(3) 3 levels of fertilizers :  $F_0=0$ ,  $F_1=11.2$  Kg/ha. of N + 5.6 Kg/ha. of  $P_2O_5$  and  $F_2=2F_1$ .N as A/S and  $P_2O_5$  as Super were applied as broadcast.**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.0 m. × 8.2 m. (b) 9.1 m. × 5.5 m. (v) 91 cm. × 137 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1962-1964. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and interaction is present.

## 5. RESULTS :

- (i) 524 Kg./ha. (ii) 102.3 Kg/ha. (36 d.f. made up of various components of Treatments×years interaction).  
 (iii) Main effects of R and F are highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
P <sub>1</sub>	579	561	501	447	554	640	547
P <sub>2</sub>	560	492	502	475	512	567	518
P <sub>3</sub>	601	486	434	446	500	575	507
Mean	580	513	479	456	522	594	524
F <sub>0</sub>	498	414	456				
F <sub>1</sub>	564	523	479				
F <sub>2</sub>	678	602	502				

C.D. for R or F marginal means=56.5 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(92), 62(4).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Type :- 'CM'.**

Object —To study the optimum dose of fertilizer along with spacings for Bajra.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Tobacco for 61(92); Cotton for 62(4). (c) Nil for 61(92); 12.4 C.L./ha. of F.Y.M.+ 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(4). (ii) Sandy loam. (iii) 2.7.1961; 12.7.1962. (iv) (a) 1 to 4 ploughings+1 harrowing. (b) Drilling. (c) 7 Kg./ha. (d) As per treatments. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. (vi) Bajra-207. (vii) Un-irrigated for 61(92); Irrigated for 62(4). (viii) 2 to 3 interculturations. (ix) 65 cm.; 61 cm. (x) 7.10.1961; 14.10.1962.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 row spacings : R<sub>1</sub>=30, R<sub>2</sub>=38 and R<sub>3</sub>=46 cm.

(2) 3 plant spacings : S<sub>0</sub>=Not fixed (no thinning), S<sub>1</sub>≧15 cm. by thinning and S<sub>2</sub>=23 cm. by thinning.

(3) 3 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=2M<sub>1</sub>.

## 3. DESIGN :

- (i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1962. (b) No. (c) Nil. (v) N.A. (vi) The crop for 61(92) and 62(4) were affected by heavy and continuous rains just before harvesting. (vii) Since the error variances are heterogeneous and interaction is absent, therefore individual years results are presented below.

## 5. RESULTS:

## 61(92)

- (i) 1051 Kg/ha. (ii) 117.9 Kg/ha. (iii) Main effects of S and M are highly significant and interaction R×M is significant. (iv) Av. yield of grain in Kg./ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>0</sub>	1129	1161	1142	984	1164	1284	1144
S <sub>1</sub>	1118	1124	1027	1021	1072	1176	1090
S <sub>2</sub>	983	882	891	836	913	1007	919
Mean	1077	1056	1020	947	1050	1156	1051
M <sub>0</sub>	993	924	924				
M <sub>1</sub>	1092	972	1085				
M <sub>2</sub>	1145	1272	1051				

C.D. for S or M marginal means=81.5 Kg/ha.

C.D. for the body of R×M table=141.1 Kg/ha.

62(4)

(i) 1130 Kg/ha. (ii) 232.0 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>0</sub>	1304	1179	1103	1124	1087	1375	1195
S <sub>1</sub>	1172	1064	1117	1086	1067	1200	1118
S <sub>2</sub>	1202	1050	981	1011	1026	1196	1078
Mean	1226	1098	1067	1074	1060	1257	1130
M <sub>0</sub>	1162	1048	1011				
M <sub>1</sub>	1116	1016	1049				
M <sub>2</sub>	1399	1230	1142				

C.D. for M marginal means=160.4 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- GJ. 62(240), 63(271), 64(291).**

**Site :- Agri. Res. Stn., Talod.**

**Type :- 'CM'.**

**Object :-** To find out the optimum manurial and spacing requirements of Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut for 62(240), 64(291) ; Cotton for 63(271). (c) Nil for 62(240), 64(291) ; 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy soil. (iii) 7.7.1962 ; 27.6.1963 ; 2.7.1964. (iv) (a) 1 ploughing and 2 to 3 harrowings. (b) Dibbling. (c) 4.9 Kg/ha. (d) As per treatments. (e) One or two/hill. (v) Nil for 62(240) ; 12.4 C.L./ha. of F.Y.M. (vi) N-207. (vii) Unirrigated. (viii) 1 to 2 weedings and 1 to 2 interculturings. (ix) 66.2 cm. ; 69.5 cm. ; 38.9 cm. (x) 15.10.1962 ; 25.9.1963 10.10.1964.

**2. TREATMENTS :**

All combinations of (1), (2) and (3).

(1) 3 levels of row spacings : R<sub>1</sub>=30.5, R<sub>2</sub>=38.1 and R<sub>3</sub>=45.7 cm.

(2) 3 levels of plant spacings : S<sub>1</sub>=Irregular, S<sub>2</sub>=15.2 cm. and S<sub>3</sub>=22.9 cm.

(3) 3 levels of fertilizers : M<sub>0</sub>=No fertilizer, M<sub>1</sub>=11.2 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

## 3. DESIGN :

- (i) 3<sup>3</sup> confd. RS<sup>3</sup>M<sup>3</sup> confd. totally. (ii) 9 plots/block; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 92 cm. × 92 cm. (vi) Yes.

## 4. GENERAL :

- (i) Not satisfactory for 62(240), 63(271); Normal for 64(291). (ii) Light attack of smut of Ergot for 62(240); attack of heavy catter piller for 63(271); Nil for 64(291). (iii) Grain and fodder yield. (iv) (a) 1961—1964(1961 N.A.). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the error variances are heterogeneous and interaction Treatments × years is absent. Therefore individual years results are presented below.

## 5. RESULTS :

## 62(240)

- (i) 489 Kg/ha. (ii) 117.4 Kg/ha. (iii) Main effects of R and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	380	359	582	430	450	440	440
S <sub>2</sub>	462	531	609	393	530	679	534
S <sub>3</sub>	450	536	490	350	509	617	492
Mean	430	475	560	391	496	576	489
M <sub>0</sub>	293	407	473				
M <sub>1</sub>	437	534	519				
M <sub>2</sub>	561	485	689				

C.D. for R or M marginal means = 80.8 Kg/ha.

## 63(271)

- (i) 597 Kg/ha. (ii) 255.9 Kg/ha. (iii) Main effects of S and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	689	731	712	543	610	980	711
S <sub>2</sub>	535	632	633	426	591	783	600
S <sub>3</sub>	546	418	478	306	461	675	481
Mean	590	594	608	425	554	813	597
M <sub>0</sub>	400	399	477				
M <sub>1</sub>	540	600	521				
M <sub>2</sub>	831	782	826				

C.D. for S or M marginal means = 176.0 Kg/ha.

## 64(291)

- (i) 911 Kg/ha. (ii) 222.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	903	809	881	767	831	993	863
S <sub>2</sub>	1040	916	964	853	944	1131	975
S <sub>3</sub>	987	941	751	643	991	1044	893
Mean	979	888	865	754	922	1056	911
M <sub>0</sub>	844	681	737				
M <sub>1</sub>	1011	935	819				
M <sub>2</sub>	1081	1048	1039				

C.D. for M marginal means=153.4 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(150), 62(148).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'CM'.**

**Object :-**To find out the suitable spacing and optimum dose of fertilizer for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 61(150); Wheat for 62(148). (c) N.A. for 61(150); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(148). (ii) Sandy loam. (iii) 28.6.1961; 11.7.1962. (iv) (a) 1 ploughing+1 to 2 harrowings. (b) Drilling. (c) 10 Kg/ha. (d) As per treatments. (e) Nil. (v) Nil. (vi) Bajra-207. (vii) Unirrigated. (viii) 1 interculturing for 61(150); Nil for 62(148). (ix) 73 cm.; 67 cm. (x) 22.9.1961; 28.9.1962.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 row spacings : R<sub>1</sub>=30, R<sub>2</sub>=38 and R<sub>3</sub>=46 cm.

(2) 3 plant spacings : S<sub>0</sub>=Irregular (no thinning), S<sub>1</sub>=15 cm. by thinning and S<sub>2</sub>=23 cm. by thinning.

(3) 3 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=11.2 Kg/ha. of N as A/S+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=2M<sub>1</sub>.

**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×6.4 m. (b) 7.3 m.×4.6 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of blister beetle for 61(150); No incidence for 62(148). (iii) Yield of grain. (iv) (a) 1961—1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 785 Kg/ha. (ii) 182.2 Kg/ha. (62 d.f. made up of various components of Treatments×years interaction and pooled error). (iii) Main effects of R and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>0</sub>	583	780	860	582	738	903	741
S <sub>1</sub>	699	776	997	703	789	980	824
S <sub>2</sub>	698	796	876	641	801	928	790
Mean	660	784	911	642	776	937	785
M <sub>0</sub>	488	718	720				
M <sub>1</sub>	720	778	830				
M <sub>2</sub>	772	856	1183				

C.D. for R or M marginal means=85.9 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 60(105), 61(78), 62(86).**

**Site :- Agri. Res. Stn., Umrjala.**

**Type :- 'CM'.**

**Object :-** To find out the suitable spacing and optimum dose of fertilizer for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) *Bajra*-Wheat-Cotton for 62(86) ; Nil for others. (b) N.A. for 60(105) ; Sesamum for 61(78), Gram for 62(86). (c) N.A. for 60(105) ; Nil for others. (ii) Medium black. (iii) 1.7.1960 ; 27.6.1961 ; 17.7.1962. (iv) 1 ploughing+1 to 3 harrowings (b) Drilling. (c) 6 Kg/ha. (d) As per treatments. (e) —. (v) Nil for 60(105) ; 12.4 C.L./ha. of F.Y.M. for others. (vi) 28-15-2. (vii) Unirrigated. (viii) Nil for 60(105) ; 2 interculturings+1 weeding for 61(78) ; 2 thinnings+4 weedings for 62(86). (ix) N.A., 36 cm., 33 cm. (x) 15.10.1960 ; 9.10.1961 ; 24.10.1962.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 row spacings : R<sub>1</sub>=46, R<sub>2</sub>=91 and R<sub>3</sub>=137 cm.

(2) 3 plant spacings : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.

(3) 3 manurial treatments : M<sub>0</sub>=Control (No Manure), M<sub>1</sub>=22.4 Kg/ha. of N as A/S+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=2 M<sub>1</sub>.

**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block and 5 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 7.3 m. × 5.5 m. (b) 5.5 m. × 2.7 m. for 62(86) ; 5.5 m. × 3.7 m. for others. (v) 91 cm. × 137 cm. for 62(86) ; 91 cm. × 91 cm. for others. (vi) Yes.

**4. GENERAL :**

(i) Below normal for 60(105) ; Normal for others. (ii) Nil. BHC 5% powder was dusted against bristle beetle for 62(86). (iii) Yield of grain. (iv) (a) 1958-1962. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. No. 58(104) and 59(103) have also been included for giving combined results. Error variances are heterogeneous and interaction is present.

**5. RESULTS :**

(i) 801 Kg/ha. (ii) 135.3 Kg/ha. (72 d. f. made up of various components of Treatments × years interaction). (iii) Main effect of M alone is significant. (iv) Av. yield of grain in Kg/ha.



	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	860	728	761	766	771	812	783
S <sub>2</sub>	816	820	830	764	840	862	822
S <sub>3</sub>	799	825	770	738	810	846	798
Mean	825	791	787	756	807	840	801
M <sub>0</sub>	766	741	761				
M <sub>1</sub>	817	805	799				
M <sub>2</sub>	892	827	801				

C.D. for M marginal means=57.0 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 61(173), 62(222), 63(234).**

**Site :- Agri. Res. Stn., Vijapur.**

**Type :- 'CM'.**

**Object :-** To find out the best combination of spacing, N and P<sub>2</sub>O<sub>5</sub> for Bajra.

#### 1. BASAL CONDITIONS :

(i) (a) Nil for 61(173); *Bajra-Wheat* for others. (b) *Wheat*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(173); Nil for others. (ii) Sandy loam. (iii) 29.9.1961; 10.7.1962; 28.6.1963. (iv) (a) 1 to 2 ploughings+1 to 2 harrowings. (b) Drilling for 61(173); Dibbling for others. (c) 3 Kg/ha. for 61(173); 4 Kg/ha. for others. (d) As per treatments. (e) 2 to 3. (v) Nil for 61(173); 12.4 C.L./ha. of F.Y.M. for others. (vi) N-207. (vii) Unirrigated. (viii) 1 to 2 interculturings. (ix) 88 cm.; 56 cm.; 96 cm. (v) 9.10.1961; 13.10.1962; 24.9.1963.

#### 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 row spacings : R<sub>1</sub>=30, R<sub>2</sub>=38 and R<sub>3</sub>=46 cm.

(2) 3 plant spacings : S<sub>1</sub>=Not fixed (irregular), S<sub>2</sub>=15 and S<sub>3</sub>=23 cm.

(3) 3 manurial treatments : M<sub>0</sub>=Control (No manure), M<sub>1</sub>=11.2 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=2 M<sub>1</sub>.

N was applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

#### 3. DESIGN :

(i) 3<sup>3</sup> confd. for 61(173); 3<sup>3</sup> Fact. in R.B.D. for others (ii) (a) 9 plots/block; 3 blocks/replication for 61(173); 27 for others. (b) N.A. (iii) 2. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91cm.×91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Due to heavy rains with high velocity wind on 6.9.1963, the crop was completely lodged for 63(234). (vii) Error variances are homogeneous and interaction is present.

#### 5. RESULTS :

(i) 1176 Kg/ha. (ii) 155.8 Kg/ha. (36 d.f. made up of various components of Treatments×years interaction). (iii) Main effect of M is highly significant and that of R is significant. (iv) Av. yield of grain in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1058	1191	1252	1042	1179	1280	1167
S <sub>2</sub>	1086	1186	1229	1131	1089	1281	1167
S <sub>3</sub>	1180	1190	1215	1097	1194	1294	1195
Mean	1108	1189	1232	1090	1154	1285	1176
M <sub>0</sub>	1056	1092	1122				
M <sub>1</sub>	1065	1168	1229				
M <sub>2</sub>	1203	1307	1345				

C.D. for M or R marginal means=86.1 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- 64(31), 65(120).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'ICM'.**

Object :- To study the effect of different spacings manuring and irrigations on the yield of Bajra.

#### 1. BASAL CONDITIONS :

(i) (a) *Jowar* or *Bajra*-Groundnut-Cotton for 64(31); Nil for 65(120). (b) Cotton. (c) 11.2 Kg/ha. of N+ 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(31); 33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 15.7.1964; 22.7.65. (iv) (a) 1 ploughing, 2 to 4 harrowings. (b) Dibbling. (c) 4.9 Kg/ha.; 3.7 Kg/ha. (d) As per treatments. (e) 1 to 2 plants/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) Babapuri (late). (vii) Irrigated. (viii) 1 interculturing and weeding for 61(31); 2 interculturings for other. (ix) 73 cm.; 60 cm. (x) 26.10.1964; 6.11.1965.

#### 2. TREATMENTS :

##### Main-plot treatments

3 levels of irrigation : I<sub>0</sub>=No irrigation, I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

##### Sub-plot treatments :

All combinations (1) and (2),

(1) 2 spacings : S<sub>1</sub>=61 cm. × 15 cm. and S<sub>2</sub>=61 cm. × 23 cm.

(2) 3 levels of manuring : M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>2</sub>=44.8 Kg/ha. of N+ 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>3</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super applied at sowing in furrows.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) 51.2 m. × 18.3 m. (iii) 2. (iv) (a) 8.5 m. × 6.1 m. (b) 7.3 m. × 4.9 m. (v) 61 cm. × 61 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964-65. (b) No. (c) Nil. (v) Junagadh and Bhachau. (vi) Nil. (vii) The expt. 64(31) was analysed as Fact. in R.B.D. with 6 replications because the irrigational levels could not be maintained due to lack of irrigational facilities.

#### 5. RESULTS :

##### 64(31)

(i) 611 Kg/ha. (ii) 107.4 Kg/ha. (iii) Main effects of M is highly significant and main effect of S is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	547	646	771	655
S <sub>2</sub>	498	539	668	568
Mean	522	592	719	611

C.D. for M marginal means=90.3 Kg/ha.

C.D. for S marginal means=73.7 Kg/ha.

65(120)

- (i) 1399 Kg/ha. (ii) (a) 151.1 Kg/ha. (b) 143.1 Kg/ha. (iii) Main effects of M and I are significant.  
 (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
S <sub>1</sub>	1337	1428	1574	1142	1490	1706	1446
S <sub>2</sub>	1269	1299	1489	1055	1436	1566	1352
Mean	1303	1364	1531	1099	1463	1636	1399
I <sub>0</sub>	1042	1111	1143				
I <sub>1</sub>	1343	1367	1679				
I <sub>2</sub>	1525	1612	1772				

C.D. for M marginal means=124.5 Kg/ha.

C.D. for I marginal means =265.4 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 64(30), 65(119).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'ICM'.**

Object :-To find out the effect of different spacings, manuring and irrigations on Bajra.

#### 1. BASAL CONDITIONS :

- (i) (a) *Jowar or Bajra*—Groundnut—Cotton for 64(30) ; Nil for 65(119). (b) Cotton. (c) 11.2 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(30) ; 33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(119). (ii) Medium black. (iii) 14.6.1964 ; 5.8.1965. (iv) (a) 1 to 2 ploughings, 1 to 4 harrows. (b) Dibbling. (c) 5 Kg/ha. ; 3.7 Kg/ha. (d) As per treatments. (e) 1 to 2 plants/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) N—28-15-2 (early). (vii) Irrigated. (viii) 1 weeding and interculturing. (ix) 73 cm. ; 60 cm. (x) 9.10.1964 ; 1.11.1965.

#### 2. TREATMENTS :

##### Main-plot treatments :

3 levels of irrigation : I<sub>0</sub>=No irrigation, I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

##### Sub-plot treatments

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=61 cm. × 15 cm. and S<sub>2</sub>=61 cm. × 23 cm.

(2) 3 levels of manuring : M<sub>1</sub>=22.4 Kg/ha. of N as A/s+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>2</sub>=44.8 Kg/ha. of N +22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>3</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

Fertilizers were applied at sowing in furrows.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) 51.2 m. × 18.3 m. for 64(30) ; N.A. for other. (iii) 2. (iv) (a) 8.5 m. × 6.1 m. (b) 7.3 m. × 4.9 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964-65. (b) No. (c) Nil. (v) Bhachau and Junagadh. (vi) Nil. (vii) The expt. was analysed as Fact. in R.B.D. with 6 replications due to continuous rains and the irrigation levels were not maintained for 64(30).

## 5. RESULTS :

64(30)

(i) 1427 Kg/ha. (ii) 269.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	1394	1407	1482	1428
S <sub>2</sub>	1480	1391	1410	1427
Mean	1437	1399	1446	1427

65(119)

(i) 1198 Kg/ha. (ii) (a) 236.4 Kg/ha. (b) 205.5 Kg/ha. (iii) Main effect of M and interaction M × S are significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	918	1213	1290	827	1347	1247	1140
S <sub>2</sub>	990	1448	1328	1243	1280	1243	1255
Mean	954	1331	1309	1035	1313	1245	1198
M <sub>1</sub>	924	1069	1113				
M <sub>2</sub>	1008	1580	1352				
M <sub>3</sub>	929	1344	1463				

C.D. for M marginal means = 178.8 Kg/ha.

C.D. for means in the body of M × S table = 252.7 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 64 (187), 65 (132).**

**Site :- Agri. Res. Stn., Bhachau.**

**Type :- 'ICM'.**

**Object :-** To determine the optimum requirements of irrigations, spacings and fertilizers for Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy soil. (iii) 3.7.1964 ; 23.7.1965. (iv) (a) 1 ploughing for 64 (187) ; 2 ploughings and 1 harrowing for 65 (132). (b) Hand sowing. (c) 12.4 Kg/ha. (d) As per treatments. (e) 2 to 3 seeds/hill. (v) 24.7 C.L./ha of F.Y.M. (vi) Babapuri (early). (vii) Irrigated. (viii) 1 weeding for 64 (187) ; 1 interculturing for 65 (132). (ix) 20 cm. ; 35 cm. (x) 12.10.1964 ; 23.10.1965.

## 2. TREATMENTS :

## Main-plot treatments

3 levels of irrigation :  $I_0$ =No irrigation,  $I_1$ =2 and  $I_2$ =3 irrigations.

## Sub-plot treatments

All combinations of (1) and (2)

(1) 3 manurial levels :  $M_1$ =22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ ,  $M_2$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_3$ =67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

(2) 2 spacings :  $S_1$ =61 cm.×15 cm. and  $S_2$ =61cm.×23 cm.

N as A/S and  $P_2O_5$  applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) 51.2 m.×13.1 m. for 64 (187) ; N.A. for other. (iii) 2. (iv) (a) 8.5 m.×6.4 m. (b) 7.3 m.×5.5 m. (v) 61 cm.×46 cm. (vi) N.A.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1964-65. (b) and (c) Nil. (v) N.A. (vi) Nil. (vii) Sub-plot error variances are heterogeneous.

## 5. RESULTS :

## 64 (187)

(i) 1339 Kg/ha. (ii) (a) 49.8 Kg/ha. (b) 216.3 Kg/ha. (iii) Main effect of I is highly significant. Main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$M_1$	$M_2$	$M_3$	Mean
$S_1$	1109	1543	1453	1207	1384	1514	1368
$S_2$	1073	1489	1365	1166	1356	1404	1309
Mean	1091	1516	1409	1187	1370	1459	1339
$M_1$	993	1372	1195				
$M_2$	1130	1541	1439				
$M_3$	1150	1635	1592				

C.D. for I marginal means =87.3 Kg/ha.

C.D. for M marginal means=188.2 Kg/ha.

## 65 (132)

(i) 1038 Kg/ha. (ii) (a) 112.8 Kg/ha. (b) 375.4 Kg/ha. (iii) Main effect of I acre is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$M_1$	$M_2$	$M_3$	Mean
$S_1$	877	1177	1089	1056	887	1200	1048
$S_2$	1023	1267	792	752	1117	1214	1028
Mean	950	1222	941	904	1002	1207	1038
$M_1$	1098	858	755				
$M_2$	733	1352	921				
$M_3$	1018	1456	1147				

C.D. for I marginal means=198.1 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 63(31), 64(2), 65(139).**

**Site :- Trial-cum-Demons. Farm,  
Chanasura.**

**Type :- 'ICM'.**

**Object :-** To find out the economic spacings and fertilizer dose under irrigated conditions for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Rapeseed for 63 (31), 65 (139); Bajra in Kharif and wheat in Rabi for 64 (2). (c) Nil for 63 (31), 64 (2); 22.4 Kg/ha. of N for 65 (139). (ii) Light goradu (Sandy loam). (iii) 13.7.1963; 19.7.1964; 6.7.1955. (iv) (a) 1 to 2 ploughings, 2 to 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) N.A. for 63 (31), 64 (2); 2 to 3 seeds/dibble. (v) 12.4 C.L./ha. of F.Y.M. for 63 (31), 64 (2); Nil for 65 (139). (vi) Bajra-207 (early). (vii) As per treatments. (viii) 1 to 2 interculturings for 63 (31), 64 (2); Nil for 65 (139). (ix) 59 cm.; 44 cm.; 34 cm. (x) 4.10.1963; 3.10.1964; 7.10.1965.

**2. TREATMENTS :**

**Main-plot treatments**

3 levels of irrigations :  $I_0=0$ ,  $I_1=1$  and  $I_2=2$  irrigations.

**Sub-plot treatments**

All combinations of (1) and (2)

(1) 3 manurial levels :  $M_1=22.4$  Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ ,  $M_2=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_3=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

(2) 2 spacings :  $S_1=46$  cm.  $\times$  15 cm. and  $S_2=46$  cm  $\times$  23 cm.

N as A/S and  $P_2O_5$  as super applied at sowing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.23 m.  $\times$  6.4 m. (b) 7.3 m.  $\times$  5.5 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain and fodder. (iv) (a) 1963-65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Sub-plot error variances are heterogeneous.

**5. RESULTS :**

**63 (31)**

(i) 1244 Kg/ha. (ii) (a) 3.9 Kg/ha. (b) 187.9 Kg/ha. (iii) Main effects of I and M are highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$M_1$	$M_2$	$M_3$	Mean
$S_1$	1137	1408	1246	1080	1312	1398	1263
$S_2$	1158	1266	1250	1029	1306	1339	1225
Mean	1148	1137	1248	1055	1309	1369	1244
$M_1$	970	1137	1056				
$M_2$	1156	1467	1305				
$M_3$	1311	1408	1383				

C.D. for I marginal means =6.9 Kg/ha.

C.D. for M marginal means=163.4 Kg/ha.

**64 (2)**

(i) 1215 Kg/ha. (ii) (a) 112.9 Kg/ha. (b) 231.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	1260	1213	1088	1067	1146	1347	1187
S <sub>0</sub>	1150	1321	1260	980	1287	1464	1244
Mean	1205	1267	1174	1024	1217	1405	1215
M <sub>1</sub>	1080	1150	840				
M <sub>2</sub>	1177	1274	1199				
M <sub>3</sub>	1358	1375	1482				

C.D. for M marginal means=201.8 Kg/ha,

65 (139)

(i) 2523 Kg/ha. (ii) (a) 435.5 Kg/ha. (b) 427.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	2187	2743	2749	2349	2753	2577	2560
S <sub>2</sub>	2142	2610	2710	2383	2338	2741	2487
Mean	2165	2676	2729	2366	2545	2659	2523
M <sub>1</sub>	2311	2414	2373				
M <sub>2</sub>	2127	2619	2890				
M <sub>3</sub>	2056	2996	2925				

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 63(30), 64(195).**

**Site :- Trial-cum-Demons. Farm; Chanasura.**

**Type :- 'ICM'.**

**Object :-**To find out the economic spacing, number of irrigations and requirements of fertilizers for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Rape; wheat. (c) Nil; 12.4 C.L./ha. of F.Y.M. (ii) Sandy soil. (iii) 13.7.63; 20.7.64. (iv) (a) 1-2 ploughings and harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1-2. (v) 12.4 C.L./ha. of F.Y.M. (vi) Babapuri (late). (vii) Irrigated. (viii) 1 interculturing. (ix) 59 cm.; 44 cm. (x) 27.10.63; 28.10.64.

**2. TREATMENTS :**

**Main-plot treatments**

3 levels of irrigations: I<sub>0</sub>=No irrigation; I<sub>1</sub>=2 irrigations and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments**

All combinations of (1) and (2)

(1) 2 spacings: S<sub>1</sub>=46 cm. × 15 cm. and S<sub>2</sub>=46 cm. × 23 cm.

(2) 3 manurial treatments: M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>2</sub>=2 M<sub>1</sub> and M<sub>3</sub>=3 M<sub>1</sub>.

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

**3. DESIGN :**

(i) Split-plot. (ii) 3 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.23 m. × 6.4 m. (b) 7.3 m. × 5.5 m. (v) 46 cm. × 46 cm. (iv) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963-1964. (b) No. (c) The results of combined analysis are presented under 5. (v) N.A. (vi) Shortage of rains. (vii) Plot to plot variation is very high the reasons for the same is N.A. for 64 (195).

## 5. RESULTS :

(i) 595 Kg/ha. (ii) (a) 168.4 Kg/ha. with 6 d.f. made up of pooled error and interaction of Treatments with years. (b) 247.4 Kg/ha. with 41 d.f. made up of pooled error and interactions of S,M, I×S, I×M and S×M with years. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	600	573	622	568	582	645	598
S <sub>2</sub>	544	686	545	430	654	690	591
Mean	572	629	584	499	618	668	595
M <sub>1</sub>	464	523	509				
M <sub>2</sub>	518	623	714				
M <sub>3</sub>	734	741	527				

**Crop :- Bajra (Kharif.)**

**Ref :- Gj. 63(218), 64(181), 65(87).**

**Site :- Irrigation Demons. Farm., Jamnagar. Type :- 'ICM'.**

Object :—To study the effect of irrigations, fertilisers and spacings on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut and *Jowar*; *Bajra* and Cotton respectively. (c) Nil for 63 (218), 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for *Bajra* and 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for cotton. (ii) Medium black soil. (iii) 24.7.63; 11.7.64; 23.7.65. (iv) (a) 1-2 ploughings and 2 harrowings. (b) Dibbling. (c) 5 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Hybrid (early). (vii) As per treatments. (viii) 2-3 interculturations and weeding. (ix) 29 cm.; 57 cm.; 34 cm. (x) 22.10.63; 16.10.64; 10.10.65.

## 2. TREATMENTS :

**Main plot treatments**

3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=1 irrigation (on 4.9.63), I<sub>2</sub>=2 irrigations (on 18/8 and 15/9/63).

**Sub-plot treatments**

All combinations of (1) and (2)

(1) 3 levels of fertilizers : F<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, F<sub>2</sub>=2 F<sub>1</sub> and F<sub>3</sub>=3F<sub>1</sub>.

(2) 2 spacings : S<sub>1</sub>=61 cm.×15 cm. and S<sub>2</sub>=61 cm.×23 cm.

N as A/S broadcast at sowing, P<sub>2</sub>O<sub>5</sub> as Super drilled on 25.6.64. One irrigation on 4.9.64 and 2 irrigations on 4/9/64 and 17.9.64 respectively for 64 (181).

N as A/S broadcast on 29.8.65, P<sub>2</sub>O<sub>5</sub> as Super drilled on 22.6.65. One irrigation on 24.8.65 and 2 irrigations on 8.8.65 and 19.9.65 respectively for 65 (87).

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plots. (b) N.A. (ii) 2. (vi) (a) 8.5 m.×6.4 m. (b) 7.3 m.×5.5 m. (v) 61 cm.×46 cm. (vi) Yes.

## 4. GENERAL :

(i) Lodging in Oct. for 64 (218). Normal for others. (ii) Blister beetle attack for 63 (218) and 64 (181). Nil for 65 (87). (iii) Yield of grain. (iv) (a) 1963-1965. (b) No. (c) The results of combined analysis are presented under 5. Results. (v) N.A. (vi) The crop was initially raised with soaking dose of canal water due to late receipt of monsoon in 63 (218). (vii) Nil.



## 5. RESULTS :

- (ii) 736 Kg/ha. (ii) (a) 344.6 Kg/ha. with 10 d.f. made up of pooled error and interaction of Treatments with years. (b) 200.1 Kg/ha. with 22 d.f. made up of interaction of years with S, F, I×F, I×S and F×S. (iii) Main effect of I is significant. Main effect of F is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mcan
F <sub>1</sub>	482	744	635	616	628	622
F <sub>2</sub>	586	782	654	703	644	674
F <sub>3</sub>	745	1011	984	943	834	913
Mean	604	846	759	754	719	736
S <sub>1</sub>	647	844	771			
S <sub>2</sub>	562	848	746			

C.D. for I marginal means=180.9 Kg/ha.  
C.D. for F marginal means=97.8 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 63(219) ; 64(179) ; 65(85).**

**Site :- Irrigation Demons. Farm, Jamnagar.**

**Type :- ICM<sup>2</sup>.**

**Object :** To study the effect of irrigations, fertilizers and spacings on the yield of Bajra.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Groundnut and Jowar for 63 (219) ; Bajra for 64 (179) and Cotton for 65 (85). (c) Nil ; 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> respectively. (ii) Medium black. (iii) 26.7.63 ; 11.7.4 ; 23.7.65. (iv) (a) 1-2 ploughings and 2-3 harrowings. (b) Dibbling. (c) 3-5 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Babapuri (late). (vii) As per treatments. (viii) 2 interculturations and weedings. (ix) 29 cm. ; 57 cm. ; 34 cm. (x) 27.10.63 ; 28.10.64 ; 28.10.65.

## 2. TREATMENTS :

**Main-plot treatments**

3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments**

All combinations of (1) and (2).

(1) 3 levels of fertilizers : F<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, F<sub>2</sub>=2F<sub>1</sub>, and F<sub>3</sub>=3F<sub>1</sub>.

(2) 2 spacings : S<sub>1</sub>=61 cm. × 15 cm. and S<sub>2</sub>=61 cm. × 23 cm.

N as A/S broadcast at sowing and P<sub>2</sub>O<sub>5</sub> as Super drilled 4 weeks before sowing. Irrigated on 18.8.63 ; 5.9.63 and 29.9.63 for 63(219). P<sub>2</sub>O<sub>5</sub> as Super drilled 2 weeks before sowing and irrigated on 4.9.64 ; 17.9.64 and 2.10.64 for 64 (179).

N as A/S broadcasted 4 weeks after sowing and P<sub>2</sub>O<sub>5</sub> as Super drilled 4 weeks before sowing. Irrigated on 8.8.65 ; 24.8.65 and 19.9.65 for 65 (85).

## 3. DESIGN :

- (i) Split-plot. (ii) 3 main-plots/replication ; 6 Sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.53 m. × 6.5 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal for 63(219). Unsatisfactory for others. (ii) Blister beetle attack in 63 (219) and 64 (119). (iii) Yield of grain. (iv) (a) 1963-1965. (b) No. (c) The results of combined analysis are presented under 5 results. (v) N.A. (vi) The crop was initially raised with the soaking dose of canal water due to late receipt of monsoon for 63 (219) late rains affected the crop for 64 (119). (vii) Errors are homogeneous and interaction is absent.

## 5. RESULTS :

- (i) 459 Kg/ha. (ii) (a) 530.5 Kg/ha. with 10 d. f. made up of pooled error and interaction of I with years. (b) 291.2 Kg/ha. with 67 d. f. made up of pooled error and interaction of F, S, I×S, F×I and S×I with years. (iii) Main effect of I is significant and that of F is highly significant. (iv) Av. yield of grain in Kg/ha.

	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>0</sub>	335	342	416	379	349	364
I <sub>1</sub>	286	402	535	398	417	408
I <sub>2</sub>	448	571	799	539	673	606
Mean	356	438	584	439	480	459
S <sub>1</sub>	344	401	572			
S <sub>2</sub>	368	476	596			

C. D. for I marginal means = 278.5 Kg/ha.

C. D. for F marginal means = 194.0 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- GJ. 63(66) ; 64(13).**

**Site :- Central Expt. Stn., Junagadh.**

**Type :- 'ICM'.**

**Object :-** To find out the requirements of irrigation, spacing and fertilizers for Bajra.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. for 63 (66) ; 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64 (13). (ii) Medium black. (iii) 29.6.63 ; 20.7.64. (iv) (a) Nil for 63(66) ; 1 ploughing and 2 harrowings for 64 (13). (b) Drilling (c) 5.6 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 63 (66) and Nil for 64 (13). (vi) N-28-15-2 (early). (vii) As per treatments. (viii) 3 inter-culturings. (ix) 56.8 cm. for 63 (66) and 137 cm. for 64 (13). (x) 11.10.64 ; 16.11.64.

## 2. TREATMENTS :

**Main-plot treatments**

3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=1 and I<sub>2</sub>=2 irrigations.

**Sub-plot treatments**

All combinations and (1) and (2).

(1) 2 spacings : S<sub>1</sub>=61 cm.×15 cm. ; S<sub>2</sub>=61 cm.×23 cm.

(2) 3 levels of fertilizers : F<sub>1</sub>=22.4 Kg/ha. of N and 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, F<sub>2</sub>=2F<sub>1</sub> and F<sub>3</sub>=3F<sub>1</sub>.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 3 main-plots/replication ; 5 sub-plots/main plots. (b) N.A. (iii) 2. (iv) (a) 8.5 m.×6.5 m. (b) 7.3 m.×5.5 m. (v) 61 cm.×46 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal for 64 (13) ; gced for 63 (66). (ii) Attack of stem borer and rats for 63 (66) ; Attack of blister beetle, ergot in 64 (13). (iii) Yield of grain. (iv) (a) 1963 to 1964. (b) No (c) Nil. (v) N.A. (vi) The expt. was planned as a split plot design, but analysed as R.B.D. with 6 replications due to natural rain fall which affected the irrigational treatments. (vii) As the variances are heterogeneous and interaction is absent the individual results are given below.

## 5. RESULTS :

**63(66)**

- (i) 1608 Kg/ha. (ii) 115.9 Kg/ha. (iii) Main effects of M are highly significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	1517	1669	1680	1622
S <sub>2</sub>	1512	1679	1589	1593
Mean	1515	1674	1635	1608

C. D. for M marginal means=95.5 Kg/ha.

64(13)

(i) 500 Kg/ha. (ii) 72.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	457	581	498	512
S <sub>2</sub>	515	490	457	487
Mean	486	536	478	500

**Crop :- Bajra (Kharif.)**

**Ref :- Gj. 63(55) ; 64(12).**

**Site :- Central Exptl. Stn., Junagadh,**

**Type :- 'ICM'.**

Object : To find out the requirements of Irrigation, spacing and fertilizers for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. for 63(65) and 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 29.6.1963 ; 20.7.1964. (iv) Nil for 63 (65) ; 1 ploughing and 2 harrowings for 64 (12). (b) Drilling. (c) 5.6 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Babapuri (late). (vii) Irrigated. (viii) 4 interculturings and 1 thinning. (ix) 56.8 cm. for 63 (65) and 137.1 cm. for 64 (12). (x) 11.10.63 ; 16.11.64.

**2. TREATMENTS :**

**Main-plot treatments**

3 levels of irrigation : I<sub>0</sub>=No irrigation ; I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments**

All combinations of (1) and (2),

(1) 2 spacings : S<sub>1</sub>=61 cm. × 15 cm. ; S<sub>2</sub>=61 cm. × 23 cm.

(2) 3 levels of fertilizers : F<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, F<sub>2</sub>=2F<sub>1</sub> and F<sub>3</sub>=4F<sub>1</sub>.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super. Time of application : N.A.

**3. DESIGN :**

(i) Split-plot. (ii) 3 main-plots/ replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.5m. × 6.5 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. Attack of stem borer and rust for 63 (65) ; Attack of Blister beetle, ergot. for 64(12). (iii) Yield and grain. (iv) (a) 1960 to 1964. (b) No. (c) Nil. (v) N.A. (vi) The expt. was planned in a split plot design, but it is analysed as R.B.D. with 6 replications as the irrigation levels could not be main tained due to natural rain fall.

**5. RESULTS :**

63(65)

(i) 1560 Kg/ha. (ii) 188.2 Kg/ha. (iii) None of the effects is significant. (v) Av. yield and grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	1499	1494	1649	1547
S <sub>2</sub>	1522	1586	1611	1543
Mean	1510	1540	1630	1560

64(12)

(i) 523 Kg/ha. (ii) 99.5 Kg/ha. (iii) None of the effect is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	448	534	561	514
S <sub>2</sub>	512	511	579	531
Mean	480	523	565	523

**Crop :- Bajra (Kharif).****Ref :- GJ. 63(238), 64(230), 65(19).****Site :- Irrigation Demons. Farm, Kukda. Type :- 'ICM'.**

Object :—To find out the optimum number of irrigations spacings and fertilizers does for Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 63 (238) and 64 (230) : Cotton, Bajra-cotton for 65 (19). (b) Cotton for 63(238) and 65 (19) wheat for 64 (230). (c) Nil for 63 (238) and 64 (230) ; 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65 (19). (ii) Medium black. (iii) 11.7.1963 ; 5.7.1964 ; 6.7.1965. (iv) (a) 2 ploughings, 2-3 harrowings. (b) Drilling (c) 6 Kg/ha. (d) As per treatments. (e) 2. (v) Nil. (vi) L-11 (early). (vii) As per treatments. (viii) 2 weedings, gap fillings. (ix) 41 cm. for 63 (238) ; 36 cm. for 64 (230) ; 37 cm. for 65 (19). (x) 21.10.63 ; 4.10.64 ; 14.10.1965.

## 2. TREATMENTS :

**Main-plot treatments**3 irrigations : I<sub>0</sub>=No irrigation ; I<sub>1</sub>=1 irrigation, I<sub>2</sub>=2 irrigations.**Sub-plot treatments**

All combinations of (1) and (2).

(1) 3 levels of fertilizers : F<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, F<sub>2</sub>=2F<sub>1</sub> and F<sub>3</sub>=3F<sub>1</sub>.(2) 2 spacings : S<sub>1</sub>=61 cm. × 15 cm. and S<sub>2</sub>=61 cm. × 23 cm.

## 3. DESIGN

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.5 m. × 6.4 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) 1963 to 1965. (b) No, (c) Nil. (v) and (vi) Nil. (vii) As the sub-plot variances are heterogeneous, the results of individual years are presented below.

## 5. RESULTS :

63(238)

(i) 733 Kg/ha. (ii) (a) 218.0 Kg/ha. (b) 66.8 Kg/ha. (iii) Main effect of F is highly significant and that of S is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	561	666	728	696	608	652
F <sub>2</sub>	672	751	721	732	697	715
F <sub>3</sub>	778	820	894	845	816	831
Mean	671	746	781	758	707	733
S <sub>1</sub>	707	768	798			
S <sub>2</sub>	634	723	764			

C. D. for F marginal means = 58.2 Kg/ha.

C. D. for S marginal means = 47.5 Kg/ha.

64(230)

(i) 1098 Kg/ha. (ii) (a) 214.3 Kg/ha. (b) 167.4 Kg/ha. (iii) Main effect of F is highly significant and that of S is significant. Interaction (I×S) is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	904	847	879	860	894	877
F <sub>2</sub>	1304	1230	1170	1312	1158	1235
F <sub>3</sub>	1199	1145	1199	1318	1044	1181
Mean	1136	1074	1083	1168	1032	1098
S <sub>1</sub>	1149	1254	1087			
S <sub>2</sub>	1122	894	1079			

C. D. for F marginal means = 145.8 Kg/ha.

C. D. for S marginal means = 118.9 Kg/ha.

C. D. for S means at the same level of I = 206.1 Kg/ha.

C. D. for I means at the same level of S = 295.8 Kg/ha.

65(19)

(i) 814 Kg/ha. (ii) (a) 225.7 Kg/ha. (b) 156.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	698	797	760	774	729	752
F <sub>2</sub>	945	947	698	891	836	863
F <sub>3</sub>	928	779	777	857	799	828
Mean	857	841	745	841	788	814
S <sub>1</sub>	880	872	770			
S <sub>2</sub>	834	810	720			

**Crop :- Bajra (Kharif).****Ref :- 63(239), 64(231), 65(20).****Site :- Irrigation Demons. Farm, Kukda.****Type :- 'ICM'**

Object :—To find out the optimum number of irrigations, spacing and fertilizer dose for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 63 (239) and 65 (20); wheat for 64 (231). (c) Nil for 63 (239) and 64 (231); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 65 (20). (ii) Medium black. (iii) 11.7.1963; 5.7.1964; 6.7.1965  
 (iv) (a) 2 ploughings; 2-3 harrowings. (b) Drillings. (c) 6 Kg/ha. (d) As per treatments. (e) N.A. for 63 (239) and 64 (231); 2 plants/hill for 65 (20). (v) Nil for 63 (239) and 64 (231); 12.4 C.L./ha. of F.Y.M. for 65(20). (vi) Babapuri (late). (vii) Irrigated. (viii) Nil. (ix) 41 cm. for 63 (239); 36 cm. for 64 (231); 37 cm. for 65 (20). (x) 24.10.1963; 14.10.1964; 26.10.1965.

**2. TREATMENTS :****Main-plot treatments**3 irrigations :  $I_0$ =No irrigation ;  $I_1$ =2 irrigation and  $I_2$ =3 irrigations.**Sub-plot treatments**

All combinations of (1) and (2).

(1) 3 levels of fertilizers :  $F_1$ =22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ .  $F_2$ =2  $F_1$  and  $F_3$ =3  $F_1$ .(2) 2 spacings :  $S_1$ =61 cm. × 15 cm. and  $S_2$ =61 cm. × 23 cm.N applied as A/S and  $P_2O_5$  as Super.Date and application : For N : 30.8.1963 ; 7.8.1964 ; 4.8.1965. for  $P_2O_5$  : 11.7.1963 ; 6.7.1964 ; 6.7.1965.**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main plot. (b) N.A. (iii) 2. (iv) (a) 8.5 m. × 6.4 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil for 63 (239); Attack of bristle beetle. Endrin applied as control measure for others. (iii) Yield of grain. (iv) 1963 to 1965. (b) No. (c) Results of combined analysis, given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 894 Kg/ha. (ii) (a) 261.6 Kg/ha. (based 10 d.f. made up of pooled error+(Treatments×years interaction), (b) 147.4 Kg/ha. (based on 67 d.f. made up of pooled error+(Treatments×years interaction). (iii) Only main effect of I is significant. (iv) Av. yield of grain in Kg/ha.

	$F_1$	$F_2$	$F_3$	$S_0$	$S_1$	Mean
$I_0$	769	723	754	764	732	748
$I_1$	951	959	922	960	928	944
$I_2$	937	992	1043	1011	971	991
Mean	886	891	906	912	877	894
$S_1$	942	883	910			
$S_2$	830	899	902			

C. D. for I marginal means=237.9 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- GJ. 63(232) ; 64(208).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'ICM'.**

Object :—To study the effect of different spacings, irrigations and manures on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Bajra. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 6.7.63 ; 30.6.1964. (iv) (a) 3 ploughings and 2 harrowings. (b) Drilling, (c) 5 Kg/ha. (d) As per treatments. (e) N. A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Bajra-207 (early). (vii) Irrigated. (viii) 1-2 weedings and 1 inter-cultings. (ix) 92 cm. for 63 (232) ; 47 cm. for 64 (208). (x) 24.9.1963 ; 28.9.1964.

## 2. TREATMENTS :

## Main-plot treatments

3 levels of irrigations :  $I_0=0$ ,  $I_1=1$  and  $I_2=2$  irrigations

## Sub-plots treatments

All combinations of (1 and (2).

(1) 2 spacings :  $S_1=46$  cm.  $\times$  15 cm. and  $S_2=46$  cm.  $\times$  23 cm.

(2) 3 levels of fertilizers  $F_1=22.4$  Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ ,  $F_2=2 F_1$  and  $F_3=3 F_1$ .  
N as A/S and  $P_2O_5$  as super drilled.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main plots/replication ; 6 sub-plots/main plot. (b) N.A. (iii) 2. (iv) (a) 8.2 m. 6.4 m. (b) 7.3 m.  $\times$  5.5 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil for 63 (232) ; Attack of white grules for 64 (208). (iii) Yield of grain. (iv) 1963 to 1964. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the sub-plot variances are heterogeneous the results of the individual years are given under 5.

## 5. RESULTS :

63(232)

(i) 1187 Kg/ha. (ii) (a) 188.1 Kg/ha. (b) 150.0 Kg/ha. (iii) Main effect of S is highly significant and that of F is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$F_1$	1065	878	1283	1167	984	1075
$F_2$	1271	1152	1289	1316	1159	1237
$F_3$	1221	1196	1333	1304	1196	1250
Mean	1185	1075	1302	1262	1113	1187
$S_1$	1250	1142	1395			
$S_2$	1121	1009	1208			

C. D. for S marginal means=106.6 Kg/ha.

C. D. for F marginal means=130.5 Kg/ha.

64(208)

(i) 1158 Kg/ha. (ii) (a) 397.9 Kg/ha. (b) 409.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$F_1$	1190	1046	1022	1005	1167	1086
$F_2$	1202	1165	1159	1204	1146	1175
$F_3$	1358	1370	909	1225	1200	1212
Mean	1250	1194	1030	1145	1171	1158
$S_1$	1262	1117	1055			
$S_2$	1237	1271	1005			

**Crop :- Bajra (Kharif).****Ref :- Gj. 63(168), 64(102), 65(12).****Site :- Trial-cum-Demons. Farm, Thasra.****Type :- 'ICM'.**

Object :—To find out the optimum number of irrigations, suitable spacings and fertilizers dose for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 63 (168) and 64 (102); Wheat for 65 (12). (c) 67.2 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super for 63 (168); 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super for 64 (102); 33.6 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super for 65 (12). (ii) Sandy loam. (iii) 1.7.1963; 4.7.1964; 21.7.1965. (iv) (a) 1-3 ploughings and harrowings. (b) Drilling. (c) 9.9 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil for 63 (168); 12.4 C.L./ha. of F.Y.M. for others. (vi) N-207. (vii) Irrigated. (viii) 3-4 weedings and 2-4 interculturing. (ix) 102 cm. for 63 (168); 77 cm. for 64 (102) and 42 cm. for 65 (12). (x) 30.9.1963; 24.9.1964; 1.10.1965.

**2. TREATMENTS :****Main-plot treatments :**

3 levels of irrigations :  $I_0=0$ ,  $I_1=1$  irrigation of depth 61 cm. applied in 2nd week of August, and  $I_2=2$  irrigations of depth 61 cm. applied in 1st and 4th week of August.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 levels of spacings :  $S_1=46$  cm.  $\times$  15 cm. and  $S_2=46$  cm.  $\times$  23 cm.

(2) 3 manurial treatments :  $M_1=22.4$  Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ ,  $M_2=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_3=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

Date of application : For 63 (168); N as A/S applied on 1.7.1963 and 30.7.1963;  $P_2O_5$  as Super on 1.7.1963. For 64 (102); N as A/S applied on 4.7.1964 and 28.7.1964;  $P_2O_5$  as Super on 4.7.1964. For 65 (12); N as A/S applied on 21.7.1965 and 16.8.1964;  $P_2O_5$  as Super on 21.7.1965.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.2 m.  $\times$  6.4 m. (b) 7.4 m.  $\times$  5.5 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1963 to 1965. (b) No. (e) Nil. (v) N.A. (vi) Nil. (vii) As the variances are heterogeneous; the individual years results are given below.

**5. RESULTS :****63(168)**

(i) 1186 Kg/ha. (ii) (a) 52.8 Kg/ha. (b) 163.9 Kg/ha. (iii) Main effect of I and interaction of  $I \times M$  are significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$M_1$	1168	1211	912	1045	1150	1097
$M_2$	1346	961	1277	1123	1267	1195
$M_3$	1320	1196	1278	1252	1278	1265
Mean	1278	1123	1156	1140	1232	1186
$S_1$	1236	1050	1134			
$S_2$	1321	1196	1178			

C. D. for I marginal means = 92.5 Kg/ha.  
 C. D. for I means at the same level of M = 211.3 Kg/ha.  
 C. D. for M means at the same level of I = 247.1 Kg/ha.

**64(102)**

(i) 1096 Kg/ha. (ii) (a) 401.4 Kg/ha. (b) 94.4 Kg/ha. (iii) Main effects of 'M' and 'S' are highly significant. (iv) Av. yield of grain in Kg/ha.



	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	800	1071	965	864	1028	945
M <sub>2</sub>	962	1099	972	824	1098	1011
M <sub>3</sub>	1243	1401	1352	1233	1431	1332
Mean	1002	1190	1096	1007	1185	1096
S <sub>1</sub>	918	1148	955			
S <sub>2</sub>	1086	1233	1237			

C. D. for M marginal means = 82.0 Kg/ha.

C. D. for S marginal means = 67.1 Kg/ha.

65(12)

- (i) 1155 Kg/ha. (ii) (a) 118.1 Kg/ha. (b) 249.8 Kg/ha. (iii) Only main effects of M is highly significant.  
(iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	909	894	1003	992	878	935
M <sub>2</sub>	1134	1305	1196	1148	1275	1212
M <sub>3</sub>	1059	1355	1542	1343	1293	1319
Mean	1034	1185	1247	1161	1149	1155
S <sub>1</sub>	1092	1256	1136			
S <sub>2</sub>	976	1113	1358			

C. D. for M marginal means = 217.4 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 64(101), 65(11).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'ICM'.**

Object :- To find out the optimum number of irrigations, suitable spacings and fertilizers dose for Bajra.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Cotton for 64 ; Wheat for 65. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam.  
(iii) 4.7.64 ; 21.7.65. (iv) (a) 1 to 3 ploughings and 1 to 3 harrowings. (b) Drilling. (c) 10 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 65. (vi) Babapuri. (vii) As per treatments.  
(viii) 3 weedings ; 2 to 4 interculturings. (ix) 77 cm. for 64 ; 42 cm. for 65. (x) 10.10.64, 22.10.65.

**2. TREATMENTS :**

**Main plot treatments :**

- 3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=2 irrigations of depth 61 cm. applied on 1st and 4th week of August  
I<sub>2</sub>=3 irrigations of depth of 61 cm. applied on 1st and 4th week of August and 3rd week of Sept.

**Sub-plot treatments :**

All combinations of (1) and (2).

- (1) 2 spacings : S<sub>1</sub>=46 cm. × 15 cm. and S<sub>2</sub>=46 cm. × 23 cm.

- (2) 3 manurial treatments : M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>3</sub>=67.2 Kg/ha. N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S applied on 4.7.1964 and 28.7.1964 and P<sub>2</sub>O<sub>5</sub> as Super applied on 4.7.1964

N as A/S applied on 4.7.64 and 16.8.65 and P<sub>2</sub>O<sub>5</sub> as Super on 4.7.65.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.2 cm. x 6.4 cm. (b) 7.3 m. x 5.5 m. (v) 46 cm. x 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of kapas. (iv) (a) 1963-65 (Expt. failed in 63). (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments x years interaction is present.

## 5. RESULTS :

(i) 654.0 Kg/ha. (ii) (a) 439.4 Kg/ha. (based on 2d.f. made of Treatments x years interaction) (b) 123.3 Kg/ha. (based on 41 d.f. made of pooled error + Treatments x years interaction). (iii) Main effect of M is highly significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	483	617	533	488	600	544
M <sub>2</sub>	399	763	570	601	554	578
M <sub>3</sub>	756	899	863	789	889	839
Mean	546	760	655	626	681	654
S <sub>1</sub>	525	771	582			
S <sub>2</sub>	567	748	728			

C. D. for M marginal means = 71.9 Kg/ha.

**Crop :- Bajra (Kharif).**

**Ref :- Gj. 63(84), 64(18), 65(169).**

**Site :- Agri. Res. Stn., Umrjala.**

**Type :- 'ICM'.**

Object : - To find out the optimum spacing and fertilizer dose for Bajra under irrigated conditions.

## 1. BASAL CONDITIONS :

(i) (a) *Bojra-Wheat-Cotton* for 63(84), 64(18) ; Nil for 65(169). (b) Cotton for 63(84) ; Wheat for 64 (18) ; Lucerne for 65(169). (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(84), 65(169) ; 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(18). (ii) Medium black soil. (iii) 12.7.1963 ; 11.7.1964 ; 24.7.1965. (iv) (a) One ploughing and two harrowings. (b) Drilling for 63(84) ; 64(18) ; Hand sowing for 65(169). (c) 3 Kg/ha. ; 2 Kg/ha. ; 7.4 Kg/ha. (d) As per treatments. (e) N.A. for 63(84), 64(18) ; 1 plant/hill for 65(169). (v) 12.4 C.L./ha. of F.Y.M. (vi) Babapuri. (vii) Irrigated. (viii) 1 weeding and 2 interculturings. (ix) 46 cm. ; 95 cm. ; 32 cm. (x) 17.10.1963 ; 18.10.1964 ; 22.10.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

3 level of irrigations : I<sub>0</sub>=No irrigation, I<sub>1</sub>=2 irrigations and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=61 cm. x 15 cm. and S<sub>2</sub>=61 cm. x 23 cm.

(2) 3 manurial treatments : M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>3</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S applied in two equal doses, 1st at sowing and other one month after sowing. P<sub>2</sub>O<sub>5</sub> as Super applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.5 m. x 6.4 m. (b) 7.3 m. x 5.5 m. (v) 61 cm. x 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 63(84); Normal for others. (ii) Nil. (iii) Grain yield. (iv) (a) 1963-65. (b) No. (c) Nil. (v) N.A. (vi) Nil for 63(84); Heavy rains accompanied by storm from 15th to 18th September caused severe lodging for 64(18), 65(169). (vii) Results have been presented for individual years because the error variances for sub-plot are heterogeneous.

## 5. RESULTS :

## 63(84)

(i) 1545 Kg/ha. (ii) (a) 43.1 Kg/ha. (b) 100.3 Kg/ha. (iii) Main effects of I and M are highly significant. Interactions  $S \times M$  and  $I \times M$  are significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	1400	1541	1608	1351	1521	1677	1516
S <sub>2</sub>	1406	1723	1592	1539	1562	1622	1574
Mean	1403	1632	1600	1445	1541	1649	1545
M <sub>1</sub>	1359	1454	1522				
M <sub>2</sub>	1299	1724	1601				
M <sub>3</sub>	1551	1719	1677				

C.D. for I marginal means = 75.7 Kg/ha.  
 C.D. for M marginal means = 87.3 Kg/ha.  
 C.D. for body of  $S \times M$  table = 123.4 Kg/ha.  
 C.D. for I means at the same level of M = 200.5 Kg/ha.  
 C.D. for M means at the same level of I = 149.6 Kg/ha.

## 64(18)

(i) 851 Kg/ha. (ii) (a) 290.5 Kg/ha. (b) 203.1 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	772	1032	884	681	1015	992	896
S <sub>2</sub>	729	801	888	650	978	791	806
Mean	751	916	886	665	997	892	851
M <sub>1</sub>	682	582	732				
M <sub>2</sub>	832	1221	937				
M <sub>3</sub>	738	947	990				

C.D. for M marginal means = 176.7 Kg/ha.

## 65(169)

(i) 1326 Kg/ha. (ii) (a) 546.8 Kg/ha. (b) 137.8 Kg/ha. (iii) Main effect of M and interaction  $I \times M \times S$  are significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
S <sub>1</sub>	1080	1377	1443	1213	1283	1404	1300
S <sub>2</sub>	1082	1453	1522	1204	1406	1447	1352
Mean	1081	1415	1482	1208	1344	1426	1326
M <sub>1</sub>	1028	1289	1308				
M <sub>2</sub>	1040	1439	1554				
M <sub>3</sub>	1174	1517	1585				

C.D. for M marginal means = 97.9 Kg/ha.

**Crop :- Bajra (Kharif).****Ref :- Gj. 63(76), 64(19), 65(170).****Site :- Agri. Res. Stn., Umralla.****Type :- 'ICM'.**

Object :—To find out the optimum spacings, dose of fertilizers under irrigated conditions for Bajra.

**1. BASAL CONDITIONS :**

(i) (a) Bajra-Wheat-Cotton for 63(76), 64(19); Nil for 65(170). (b) Cotton for 63(76); wheat for 64(19); Lucerne for 65(170). (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  for 63(76), 65(170); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 64(19). (ii) Medium black. (iii) 12.7.1963; 11.7.1964; 24.7.1965. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling for 63(76), 64(19); Hand sowing for other. (c) 3 Kg/ha.; 2 Kg/ha.; 7.4 Kg/ha. (d) As per treatments. (e) N.A. for 63(76), 64(19); 1 plant/hill for 65(170). (v) 12.4 C.L./ha. of F.Y.M. (vi) N-28-15-2. (vii) Irrigated. (viii) 2 weedings, interculturings and thinnings. (ix) 46 cm.; 95 cm.; 32 cm. (x) 13.10.1963; 12.10.1964; 9.10.1965.

**2. TREATMENTS :****Main-plot treatments :**3 levels of irrigations :  $I_0$ =No irrigation,  $I_1$ =2 irrigations and  $I_2$ =3 irrigations.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings :  $S_1$ =61 cm. × 15 cm. and  $S_2$ =61 cm. × 23 cm.(2) 3 manurial levels :  $M_1$ =22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ ;  $M_2$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_3$ =67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .N as A/S applied in two equal doses, 1st dose at sowing and 2nd at one month after sowing.  $P_2O_5$  as Super applied at sowing.**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.5 m. × 6.4 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Good for 63(76); Normal for others but slight lodging on 21 and 22 Sept. due to stormy rains for 65(170), 64(19). (ii) Nil. (iii) Grain yield. (iv) 1963-65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Results have been presented individually because sub-plot error variances are heterogeneous.

**5. RESULTS :****63(76)**

(i) 1612 Kg/ha. (ii) (a) 373.0 Kg/ha. (b) 191.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$S_1$	$S_2$	Mean
$M_1$	1571	1542	1596	1575	1564	1569
$M_2$	1623	1380	1671	1545	1571	1558
$M_3$	1764	1789	1577	1595	1825	1710
Mean	1652	1570	1615	1572	1653	1612
$S_1$	1611	1528	1575			
$S_2$	1694	1612	1654			

**64(19)**(i) 997 Kg/ha. (ii) (a) 70.7 Kg/ha. (b) 101.2 Kg/ha. (iii) Main effect of M is highly significant. Interaction  $M \times S$  is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	819	760	760	704	855	779
M <sub>2</sub>	1196	968	1034	1125	1007	1066
M <sub>3</sub>	1121	1115	1199	1173	1117	1145
Mean	1045	948	998	1001	993	997
S <sub>1</sub>	1001	992	1009			
S <sub>2</sub>	1090	903	986			

C.D. for M marginal means = 88.0 Kg/ha.

C.D. for body of M × S table = 124.5 Kg/ha.

65(170)

(i) 1117 Kg/ha. (ii) (a) 228.6 Kg/ha. (b) 87.4 Kg/ha. (iii) Main effects of M and interactions M × S and M × I are highly significant. Main effect of S is significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	987	847	888	899	916	907
M <sub>2</sub>	1261	938	1243	1138	1157	1147
M <sub>3</sub>	1264	1318	1308	1418	1175	1297
Mean	1171	1034	1146	1152	1083	1117
S <sub>1</sub>	1229	1074	1152			
S <sub>2</sub>	1113	995	1140			

C.D. for M marginal means = 76.0 Kg/ha.

C.D. for S marginal means = 62.1 Kg/ha.

C.D. for body of M × S table = 107.5 Kg/ha.

C.D. for I means at the same level of M = 106.1 Kg/ha.

C.D. for M means at the same level of I = 61.8 Kg/ha.

**Crop :- Maize (Kharif).**

**Site :- Agri. Res. Stn., Dohad.**

**Ref :- Gj. 60(148), 61(120).**

**Type :- 'M'.**

**Object :-** To study the effect of N and P<sub>2</sub>O<sub>5</sub> on the yield of Maize.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat for 60(148) ; Gram for 61(120) (c) Micronutrients for 60(148) ; 11.2 Kg/ha. of N for 61(120). (ii) Medium black. (iii) 1.7.1960., 20.6.1961. (iv) (a) 2 ploughings+1 harrowing. (b) Dibbling. (c) N.A. (d) 61 cm. × 30 cm. (e) 1. (v) Nil. (vi) Farm *Sameri*. (vii) Un-irrigated. (viii) 3 weedings+1 interculturings for 60(148) ; 3 interculturing for 61(120). (ix) 57 cm., 102 cm. (x) 7.10.1960., 20.9.1961.

**2. TREATMENTS :**

4 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=11.2 Kg/ha. of N as A/S+5.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>2</sub>=2M<sub>1</sub> and M<sub>3</sub>=3 M<sub>1</sub>.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) 30.5 m. × 25.6 m. (iii) 4. (iv) (a) 6.1 m. × 4.9 m. (b) 5.5 m. × 4.3 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Attack of top borer for 60(148); No incidence for 61(120). (iii) Yield of grain. (iv) (a) 1960—1961. (b) No. (c) Results of combined analysis are given under 5. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 1215 Kg/ha. (ii) 349.3 Kg/ha. (21 d.f. made up of pooled error and Treatments $\times$ years interaction). (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	908	1233	1233	1487

C.D.=363.3 Kg/ha.

**Crop :- Maize (Kharif).**  
**Site :- Agri. Res. Stn., Dohad.**

**Ref :- Gj. 65(34).**  
**Type :- 'MV'.**

Object :—To find out the suitable variety of Maize and dose of N.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Gram. (c) Nil. (ii) Medium black soil. (iii) 20.7.65. (iv) (a) 1 ploughing. (b) Dibbling. (c) 15 Kg/ha. (d) 61 cm. $\times$ 30 cm. (e) One. (v) Nil. (vi) As per treatments. (vii) Irrigated. (viii) 4 interculturings. (ix) 34 cm. (x) 3.11.65.

## 2. TREATMENTS :

## Main-plot treatments :

3 varieties : V<sub>1</sub>=Farm Sameri Maize, V<sub>2</sub>=Ganga safed-2 and V<sub>3</sub>=Ganga-3.

## Sub-plot treatments :

5 levels of N as A/S : N<sub>1</sub>=44.8, N<sub>2</sub>=89.7, N<sub>3</sub>=134.5, N<sub>4</sub>=178.3 and N<sub>5</sub>=224.2 Kg/ha.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 3 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. $\times$ 3.7 m. (b) 6.1 m. $\times$ 2.4 m. (v) 61 cm. $\times$ 61cm. (vi) Yes.

## 4. GENERAL :

- (i) Satisfactory. (ii) attack of army worms. Endrin was sprayed. (iii) Grain and fodder yield. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) Nil. (vi) Scanty and uneven rainfall. (vii) Nil.

## 5. RESULTS :

- (i) 2501 Kg/ha. (ii) (a) 1056.2 Kg/ha. (b) 374.7 Kg/ha. (iii) Main effect of V is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	Mean
V <sub>1</sub>	2472	2615	2472	2355	2153	2413
V <sub>2</sub>	2136	1749	2153	2102	1808	1990
V <sub>3</sub>	3187	3086	3002	3280	2952	3101
Mean	2598	2483	2542	2579	2304	2501

C.D. for V marginal means=817.1 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Gj. 65 (13).****Site :- Trial-cum-Demons. Farm, Thasra.****Type :- 'MV'.**

**Object :-**To study the performance of different varieties of Hybrid Maize and to find the optimum dose of fertilizer.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Tobacco. (c) 22.4 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ +67.2 Kg/ha. of  $K_2O$ . (ii) Sandy loam. (iii) 20.7.65. (iv) (a) 4 harrowings. (b) Dibbling. (c) 7 Kg/ha. (d) 61 cm.×30 cm. (e) One. (v) 67.2 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ . (vi) As per treatments. (vii) Irrigated. (viii) 4 weedings and 3 interculturings. (ix) 42 cm. (x) 3.11.65.

**2. TREATMENTS :****Main plot treatments**

3 varieties :  $V_1$ =Farm Sameri,  $V_2$ =Ganga Safed—2 and  $V_3$ =Ganga-3.

**Sub-plot treatments**

5 levels of N as A/S :  $N_1=44.8$ ,  $N_2=89.7$ ,  $N_3=134.5$ ,  $N_4=179.3$  and  $N_5=224.2$  Kg/ha.

N applied in 4 doses on 16.7.65, 19.8.65, 25.8.65 and 8.9.65 respectively.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 3.7 m.×7.3 m. (b) 2.4 m.×6.1 m. (iv) 61 cm.×61 cm. (v) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Grain and fodder yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 4011 Kg/ha. (ii) (a) 816.7 Kg/ha. (b) 481.7 Kg/ha. (iii) Main effect of V is significant (iv) Av. yield of grain in Kg/ha.

	$N_1$	$N_2$	$N_3$	$N_4$	$N_5$	Mean
$V_1$	3145	3448	3179	3296	3700	3354
$V_2$	4205	4676	5079	3885	3835	4336
$V_3$	4255	4339	4440	4205	4474	4343
Mean	3868	4154	4233	3795	4003	4011

C.D. for V marginal means=632.0 Kg/ha.

**Crop :- Maize (Kharif).****Ref :- Gj. 63(91), 64(270), 65(33).****Site :- Agri. Res. Stn., Dohad.****Type :- 'CM'.**

**Object :-**To find out the suitable spacing and manurial dose for Maize.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Chillies for 63, Maize for 64 and cotton for 65. (c) 33.6 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  for 63, 112.1 Kg/ha. of N+56.0 Kg/ha. of  $P_2O_5$  for 64, 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 65. (ii) Medium black soil. (iii) 4.7.63 ; 30.6.64 ; 23.7.65. (iv) (a) 1-2 ploughings and harrowings. (b) Dibbling. (c) 15 Kg/ha. (d) As per treatments. (e) One. (v) Nil. (vi) Farm Sameri. (vii) Unirrigated. (viii) 1 interculturing and 1 weeding for 63. 3 interculturings for 64, 2 hoeings and 1 thinning for 65. (ix) 60 cm. 49 cm ; 34 cm. (x) 9.10.63 ; 7.10.64 ; 29.10.65.

## 2. TREATMENTS :

## Main plot treatments

3 manurial treatments :  $M_0=0$ ,  $M_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_2=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

## Sub-plot treatments

All combinations of (1) and (2)

- (1) 3 spacings between plants :  $P_1=15$ ,  $P_2=30$  and  $P_3=46$  cm.  
 (2) 2 spacings between rows :  $R_1=30$  and  $R_2=61$  cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main plot. (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  7.3 m. (b) 7.3 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of army worms. (iii) Grain yield. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) N.A. (vi) Uneven and scanty rains for 64 and 65. (vii) Sub-plot error variances are heterogeneous, therefore the results of individual years are presented below.

## 5. RESULTS :

63(91)

(i) 3223 Kg/ha. (ii) (a) 516.8 Kg/ha. (b) 409.9 Kg/ha. (iii) Main effect of M is significant. Main effect of P and interaction  $M \times P$  are highly significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$R_1$	$R_2$	Mean
$P_1$	1725	3850	4310	3467	3123	3295
$P_2$	1900	3575	4136	3563	2845	3204
$P_3$	1956	3252	4298	3426	2911	3169
Mean	1860	3559	4248	3485	2960	3223
$R_1$	1794	3849	4813			
$R_2$	1927	3268	3683			

C.D. for M marginal means=907.9 Kg/ha.

C.D. for P marginal means=356.5 Kg/ha.

C.D. for P means at the same level of M=617.8 Kg/ha.

C.D. for M means at the same level of P=980.4 Kg/ha.

64(270)

(i) 2441 Kg/ha. (ii) (a) 378.7 Kg/ha. (b) 185.6 Kg/ha. (iii) All the main effects and the interactions are highly significant. (iv) Av. yield of grain in Kg/ha.

	$M_0$	$M_1$	$M_2$	$R_1$	$R_2$	Mean
$P_1$	1395	3005	3488	2554	2705	2629
$P_2$	1302	2759	2977	2450	2242	2346
$P_3$	1660	2616	2772	2602	2097	2349
Mean	1452	2793	3079	2535	2348	2441
$R_1$	1358	2923	3324			
$R_2$	1547	2654	2834			

C.D. for M marginal means

=665.4 Kg/ha.

C.D. for P marginal means

=161.5 Kg/ha.

C.D. for R marginal means

=131.9 Kg/ha.

C.D. for P marginal means at the same level of M

=279.8 Kg/ha.

C.D. for M marginal means at the same level of P

=552.6 Kg/ha.

C.D. for R marginal means at the same level of M

=228.4 Kg/ha.

C.D. for M marginal means at the same level of R

=668.4 Kg/ha.

C.D. for the body of  $P \times R$  table

=504.3 Kg/ha.



1965.

(i) 1430 Kg/ha. (ii) (a) 258.4 Kg/ha. (b) 253.6 Kg/ha. (iii) Main effect of M is significant. (iv) Av. yield of grain in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
P <sub>1</sub>	1050	1709	1799	1482	1516	1499
P <sub>2</sub>	1071	1588	1707	1476	1435	1455
P <sub>3</sub>	987	1451	1567	1364	1306	1335
Mean	1076	1586	1667	1441	1419	1430
F <sub>1</sub>	994	1669	1659			
F <sub>2</sub>	1078	1503	1676			

C.D. for M marginal means=454.0 Kg/ha.

**Crop :- Gram.**

**Ref :- Gj. 61(110), 62(26), 63(11), 64(150)**

**Site :- Agri. Res. Stn., Arnej.**

**Type :- 'M'.**

**Object :-** To see the effect of different sources of P<sub>2</sub>O<sub>5</sub> on the yield of Gram.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat for 61 (110) ; *Jowar* (fodder) for 62 (26) ; Gram for 63(11). (c) Nil. (ii) Medium black. (iii) 26.10.1961 ; 21.10.1962 ; 27.10.1963, 26.10.64. (iv) (a) 4 ploughings for 61 (110) ; 5 harrowings for others. (b) Drilling. (c) 56 Kg/ha. [45 Kg/ha. in 64 (150)]. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) B.N.-31. (medium). (vii) Unirrigated. (viii) 2 weedings for 63 (11) ; 1 weedings for 64 (150) and Nil for others. (ix) 4 cm. for 63 (11) ; Nil for others. (x) 27.2.1962 ; 5.2.1963 ; 7.3.1964 ; 17.2.1965.

**2. TREATMENTS :**

5 sources of P<sub>2</sub>O<sub>5</sub> at 44.8 Kg/ha. : S<sub>0</sub>=Control, S<sub>1</sub>=Triple super, S<sub>2</sub>=Mono. Ammo. phos ; S<sub>3</sub>=Biammo. phos. and S<sub>4</sub>=Ammoniated triple super.  
[22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> was applied in 64 (150)]

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 12.2 m × 3.7 m. (b) 10.4 m. × 2.4 m. (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) No incidence for 61 (110) ; Attack of white ants and pod borers for 62 (26) ; Attack of pod borers for 63 (11) and andrex was sprayed. (iii) Yield of grain. (iv) (a) 1961-1964 (modified in 1964). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

**61 (110).**

(i) 840 Kg/ha. (ii) 74.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield	794	843	851	855	859

**62 (26).**

(i) 573 Kg/ha. (ii) 142.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield	570	572	562	647	513

63(11)

(i) 476 Kg/ha. (ii) 205.8 Kg/ha. (iii) Treatment differences are not significant, (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield	368	678	324	513	496

64 (150)

(i) 429 Kg/ha. (ii) 62.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield	389	428	442	465	419

**Crop :- Gram.**

**Ref :- Gj. 60(8), 61(109), 62(25).**

**Site :- Agri. Res. Stn., Arnej**

**Type :- 'M'.**

**Object :-** To see the effect of N and P on the yield of Gram.

**1. BASAL CONDITIONS.**

(i) (a) Nil. (b) *Jowar* for 62 (25); wheat for others. (c) 12.4 C.L./ha. of F.Y.M. for 60 (8); Nil for others. (ii) Medium black. (iii) 26.10.1960; 26.10.1961; 21.10.1962. (iv) (a) 4 to 5 harrowings. (b) Drilling. (c) 22 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) Chafa. (vii) Unirrigated. (viii) Nil. (ix) Nil for 62 (25); N.A. for others. (x) 19.2.1961; 26.2.1962; 18.2.1963.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=5.6 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=22.4 Kg/ha.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m. × 8.20 m. (b) 9.1 m. × 6.4 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of pod borers for 62 (25); No incidence for others. (iii) Yield of grain. (iv) 1959-1962. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Results of expt. 59 (47) have also been included for giving combined results. Error variances are heterogenous and Treatments × years interaction is absent.

**5. RESULTS :**

**60 (8).**

(i) 540 Kg/ha. (ii) 48.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	Mean
P <sub>0</sub>	562	536	549
P <sub>1</sub>	514	548	531
Mean	538	542	540

**61 (109)**

(i) 929 Kg/ha, (ii) 113.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha,

	N <sub>0</sub>	N <sub>1</sub>	Mean
P <sub>0</sub>	924	900	912
P <sub>1</sub>	952	939	946
Mean	938	920	929

62 (25).

(i) 570 Kg/ha. (ii) 198.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	Mean
P <sub>0</sub>	609	544	577
P <sub>1</sub>	536	590	563
Mean	573	567	570

**Crop :- Gram (Rabi).****Gj. :- 61(124), 62(121), 63(132), 64(66).****Site :- Agri. Res. Stn., Dabhoi.****Type :- 'M'.****Object :-**To study the effect of different sources of P<sub>2</sub>O<sub>5</sub> on Gram.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 63 (132); Paddy for others. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 6.11.1961, 6.11.1962, 4.11.1963, 18.11.1964. (iv) (a) 2 ploughings for 61 (124), 2 ploughings+2 harrowings for 63 (121); Nil for 63 (132); 1 harrowing for 64 (66). (b) Drilling. (c) 45 Kg/ha. for 64 (66); 56 Kg/ha. for others. (d) 46 cm. between rows. (e) -. (v) 22.4 Kg/ha. of N for 62 (121); Nil for others. (vi) BN-31. (vii) Unirrigated. (viii) Nil. (ix) N.A., 90 cm.; 101 cm.; 84 cm. (x) 4.3.1962, 4.3.1963, 1.3.1964, 27.2.1965.

**2. TREATMENTS :**

5 sources of P<sub>2</sub>O<sub>5</sub> at 44.8 Kg/ha.: S<sub>0</sub>=Control, S<sub>1</sub>=Triple Super, S<sub>2</sub>=Mono. Ammo. Phos., S<sub>3</sub>=Diammo. phos, and S<sub>4</sub>=Ammoniated triple Super.

There is no control plot and S<sub>1</sub>=Super in the expt. no. 61 (124).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5 (2 for 61 and 4 for 63). (b) N.A. (iii) 6 for 62 (121), 8 for others. (iv) (a) 7.3 m. x 5.5 m. (b) 6.1 m. x 4.6 m. (v) 61 cm. x 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1964 (modified in 1962). (b) No. (c) Nil. (v) N.A. (vi) Due to salinity of soils replication was completely vitiated for 63 (132) and 3 replications failed in 61 (124). (vii) Error variance are heterogeneous and Treatments x years interaction is absent.

**5. RESULTS :****61(124)**

(i) 161 Kg/ha. (ii) 56.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield :	172	107	186	179

**62(121)**

(i) 605 Kg/ha. (ii) 124.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield :	508	532	640	765	580

**63(132)**

(i) 775 Kg/ha. (ii) 205.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield :	744	951	771	816	592

64(66)

(i) 405 Kg/ha. (ii) 52.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>
Av. yield :	368	471	408	435	341

C. D. = 54.2 Kg/ha.

**Crop :- Gram (Rabi).****Ref :- GJ. 63(208).****Site :- D.F.R.S. Dhandhuka.****Type :- 'M'.**

Object :—To study the effect of different Micronutrients through foliar spraying on Gram.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Gram (or wheat). (b) Cotton. (c) Nil. (ii) Medium black. (iii) 22.10.63. (iv) (a) 1 ploughing and 4 harrowings. (b) Drilling. (c) 30 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) Chafa. (vii) Unirrigated. (viii) Nil. (ix) 4 cm. (x) 23.2.64.

**2. TREATMENTS :**

6 micronutrient treatments : T<sub>0</sub>=Control (water spray). T<sub>1</sub>=Boron as 2.2 Kg/ha. of Borax+0.6 Kg/ha. Bentonite, T<sub>2</sub>=Copper as 8.9 Kg/ha. of Cu SO<sub>4</sub>+8.9 Kg/ha. lime. T<sub>3</sub>=Zinc as 3.4 Kg/ha. of ZnSO<sub>4</sub>+2.2 Kg/ha. of lime. T<sub>4</sub>=Manganese as 3.4 Kg/ha. of MnSO<sub>4</sub>+2.2 Kg/ha. of lime. T<sub>5</sub>=Molybdenum as 0.21 Kg/ha. of Sodium molybdate. micronutrients dissolved in 1123 liters of water and sprayed as foliar spray.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) 60.4 m.×20.1 m. (iii) 2. (iv) (a) 20.1 m.×10.1 m. (b) 18.3 m.×7.6 m. (v) 91 cm.×122 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Attack of pod borer. (iii) Yield of grain. (iv) (a) 1963 only. (b) No. (c) Nil. (v) Vallabhipur. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 964 Kg/ha. (ii) 106.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment :	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	1055	1005	879	933	954	958

**Crop :- Gram (Rabi).****Ref :- GJ. 61(118), 62(89), 63(92).****Site :- Agri. Res. Stn., Dohad.****Type :- 'IM'.**

Object :—To find out the optimum number of irrigations and manurial dose of P for Gram.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61 (118) ; Gram-Paddy for others. (b) Paddy and wheat for 61 (118) ; Paddy for others. (c) 33.6 Kg/ha. of N to Paddy+16.8 Kg/ha. of N to wheat for 61 (118) ; 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super for others. (ii) Medium black. (iii) 24.11.1961 ; 12.12.1962 ; 7.11.1963. (iv) 3 to 4 ploughings. (b) Drilling. (c) 22 Kg/ha. for 61 (118) ; 45 Kg/ha. for others. (d) 30 cm. between rows. (e) —. (v) 24.7 C.L./ha. of F.Y.M. for 61 (118) ; 11.2 Kg/ha. of N as A/S for others. (vi) Dohad-yellow (early). (vii) As per treatments. (viii) 1 weeding for 63 (92) ; Nil for others. (ix) Nil. (x) 18.4.1962 ; 21.4.1963 ; 31.3.1964.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 irrigational treatments :  $I_1=1$  irrigation 35 days after sowing,  $I_2=2$  irrigations 35 and 50 days after sowing and  $I_3=3$  irrigations 35, 50 and 60 days after sowing.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=33.6$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) 19.8 m. × 15.9 m. (iii) 4. (iv) (a) 7.3 m. × 5.8 m. (b) 6.1 m. × 4.6 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 61 (118) ; Below normal due to wilting for others. (ii) Nil. (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 1478 Kg/ha. (ii) 224.7 Kg/ha. (55 d.f. made up of pooled error and various components of Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	$I_1$	$I_2$	$I_3$	Mean
$P_0$	1506	1543	1354	1468
$P_1$	1522	1489	1456	1489
Mean	1514	1516	1405	1478

**Crop :- Gram. (Rabi).**  
**Site :- Agri. Res. Stn., Jamnagar.**

**Ref :- Gj. 60(137), 61(73), 62(209).**  
**Type :- 'IM'.**

Object :—To find out suitable number of irrigations and fertilizer dose for Gram.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Mug+Sann for 60 (137) ; Mug for 61 (73) ; Groundnut for 62 (209). (c) Nil. (ii) Medium black. (iii) 8.11.1960 ; 11.11.1961 ; 11.11.1962. (iv) (a) 2 ploughings+1 to 2 harrowings. (b) Drilling. (c) N.A. for 60 (137) ; 22 Kg./ha. for 61 (73) ; 45 Kg./ha. for 62 (209). (d) 46 cm. between rows for 62 (209) ; 30 cm. between rows for other. (e) Nil. (v) Nil. (vi) Chafa. (vii) As per treatment. (viii) 1 weeding+1 interculturing for 60 (137) ; 1 weeding for 61 (73) ; Nil for 62 (209). (ix) Nil. (x) 11.2.1961 ; 26.2.1962 to 3.3.1962 ; 18.2.1963.

## 2. TREATMENTS :

## Main-plot treatments

3 levels of  $P_2O_5$  as super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

## Sub-plot treatments

10 irrigational treatments :  $I_0=$ No irrigation,  $I_1=1$  irrigation 20 days after sowing,  $I_2=1$  irrigation 35 days after sowing,  $I_3=1$  irrigation 50 days after sowing,  $I_4=1$  irrigation 65 days after sowing,  $I_5=2$  irrigation 20 and 35 days after sowing,  $I_6=2$  irrigations 20 and 50 days after sowing,  $I_7=2$  irrigations 35 and 50 days after sowing,  $I_8=3$  irrigations, 20, 35 and 50 days after sowing and  $I_9=3$  irrigations 35, 50 and 65 days after sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 10 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. for 60 (137); 18.3 m. × 2.7 m. for others. (b) 15.9 m. × 1.8 m. for 60 (137); 16.5 m. × 1.8 m. for others. (v) N.A. for 60 (137); 91 cm. × 46 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory for 62 (209); Normal for others. (ii) No incidence for 60 (137); Attack of pod borers and root rot for others. (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous, the results of individual years are presented under 5. Results.

## 5. RESULTS :

## Gj. 60 (137).

(i) 603 Kg/ha. (ii) (a) 543.9 Kg/ha. (b) 189.1 Kg/ha. (iii) Main effect of I is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	I <sub>9</sub>	Mean
P <sub>0</sub>	544	495	368	384	591	575	595	861	862	495	577
P <sub>1</sub>	496	700	557	348	688	829	731	785	917	405	646
P <sub>2</sub>	452	486	467	373	644	604	608	623	942	654	585
Mean	497	560	464	468	641	669	645	756	907	518	603

C.D. for I marginal means=152.9 Kg/ha.

## Gj. 61 (73).

(i) 366 Kg/ha. (ii) (a) 286.0 Kg/ha. (b) 139.7 Kg/hg. (iii) Main effect of I is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	I <sub>9</sub>	Mean
P <sub>0</sub>	320	322	295	241	264	282	378	351	432	365	325
P <sub>1</sub>	253	187	365	282	296	479	329	382	624	411	361
P <sub>2</sub>	165	313	569	361	261	407	591	382	544	519	411
Mean	246	274	410	295	274	389	433	372	533	432	366

C.D. for I marginal means=112.9 Kg/ha.

## Gj. 62 (209).

(i) 457 Kg/ha. (ii) (a) 408.6 Kg/ha. (b) 157.8 Kg/ha. (iii) Main effect of I is highly significant. (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	I <sub>9</sub>	Mean
P <sub>0</sub>	171	347	388	214	203	488	683	574	701	781	455
P <sub>1</sub>	152	473	465	433	291	712	724	414	821	671	516
P <sub>2</sub>	75	341	288	270	144	553	588	526	674	547	401
Mean	133	387	380	306	213	584	665	505	732	666	457

C.D. for I marginal means=127.5 Kg/ha.

**Crop :- Gram. (Rabi).**

**Ref :- GJ. 60(64), 61(188), 62(152).**

**Site :- Trial-cum-Demons. Farm, Thasra. Type :- 'IM'.**

**Object :-**To find out the optimum number and interval of canal irrigations with different doses of  $P_2O_5$  for Gram.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 60 (64); Paddy for others. (c) N.A. for 60 (64); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 61 (188); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. for 62 (154). (ii) (a) Sandy loam. (iii) N.A.; 18.11.1961; 24.11.1962. (iv) (a) 2 to 3 ploughings+1 harrowing. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil. (vi) Chafa. (vii) As per treatments. (viii) N.A. for 60 (64); Nil for 61(188); 2 weedings for 62 (154). (ix) Nil. (x) N.A. 28.3.1962; 16.3.1963.

**2. TREATMENTS :**

**Main-plot treatments**

10 irrigational treatments :  $I_0$ =No irrigation ;  $I_1$ =1 irrigation 20 days after sowing,  $I_2$ =1 irrigation 35 days after sowing,  $I_3$ =1 irrigation 50 days after sowing,  $I_4$ =1 irrigation 65 days after sowing,  $I_5$ =2 irrigations 20 and 35 days after sowing,  $I_6$ =2 irrigations 20 and 50 days after sowing,  $I_7$ =2 irrigations 35 and 50 days after sowing,  $I_8$ =3 irrigations, 20, 35, 50 days after sowing and  $I_9$ =3 irrigations 30, 50 and 65 days after sowing.

**Sub-plot treatments**

3 levels of  $P_2O_5$  as super :  $P_0=0$ ,  $P_1=16.8$  and  $P_2=33.6$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 10 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m. x 3.0 m. (b) 7.3 m. x 1.8 m: (v) 91 cm. x 61 cm. (vi) Yes.

**3. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of grain. (iv) (a) 1960—1962. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) Sub-plot error variances are heterogenous. Therefore results of individual years are given below.

**5. RESULTS :**

**GJ. 60 (64).**

(i) 828 Kg/ha. (ii) (a) 246.3 Kg/ha. (b) 126.2 Kg/ha. (iii) Main effect of P is highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$I_7$	$I_8$	$I_9$	Mean
$P_0$	523	730	593	542	687	708	713	600	624	818	654
$P_1$	795	751	772	698	857	916	834	779	1007	967	838
$P_2$	773	1027	948	963	965	1028	1028	974	1101	1133	994
Mean	697	835	771	734	836	858	858	784	911	973	828

C.D. for P marginal means=56.4 Kg/ha.

**GJ. 61 (188).**

(i) 959 Kg/ha. (ii) (a) 78.5 Kg/ha. (b) 71.0 Kg/ha. (iii) Main effects of P and I are highly significant. (iv) Av. yield of grain in Kg/ha.

	$I_0$	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$I_7$	$I_8$	$I_9$	Man
$P_0$	534	759	790	856	861	852	796	843	966	974	823
$P_1$	766	790	895	869	966	1029	816	986	1042	1170	933
$P_2$	846	800	1054	1042	1108	1218	1179	1229	1304	1422	1120
Mean	715	787	913	922	978	1033	930	1019	1104	1188	959

C.D. for I marginal means=82.5 Kg/ha.

C.D. for P marginal means=31.8 Kg/ha.

**Gj. 62 (154).**

- (i) 964 Kg/ha. (ii) (a) 166.5 Kg/ha. (b) 120.4 Kg/ha. (iii) Main effects of P and I are highly significant.  
 (iv) Av. yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>	I <sub>7</sub>	I <sub>8</sub>	I <sub>9</sub>	Mean
P <sub>0</sub>	626	944	794	854	794	919	845	901	835	934	845
P <sub>1</sub>	714	919	1050	1050	897	1018	1112	981	1091	1149	998
P <sub>2</sub>	826	1000	1129	1093	953	1009	1074	1018	1112	1274	1049
Mean	722	954	991	999	881	982	1010	967	1013	1119	964

C.D. for I marginal means=139.5 Kg/ha.

C.D. for P marginal means=53.8 Kg/ha.

**Crop :- Tur (Kharif).**

**Ref :- Gj. 63(135), 64(85), 65(265).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'MF'.**

Object :—To study the residual effect of P applied to previous Cotton crop on Tur.

**1. BASAL CONDITIONS :**

(i) (a) Cotton—Tur. (b) Cotton. (c) As per treatments. (ii) Deep black soil. (iii) 22.7.63 ; 12.9.64 ; 4.8.65. (iv) (a) 2-3 harrowings. (b) Drilling. (c) 15 Kg/ha. for 65(265), 10 Kg/ha. for others. (d) 91 cm. between rows. (e) Nil. (vi) Local for 65(265), 274—2 for others. (vii) Unirrigated for 63(135). Irrigated for other years. (viii) 2-3 interculturings and weedings. (ix) 120 cm. ; 213 cm. ; 89 cm. (x) N.A. ; 22.4.65 ; 26.4.66.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.

(2) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=44.8 and N<sub>2</sub>=67.2 Kg/ha.

These fertilizer doses were applied to previous Cotton crop on 23.8.62 and 27.8.63 respectively.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 9.1 m. (b) 6.7 m. × 5.5 m. (v) 122 cm. × 183 cm. (vi) N.A.

**4. GENERAL :**

(i) Normal. (ii) Attack of pod borers and wilt for 65(265), Nil for others. (iii) Yield of grain. (iv) (a) 1963—1966. (b) Yes. (c) N.A. (v) N.A. (vi) Severe cold in Feb. 64 and 3.6 cm. rains on 26.11.63 for 63(135). Heavy rains through out monsoon for 64(85). Absence of rains in September for 65(265). (vii) N.A.

**5. RESULTS :**

**63 (135)**

(i) 810 Kg/ha. (ii) 224.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	650	921	862	811
P <sub>1</sub>	959	1000	1108	1022
P <sub>2</sub>	821	993	876	897
Mean	810	971	949	910



64 (85)

(i) 1048 Kg/ha. (ii) 113.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1003	1068	1016	1029
P <sub>1</sub>	1050	1112	957	1040
P <sub>2</sub>	1072	1067	1090	1076
Mean	1042	1082	1021	1048

65 (265)

(i) 743 Kg/ha. (ii) 152.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of grain in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	735	756	820	770
P <sub>1</sub>	762	761	781	768
P <sub>2</sub>	686	810	756	751
Mean	728	775	786	763

**Crop :- Mung (Kharif).**

**Ref :- Gj. 60(163).**

**Site :- Soil Cons. Res. Demons. and Trg. Centre, Vasad.**

**Type :- 'M'.**

**Object :-** To find out its effective dose of P<sub>2</sub>O<sub>5</sub> for Mung crop and its residual effect on succeeding Jowar crop.

**1. BASAL CONDITIONS :**

(i) (a) *Mung-Jowar*. (b) *Jowar*. (c) Nil. (ii) Sandy loam to loam (Alluvial in nature). (iii) 25.6.1960. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) 17 Kg/ha. (d) 30 cm. × 15 cm. (e) 1. (v) Nil. (vi) *China Mung V-781*. (vii) Unirrigated. (viii) 3 interculturings. (ix) 42 cm. (x) 22.8.1960 to 16.9.1960.

**2. TREATMENTS :**

3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha. P<sub>2</sub>O<sub>5</sub> applied on 22.6.1960.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 8.5 m. × 6.7 m. (v) 30 cm. × 30 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Pods, tops and seed yield. (iv) (a) 1957-1960. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 483 Kg/ha. (ii) 87.0 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Av. yield	427	592	430

C.D.=111.9 Kg/ha.

**Crop :- Wal (Rabi).****Ref :- Gj. 62(109).****Site :- Trial-cum-Demons. Farm, Bardoli.****Type :- 'M'.**

Object :-To study the effect of N and P on Paddy and its after effect on subsequent crop of Wal.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Wal. (b) Paddy. (c) As per treatments. (ii) Clay loam. (iii) 21.11.62. (iv) (a) 1 ploughing. (b) Drilling. (c) 44.8 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) and (ix) Nil. (x) 17.4.63.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=44.8$  and  $N_2=67.2$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

These fertilizers were applied to the previous Paddy crop.

**3. DESIGN :**

(i)  $3 \times 3$  Fact. in R.B.D. (ii) (a) 9. (b) 27.4 m.  $\times$  9.1 m. (iii) 4. (iv) (a) and (b) 9.1 m.  $\times$  3.1 m. (v) Nil. (vi) Yes.

**GENERAL :**

(i) Good. (ii) Nil. (iii) Yield of grain. (iv) 1962 [Failed in 1963, 64 and 65]. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 840 Kg/ha. (ii) 176.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Wal in Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean
$P_0$	850	673	924	816
$P_1$	915	823	807	848
$P_2$	857	771	942	857
Mean	874	756	891	840

**Crop :- Brinjal (Kharif).****Ref :- Gj. 63(278), 64(300), 65(244).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'M'.**

Object :-To study the effect of fertilizers on the yield of Brinjal.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 67.2 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 4.8.1963; 7.8.1964; 24.8.1965. (iv) (a) 2 ploughings and 2 harrowings. (b) Transplanting. (c) N.A. (d) 91 cm.  $\times$  91 cm. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) Local. (vii) Irrigated. (viii) 3 to 4 weedings and 2 to 4 interculturings. (ix) 90 cm.; 47 cm. (x) 10 pickings from 26.11.63 to 21.1.64 for 63(278); 12 pickings from 6.10.1964 to 9.1.1965 for 64(300); 16 pickings from 8.11.1965 to 17.3.1966 for 65(244).

**2. TREATMENTS :**

2 manurial treatments :  $M_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of  $K_2O$  and  $M_2=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ +33.6 Kg/ha. of  $K_2O$ .

N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Pot. Sul. at transplanting.

## 3. DESIGN :

(i) AB-BA. (ii) (a) 2. (b) Nil. (iii) 2. (iv) (a) 11.9 m. × 11.9 m. (b) 10.1 m. × 10.1 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 63(278) ; Good for others. (ii) Nil for 63(278) ; Attack of aphids for 65(244) and jassids for 64(300) which was controlled by spraying Endrin. (iii) Yield of green brinjal fruit. (iv) (a) 1963—1965. (b) No. (c) Results of the combined analysis are given under 5. (v) N.A. (vi) Heavy rains and frost during winter season for 63(278) ; Nil for others. (vii) Nil.

## 5. RESULTS :

(i) 132.0 Q/ha. (ii) 14.9 Q/ha. [5 d.f. made up of interaction of Treatments with years and pooled error]. (iii) Treatment difference is not significant. (iv) Av. yield of green brinjal fruits in Q/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>
Av. yield	127.8	136.1

**Crop :- Onion (Rabi).**

**Site :- Irrigational Demons. Farm, Jamnagar.**

**Ref :- Gj. 65(82).**

**Type :- 'IM'.**

Object :—To find out the water requirements and optimum dose of manures for Onions.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Bajra. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black (light soil). (iii) 22.12.65. (iv) (a) 2 ploughings and 2 harrowings. (b) Hand sowing. (c) N.A. (d) 30 cm. × 5 cm. (e) 1 to 2. (v) Nil. (vi) Deshi-red. (vii) As per treatments. (viii) and (ix) Nil. (x) 18.4.66.

## 2. TREATMENTS :

## Main-plot treatments :

4 levels of irrigations : I<sub>1</sub>=2 irrigations when 20% moisture available in soil, I<sub>2</sub>=3 irrigations when 40% moisture available in soil, I<sub>3</sub>=4 irrigations when 60% moisture available in soil and I<sub>4</sub>=7 irrigations of 80% moisture available in soil.

## Sub-plot treatments :

All combinations (1), (2) and (3)

- (1) 3 levels of N as A/S : N<sub>0</sub>=37.0, N<sub>1</sub>=61.8 and N<sub>2</sub>=86.4 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=37.0, P<sub>1</sub>=61.8 and P<sub>2</sub>=86.4 Kg/ha.
- (3) 3 levels of K<sub>2</sub>O as Pot. Sui. : K<sub>0</sub>=74.1, K<sub>1</sub>=98.8 and K<sub>2</sub>=123.5 Kg/ha.

N applied in furrows. P and K drilled on 20.12.65.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 27 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 5.2 m. × 4.2 m. (b) 4.6 m. × 3.7 m. (v) 30 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil Folidol and Sulphur dusted as precaution. (iii) Yield of onion bulbs. (iv) (a) 1965 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 98.0 Q/ha. (ii) (a) 35.7 Q/ha. (b) 23.1 Q/ha. (iii) Main effects of I and N are highly significant. (iv) Av. yield of bulbs in Q/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
N <sub>0</sub>	64.6	74.2	101.2	125.0	87.1	90.6	96.2	95.1	89.3	89.5	91.3
N <sub>1</sub>	73.9	75.9	104.9	136.3	98.6	95.4	99.2	98.4	102.1	92.9	97.8
N <sub>2</sub>	80.2	81.8	108.4	148.9	104.2	102.3	107.7	102.5	99.1	112.7	104.8
Mean	72.9	77.3	104.8	136.7	96.7	96.1	101.0	98.7	96.8	98.4	98.0
K <sub>0</sub>	72.3	77.7	109.1	135.4	96.2	100.4	99.4				
K <sub>1</sub>	72.5	75.3	105.6	133.9	98.5	92.3	99.6				
K <sub>2</sub>	73.9	78.8	99.8	140.7	95.4	95.6	104.1				
P <sub>0</sub>	75.1	81.3	99.0	131.2							
P <sub>1</sub>	72.1	75.8	104.4	132.1							
P <sub>2</sub>	71.5	74.7	111.1	146.8							

C.D. for I marginal means =21.9 Q/ha.

C.D. for N marginal means =7.6 Q/ha.

**Crop :- Onion (Rabi).**

**Ref :- Gj. 65(246).**

**Site :- Trial-cum-Demons. Farm. Pilwai.**

**Type :- 'IM'.**

Object :- To find out the optimum requirements of water and fertilizers for Onion crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut in *Kharif*. (c) 12.3 C.L./ha. of F.Y.M.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+11.2 Kg/ha. or N. (ii) Sandy loam soil. (iii) 31.12.65/1.1.66. (iv) (a) 2 ploughings, 2 harrowings. (b) Transplanting. (c) 5. (d) 30 cm.×10 cm. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. (vi) Red-local. (vii) Irrigated. (viii) 2 interculturings. (ix) Nil. (x) 12.3.66 to 15.5.66.

**2. TREATMENTS :**

**Main-plot treatments :**

4 irrigational treatments : I<sub>0</sub>=80% available moisture (11 irrigations from 13.1.66 to 23.4.66), I<sub>1</sub>=60% available moisture (9 irrigations from 13.1.66 to 23.4.66), I<sub>2</sub>=40% available moisture (9 irrigations from 21.1.66 to 23.4.66), and I<sub>3</sub>=20% available moisture (7 irrigations from 2.2.1966 to 27.4.66).

**Sub-plot treatments :**

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S drilled on 17.12.65 and 14.3.66 : N<sub>0</sub>=37.1 ; N<sub>1</sub>=61.8 N<sub>2</sub>=86.5 and Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super broadcasted on 1.1.66 : P<sub>0</sub>=37.1, P<sub>1</sub>=61.8 and P<sub>2</sub>=86.5 Kg/ha.
- (3) 3 levels of K<sub>2</sub>O as Mur. Pot. broadcasted on 1.1.66 : K<sub>0</sub>=74.1, K<sub>1</sub>=98.8 ; K<sub>2</sub>=123.5 Kg. K<sub>2</sub>O/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication. (b) 27 sub-plots/main-plot. (iii) 2. (iv) 5.2 m.×4.3 m. (b) 4.6 m.×3.7 m. (v) 30.5 cm.×30.5 cm. (vi) N.A.

**4. GENERAL :**

(i) Normal. (ii) Attack of thrips and least eating caterpillars. *Meta systox* applied as control measure. (iii) Yield of onion b. (iv) (a) 1965 only. (b) No. (c) N.A. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 167.0 Q/ha. (ii) (a) 60.7 Q/ha. (b) 53.9 Q/ha. (iii) Main effect of I is significant. (iv) Av. yield of Onion in Q/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
I <sub>0</sub>	169.9	174.5	178.3	187.7	168.8	171.3	175.3	165.5	182.8	174.2
I <sub>1</sub>	193.0	208.3	213.3	202.0	194.0	218.6	196.2	202.9	215.5	204.9
I <sub>2</sub>	156.8	153.3	171.9	163.6	155.1	163.3	157.4	159.0	165.6	160.7
I <sub>3</sub>	116.3	123.5	144.4	108.8	134.6	140.7	129.9	114.2	140.0	128.1
Mean	159.0	164.9	177.0	164.3	163.2	173.5	164.7	160.4	175.8	167.0
K <sub>0</sub>	163.6	148.5	182.1	162.9	166.3	165.0				
K <sub>1</sub>	155.5	162.7	163.1	167.0	155.0	159.0				
K <sub>2</sub>	157.9	186.3	185.8	163.0	168.1	196.2				
P <sub>0</sub>	161.4	169.0	162.4							
P <sub>1</sub>	154.4	153.4	181.7							
P <sub>2</sub>	161.2	172.4	186.9							

C.D. for I marginal means = 37.2 Q/ha.

**Crop :- Potato (Rabi).**

**Ref :- Gj. 65(245).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum requirements of water and fertilizers with proper method of layout for Potato.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Sann in Kharif. (c) 12.4 C.L./ha. of F.Y.M.+24.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam soil. (iii) 5.12.1965. (iv) (a) 7 ploughings, 4 harrowings. (b) Dibbling. (c) 98.8 Kg/ha. (d) 46 cm. x 15 cm. (e) Nil. (v) 24.7 C.L./ha. of F.Y.M. (vi) Dhankari. (vii) Irrigated. (viii) 2 inter-culturings. (ix) Nil. (x) 11.4.1966.

**2. TREATMENTS :**

**Main-plot treatments :**

3 irrigations : I<sub>1</sub>=60% available moisture (9 irrigations from 26.12.1965, to 30.3.1966), I<sub>2</sub>=40% available moisture (7 irrigations from 20.12.1965, to 3.4.1966) and I<sub>3</sub>=20% available moisture (5 irrigations from 20.12.1965, to 28.3.1966).

**Sub-plot treatments :**

2 methods of cultivation : M<sub>1</sub>=Ridges and furrows method and M<sub>2</sub>=Flat bed method.

**Sub-sub-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>1</sub>=49.4, N<sub>2</sub>=98.8 and N<sub>3</sub>=198.2 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=49.4, P<sub>2</sub>=98.8 and P<sub>3</sub>=148.2 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Mur. of Pot. : K<sub>1</sub>=74.1, K<sub>2</sub>=123.5 and K<sub>3</sub>=172.9 Kg/ha.

N drilled on 4.12.1965 and 8.2.1966, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O drilled on 4.12.1965.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 2 sub-plots/main-plot. (b) 27 sub-sub-plots/sub-plot. (iii) 2. (iv) (a) 2.8 m. x 3.7 m. (b) 2.1 m. x 2.8 m. (v) 31 cm. x 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of Jassides and blight observed. Endrex and fytolon were sprayed. (iii) yield of potato bulbs. (iv) (a) 1965-1968. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 5471 Kg/ha. (ii) (a) 6579.6 Kg/ha. (b) 9188.2 Kg/ha. (c) 1714.0 Kg/ha. (iii) Main effect of K above is significant. (iv) Av. yield of tubers in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	K <sub>1</sub>	K <sub>2</sub>	K <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
I <sub>1</sub>	7118	6952	7896	7246	7460	7260	7896	7194	6876	7249	7395	7322
I <sub>2</sub>	5055	5743	5729	5269	5686	5572	5800	5207	5520	6389	4628	5509
I <sub>3</sub>	3414	3832	3500	3433	3481	3832	3742	3599	3405	3544	3620	3582
Mean	5196	5509	5708	5316	5542	5555	5813	5333	5267	5727	5214	5471
M <sub>1</sub>	5289	5858	6035	5555	5808	5820	6146	5542	5495			
M <sub>2</sub>	5103	5160	5381	5077	5277	5289	5479	5125	5039			
K <sub>1</sub>	5615	5748	6075	5586	5814	6037						
K <sub>2</sub>	5278	5326	5397	5259	5738	5003						
K <sub>3</sub>	4695	5454	5653	5103	5074	5624						
P <sub>1</sub>	5065	5416	5468									
P <sub>2</sub>	5240	5539	5847									
P <sub>3</sub>	5283	5572	5809									

C.D. for K marginal means = 457.1 Kg/ha.

**Crop :- Sugarcane.**

**Ref :- Gj. 65(156)**

**Site :- Reg. Sugarcane Res. Sub Station, Kodinar.**

**Type :- 'M'.**

**Object :-** To study the effect of compost and superphosphate V/S superphosphate + F.Y.M. on Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Sugarcane-Groundnut-Sann. (b) Sann and Groundnut. (c) Nil. (ii) Medium black. (iii) 20.12.64  
(iv) (a) 2 ploughings, 1 harrowing. (b) Setts in wet furrows. (c) 24710 three budded setts/ha.  
(d) 106.7 cm. between rows. (e) Nil. (v) 246.6 Kg/ha. + 84.0 Kg. K<sub>2</sub>O/ha. in 4 split doses. (iv) Co-419  
mid late to late. (vii) 23 well irrigations at the interval of 8 to 10 days. (viii) Weeding as and when  
required. (ix) 351 m. (x) 17.1.66 to 23.1.66.

## 2. TREATMENTS :

4 manurial treatments : M<sub>1</sub> = 61.8 C.L./ha. of F.Y.M. + 84.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub> (composted in pit), M<sub>2</sub> = same  
as M<sub>1</sub> (with ordinary Super applied separately), M<sub>3</sub> = 84.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super  
and M<sub>4</sub> = 61.8 C.L./ha. of F.Y.M.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) Nil. (iii) 6. (iv) (a) 16.6 m. × 9.6 m. (b) 13.6 m. × 7.5 m. (v) 151 cm. × 106  
cm. (vi) Yes.

## 4. GENERAL :

(i) Fairly good. (ii) Slight attack of stem borers. (iii) Yield of Cane. (iv) (a) 1963-1966. (b) No. (c) Nil.  
(v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 900.7 Q/ha. (ii) 114.3 Q/ha. (iii) Treatment differences are not significant (iv) Av. yield of Cane in  
Q/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	908.3	945.2	853.8	895.5

**Crop :- Sugarcane. Ref :- Gj. 60(175), 61(205), 62(213), 63(222), 64(199).**  
**Site :- Reg. Sugarcane Res. Station, Kodinar. Type :- 'M'.**

Object :- To find out the optimum level of N, P and K for Sugarcane.

1. **BASAL CONDITIONS :**

(i) (a) Sugarcane-Groundnut-Sann. (b) Sann for green manuring. (c) Nil. (ii) Medium black soil. (iii) 7.4.60, 8.1.61, 7.1.62, 13.12.62, 4.1.64 for respective expts. (iv) (a) One to two ploughings, clod crushing and ridging. (b) Planting in furrows. (c) 24,710 setts/ha. (d) 91 cm. between rows. (e) Nil. (v) Nil. (vi) Co-419 (late). (vii) Irrigated. (viii) Weeding as and when necessary. (3 interculturings were given in the case of 61 (205)). (ix) 71 cm., 126 cm., 88 cm., 138 cm. and 106 cm. respectively. (x) 29th March to 9th April 1961 ; 12th to 18th April 1962 ; 16th to 19th Feb. 1963, 9th to 12th Jan. 1964 and 16th to 21st Feb. 1965 respectively.

2. **TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=84.1$  and  $N_2=168.1$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=44.8$  and  $P_2=89.7$  Kg/ha.

(3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=84.1$  and  $K_2=168.1$  Kg/ha.

N was applied in furrows in 4 doses and  $P_2O_5$  in 2 doses and  $K_2O$  in 3 doses.

3. **DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 27. (b) N.A. (iii) 2 for 60 (175), 61 (205) and 3 for others. (iv) (a) 16.6 m.  $\times$  5.5 m. (b) 13.6 m.  $\times$  3.7 m. (v) 152 cm.  $\times$  91 cm. (vi) Yes.

4. **GENERAL :**

(i) Good. (ii) Mild attack of stem-borer. Gammexane dusted in the case of 60 (175) ; Mild attack of stem borer in the stage and Red sheath in later stage in the case of 61 (205). Attack of stem borers, striga parasite and weeds, fernoxone (2-4-D) applied twice in the case of 62 (213). Slight attack of stem borer in the case of 63(222) and 64(199). (iii) Yield of Cane (iv) (a) 1960-64. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous and the Treatments  $\times$  years interaction is present.

5. **RESULTS :**

(i) 602.8 Q/ha. (ii) 158.7 Q/ha. (based on 72 d. f. made up of interactions of different components of Treatments with years). (iii) Main effects of N and P are highly significant. (iv) Av. yield of cane in Q/ha.

	$N_0$	$N_1$	$N_2$	$K_0$	$K_1$	$K_2$	Mean
$P_0$	415.0	490.7	452.9	428.8	436.8	493.8	452.9
$P_1$	565.9	658.8	698.5	626.4	673.1	623.7	641.1
$P_2$	614.1	735.1	793.9	709.5	703.0	730.7	714.4
Mean	531.7	628.2	648.4	588.2	604.0	616.1	602.8
$K_0$	506.2	615.6	642.8				
$K_1$	541.7	623.8	646.6				
$K_2$	547.0	645.2	655.9				

C. D. for N or P marginal means=41.5 Q/ha.

**Crop :- Sugarcane.**  
**Site :- Agri. Res. Stn., Vyara.**

**Ref :- Gj. 63(124).**  
**Type :- 'M'.**

Object :- To find out the effect of applying Molasses on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Sugarcane-Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 2.2.63. (iv) (a) 3 ploughings, 1 harrowing, 2 ridgings. (b) Wet planting (end to end). (c) 24710 setts/ha. (d) Row to row 107 cm. (e) N.A. (v) 224.1 Kg/ha. of N+56.0 Kg/ha. of  $P_2O_5$ . (vi) Co-419 (medium). (vii) Irrigated. (viii) 7 interculturings, 6 weedings and 5 harrowings. (ix) 185 cm. (x) 9 to 11.3.64.

## 2. TREATMENTS :

5 sett treatments :  $T_0$ =Control, cane setts soaked in plain water and irrigated as usual and sprayed with plain water once a month from July to December.  $T_1$ =Cane setts planted after soaking overnight in 35% solution of molasses neutralized with lime.  $T_2$ =Cane setts planted after soaking overnight in water and crop irrigated with water flowing over a pit (in the channel) filled with molasses, the molasses being stirred gently while the water is passing over it.  $T_3$ =Cane setts planted after soaking overnight in water and crop foliage sprayed with 20% molasses solution in water over a month from July to Dec. the crop irrigated with plain water.  $T_4$ = $T_1+T_2+T_3$  applied together.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 22.9 m.×8.5 m. (b) 21.3 m.×6.4 m. (v) 76 cm.×107 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) BHC 50% was applied. (iii) Cane yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) N.A. (vi) Heavy rains with thunder and high velocity of winds in Oct. 63. (vii) Nil.

## 5. RESULTS :

(i) 889.3 Q/ha. (ii) 85.5 Q/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Sugarcane in Q/ha.

Treatment :	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$
Av. yield :	843.1	923.7	899.9	862.1	917.6

**Crop :- Sugarcane.**

**Site :- Agri. Res. Stn., Vyara.**

**Ref :- Gj. 65(193).**

**Type :- 'M'.**

Object :—To study the effect of different Nitrogenous fertilizers on Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Sugarcane. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 24.3.65. (iv) (a) 2 ploughings, 2 plankings. (b) Wet plankings. (c) 24700 setts/ha. (d) 91 cm. between rows. (e) N.A. (v) 90 Kg/ha. of  $P_2O_5$ +90 Kg/ha. of  $K_2O$ . (vi) Co-419. (vii) Irrigated. (viii) 4 interculturings. (ix) 114.2 cm. (x) 17.4.66.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 sources of N :  $S_1$ =Urea,  $S_2$ =A/S,  $S_3$ =A/S/N and  $S_4$ =C/A/N.

(2) 2 levels of N :  $N_1$ =168.1 and  $N_2$ =224.2 Kg/ha.

N applied in five equal doses on 24.2.65, 15.5.65, 15.6.65, 20.7.65 and 20.8.65.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 7.3 m.×15.2 m. (b) 6.4 m.×14.3 m. (v) 46 cm.×46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Endrin was sprayed twice. (iii) Cane yield. (iv) (a) and (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 835.4 Q/ha. (ii) 44.1 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.



	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	
N <sub>1</sub>	797.9	811.8	803.8	804.7	804.6
N <sub>2</sub>	861.4	856.0	911.9	835.8	866.3
Mean	829.6	833.9	857.9	820.2	835.4

C. D. for N marginal means=32.4 Q/ha.

**Crop :- Sugarcane.**

**Ref :- Gj. 64(60), 65(192).**

**Site :- Agri. Res. Stn., Vyara.**

**Type :- 'M'.**

**Object :-**To find out the economics of replacing F.Y.M. with G.M. and fertilizer for sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Sugarcane. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64 (60); Green manures+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65 (192). (ii) Black soil. (iii) 8.2.1964 ; 19.2.1965. (iv) (a) 3 ploughings, harrowing and ridging for 64 (60); 3 ploughings for others. (b) Wet planting. (c) 24710 setts/ha. (d) 91 cm. between rows. (e) N.A. (v) 112.1 Kg/ha. of N+56.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Co. 419 (medium). (vii) Irrigated. (viii) 6 weedings and 4 harrowings for 64 (60); 4 interculturings for other. (ix) 195 cm. ; 114 cm. (x) 22.3.1965 ; 21.3.1966.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 levels of manures : M<sub>1</sub>=49.4 C.L./ha. of F.Y.M., M<sub>2</sub>=24.7 C.L./ha. of F.Y.M.+G.M. before planting and M<sub>3</sub>=N,P,K fertilizers equivalent to 49.4 C.L./ha. of F.Y.M.

(2) 2 levels of interculturings : G<sub>0</sub>=Without groundnut in between two rows of sugarcane and G<sub>1</sub>=With AH 32 groundnut in between two rows of sugarcane.

Green manuring of dry glyricidia applied at the rate of 22.5 Kg/plot. (100 units of green matter=20 units of dry matter on the basis of organic matter). N, P, K were applied in the form of A/S, super and Pot. Sul. respectively.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.0 m.×9.1 m. (b) 9.1 m.×7.3 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of Pyrilla in Sept. which was controlled by spraying Endrin. BHC 50% and 2-4-D were also sprayed for 64 (60); Nil for 65 (192) but Endrin was sprayed twice. (iii) Cane yield. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis is given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

**5. RESULTS :**

(i) 671.3 Q/ha. (ii) 84.7 Q/ha. (35 d.f. made up of pooled error and Treatments×years interaction). (iii) Main effect of M alone is highly significant. (iv) Av. yield of cane in Q/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
G <sub>0</sub>	653.6	665.2	768.3	695.7
G <sub>1</sub>	623.2	627.8	689.8	646.9
Mean	638.4	646.5	729.0	671.3

C.D. for M marginal means=60.8 Q/ha.

**Crop :- Sugarcane.****Ref :- Gj. 64(59), 65(190).****Site :- Agri. Res. Stn., Vyara.****Type :- 'M'.**Object :-To find out the suitable method of placement of  $P_2O_5$  and dose of F.Y.M. for Sugarcane.**1. BASAL CONDITIONS :**

(i) (a) Paddy-Sugarcane. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 11.2.1964 ; 16.2.1965. (iv) (a) 3 ploughings and 1 harrowing. (b) Wet planting. (c) 24710 setts/ha. (d) 91 cm. between rows. (e) Nil. (v) 112.1 Kg/ha. of N. (vi) Co-419. (vii) Irrigated. (viii) Interculturings and weedings. (ix) 195 cm. ; 114 cm. (x) 23 to 26.2.1965 ; 12.2.1966.

**2. TREATMENTS :**

All combinations of (1) and (2).

(1) 3 levels of F.Y.M. :  $F_1=12.4$ ,  $F_2=24.7$  and  $F_3=49.4$  C.L./ha.(2) 2 methods of placement of 78.5 Kg/ha. of  $P_2O_5$  :  $M_1$ =By usual method and  $M_2$ =Applied 5 cm. to 8 cm. away in furrows from setts. $P_2O_5$  applied as super on 10.2.64 for 64 (59).**3. DESIGN :**(i) Fact. is R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 11.0 m.  $\times$  9.1 m. (b) 9.1 m.  $\times$  7.3 m. (v) 91 cm.  $\times$  91 cm.**4. GENERAL :**

(i) Normal. (ii) Attack of Pyrilla in Sept. which was controlled by spraying Endrin for 64 (59). BHC 50% and 2-4-D were also sprayed ; Nil for 65 (190) but Endrin sprayed three times. (iii) Yield of Cane. (iv) (a) 1964—65. (b) No. (c) Combined analysis results given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments  $\times$  years interaction is absent.

**5. RESULTS :**

(i) 796.0 Q/ha. (ii) 71.4 Q/ha. (15 d.f. made up of pooled error and Treatments  $\times$  years interaction). (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	$F_1$	$F_2$	$F_3$	Mean
$M_1$	763.6	791.4	772.7	775.9
$M_2$	833.6	805.2	809.7	816.2
Mean	798.6	798.3	791.2	796.0

**Crop :- Sugarcane.****Ref :- Gj. 60(90), 61(34), 62(116).****Site :- Agri. Res. Stn., Vyara.****Type :- 'M'.**

Object :-To ascertain which intercrop gives higher yield of cane by burrying them as G.M.

**1. BASAL CONDITIONS :**

(i) (a) Sugarcane-Paddy. (b) Paddy. (c) G.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 28.1.60 ; 20.1.61 ; 20.1.62. (iv) (a) 3 ploughings and 1 harrowing. (b) Wet planting. (c) 24710 setts/ha. (d) 107 cm. between rows. (e) One sett. (v) 24.7 C.L./ha. of F.Y.M. (vi) Co 419 (medium). (vii) Irrigated. (viii) 8 hand weedings in the case of 60 (90) and 61 (34), and 5 harrowings and 2 earthings in the case of 62 (116). (ix) 161 cm ; 185 cm. ; 104 cm. (x) 27.2.61 ; 31.1.62 ; 20.21.1.63.

**2. TREATMENTS :**5 intercrops :  $M_1$ =No intercrop,  $M_2$ =Sann,  $M_3$ =Lucerns  $M_4$ =Sesbania and  $M_5$ =No intercrop but 168.1 Kg/ha. of N.134.5 Kg/ha. of N as A/S and 56.0 Kg/ha. of  $P_2O_5$  as super was applied to all excepting  $M_5$  plots.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 37.3 m. × 13.6 m. (iii) 3. (iv) (a) 13.5 m × 7.5 m. (b) 11.4 m. × 5.3 m. (v) 107 cm. × 107 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Incidence of pest ; B.H.C. dusted. (iii) Cane yield. (iv) (a) 1959 to 1962. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 639 Q/ha. (ii) 77.3 Q/ha. (with 44 d.f. made up of Treatments × years interaction and pooled error)  
(iii) Treatment differences are not significant. (iv) Av. yield of cane in Q/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	587	648	668	622	669

**Crop :- Sugarcane.**

**Ref :- Gj. 60(91), 61(36), 62(115), 63(122).**

**Site :- Agri. Res. Stn., Vyara.**

**Type :- 'M',**

Object :—To study the effect of N, P and K on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Sugarcane—Paddy. (b) Paddy. (c) G.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black soil. (iii) 28.1.60 ; 21.1.61 ; 25.1.62 ; 17.1.63. (iv) (a) 3 ploughings, 1 harrowing and one ridging. (b) Wet planting. (c) 24,710 Setts/ha. (d) 107 cm. between rows. (e) One sett/hole. (v) 24.7 C.L. of F.Y.M./ha. (vi) Co. 419 (medium). (vii) Irrigated. (viii) 8 hand weedings for 60(91) and 61(36), 5 weedings, 5 harrowings and 2 earthings for 62 (115) and 6 interculturings, 5-6 weedings, and 6 harrowings for 63(122) (ix) 161 cm. ; 185 cm. ; 104 cm. ; 185 cm. ; (x) 12.2.61 ; 21.2.62 . 12.2.63 ; 24.2.64.

## 2. TREATMENTS :

All combinations of (1), (2) and (3).

(1) 3 levels of N as A/S : N<sub>1</sub>=89.7, N<sub>2</sub>=112.1 and N<sub>3</sub>=134.5 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=56.0 and P<sub>2</sub>=112.1 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Pot. Sul : K<sub>1</sub>=56.0, K<sub>2</sub>=112.1 and K<sub>3</sub>=168.1 Kg/ha.

(Time and method of application of fertilisers-N.A.)

## 3. DESIGN :

(i) 3<sup>3</sup> confd. (a) 9 plots/block, 3 blocks/replication. (b) 67.2 m. × 45.7 m. (iii) 2. (iv) 15.2 m. × 7.5 m. (b) 13.3 m. × 5.3 m. (v) 99 cm. × 107 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. Lodged due to heavy rains and strong winds in the case of 63 (122). (ii) Incidence of *Pyrrilla* pest noticed and B.H.C. dusted in the case of 60 (91) and no incidence of pests or diseases in the case of others. (iii) Yield of cane. (iv) (a) 1959-63. (b) No. (c) Results of combined analysis are presented under 5. (v) Nil. (vi) Heavy rains during July and August 61 in the case of 61(36) and during Oct 63 in the case of 63 (122). (vii) Expt. No. 59 (111) is also included in the pooled analysis. Error variances are homogeneous.

## 5. RESULTS :

(i) 653.4 Q/ha. (ii) 55.2 Q/ha. [based on 72 d.f. consisting of the interaction of years with single and 2 factor interaction of treatments]. (iii) Main effect of N alone in highly significant. (iv) Av. yield of cane in Q/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
P <sub>0</sub>	623.7	661.6	640.1	644.1	654.4	626.7	641.8
P <sub>1</sub>	637.2	630.8	686.5	657.4	651.1	646.0	651.5
P <sub>2</sub>	640.6	667.0	693.2	648.0	671.6	681.1	666.9
Mean	633.8	653.1	673.3	649.0	659.2	651.3	653.4
K <sub>0</sub>	633.7	643.2	672.7				
K <sub>1</sub>	640.8	677.2	659.1				
K <sub>2</sub>	626.9	638.9	688.1				

C.D. for N marginal means=23.1 Q/ha.

**Crop :- Sugarcane.**

**Ref :- Gj. 60(130), 61(209), 62(215).**

**Site :- Reg. Sugarcane Res. Stn., Kodinar. Type :- 'C'.**

**Object :-** To find out the suitable date of planting and to study the possibility of switching it over from January to October (pre-seasonal) planting.

**1. BASAL CONDITIONS :**

(i) (a) Nil in the case of 60 (130) Sugarcane-Groundnut for others. (b) N.A. in the case of 60(130). Groundnut for others. (c) N.A. in the case of 60 (130); 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for others. (ii) Medium black. (iii) As per treatments. (iv) (a) 1 ploughing in the case of 60(130); 2 plougings, clod crusting and ridging. (b) Wet planting in furrows. (c) 24,710 setts/ha. [N.A. in the case of 60 (130)]. (d) 107 cm. between rows [N.A. in the case of 60 (130)]. (e) 1 sett. (v) 224.2 Kg/ha. of N+112.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+112.1 Kg/ha. of K<sub>2</sub>O. (vi) Co-419 (late). (vii) Irrigated. (viii) Weeding was done as and when required. (ix) 126 cm. ; 126 cm. ; 88.3 cm. (x) 3 to 12.4.62 ; 26.12.62 to 4.3.63 ; 30.11.63 to 5.3.64.

**2. TREATMENTS :**

12 dates of planting : D<sub>1</sub>=15th Oct., D<sub>2</sub>=30th Oct., D<sub>3</sub>=15th Nov., D<sub>4</sub>=30th Nov., D<sub>5</sub>=15th Dec., D<sub>6</sub>=30th Dec., D<sub>7</sub>=15th Jan., D<sub>8</sub>=30th Jan., D<sub>9</sub>=15th Feb., D<sub>10</sub>=28th Feb., D<sub>11</sub>=15th March and D<sub>12</sub>=30th Mach.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 16.6 m. × 9.6 m. (b) 13.6 m. × 7.5 m. (v) 152 cm. × 107 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Slight attack of stem borer. (iii) Yield of cane. (iv) (a) 1960-1962. (b) No. (c) Results of combined analysis are presented under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

**5. RESULTS :**

(i) 898.8 Q/ha. (ii) 73.1 Q/ha. [with 22 d. f. of the interaction of Treatments × years] (iii) Treatment differences are highly significant. (iv) Av. yield of cane in Q/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>
Av. yield	969.1	1014.2	1013.5	1027.3	933.1	952.3	910.9
Treatment	D <sub>8</sub>	D <sub>9</sub>	D <sub>10</sub>	D <sub>11</sub>	D <sub>12</sub>		
Av. yield	869.4	840.5	851.1	714.7	690.3		

C.D.=123 Q/ha.

**Crop :- Sugarcane.****Ref :- Gj. 64(58), 65(189).****Site :- Agri. Res. Stn., Vyara.****Type :- 'C'.**

Object :—To study the effect of different kinds and levels of setts on the yield of Sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Sugarcane. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 64 (58); G.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 65 (189). (ii) Black soil. (iii) 7.2.1964; 13.2.1965. (iv) (a) 2 to 3 ploughings and 1 harrowing. (b) Wet planting. (c) As per treatments. (d) 91 cm. between rows. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+78.4 Kg/ha. of  $P_2O_5$ . (vi) Co-419 (medium). (vii) Irrigated (viii) 8 interculturings, 5 weedings for 64 (58); 4 interculturings for 65 (189). (ix) 195 cm.; 114 cm. (x) 11 to 16.3.1965; 16.2.1966.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 seed rates :  $R_1=24710$ ,  $R_2=29652$  and  $R_3=34594$  setts/ha.(2) 2 types of setts :  $T_1=$ Top portion of Sugarcane and  $T_2=$ Bottom portion of Sugarcane.**3. DESIGN :**(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  9.1 m. (b) 9.1 m.  $\times$  7.3 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.**4. GENERAL :**

(i) Normal. (ii) Attack of pyrilla in Sept. which was controlled by spraying of endrin for 64 (58), also BHC 50% and 2-4-D were sprayed; Nil for 65 (189), but Endrin sprayed thrice. (iii) Yield of Cane. (iv) (a) 1964-65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the error variances are heterogeneous and the interaction of Treatments with years is absent, the results of the individual years are presented below.

**5. RESULTS :****64(58)**

(i) 957.3 Q/ha. (ii) 122.4 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of Sugarcane in Q/ha.

	$R_1$	$R_2$	$R_3$	Mean
$T_1$	1048.0	994.2	982.6	1008.3
$T_2$	883.5	917.2	918.3	906.3
Mean	965.8	955.7	950.5	957.3

**65(189)**

(i) 789.1 Q/ha. (ii) 70.5 Q/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$R_1$	$R_2$	$R_3$	Mean
$T_1$	897.3	903.6	914.5	905.1
$T_2$	632.3	685.5	701.6	673.1
Mean	764.8	794.6	808.0	789.1

C. D. for T marginal means=61.3 Q/ha.

**Crop :- Sugarcane.****Ref :- Gj. 60(126), 62(108).****Site :- Trial-cum-Demons. Farm, Bardoli.****Type :- 'CV'.**

Object :—To find out suitable time of planting for different varieties of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton for 60 (126) and *Sann* (G.M.) for 62 (108). (c) 24.7 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60 (126) only. (ii) Clay loam. (iii) As per treatments. (iv) (a) 2 ploughings, 3 to 4 harrowings, 1 planting and 1 ridging. (b) Planting by setts. (c) 24710 setts/ha. for 60 (126); 75.3 Q/ha. for 62 (108). (d) 107 cm. between rows. (e) Single sett. (v) 24.7 C.L./ha. of F.Y.M. for 60 (126); 24.7 C.L./ha. of F.Y.M.+134.5 Kg/ha. of N for 62 (108). (vi) As per treatments. (vii) Irrigated. (viii) N.A. (ix) 176 cm.; 135 cm. (x) Last weeks of Nov., Dec., Jan., and Feb.

## 2. TREATMENTS :

## Main plot treatments

4 times of planting : D<sub>1</sub>=Last week of Nov., D<sub>2</sub>=Last week of Dec., D<sub>3</sub>=Last week of Jan., and D<sub>4</sub>=Last week of Feb.

## Sub-plot treatments

3 varieties : V<sub>1</sub>=Co-740, V<sub>2</sub>=Co-775 and V<sub>3</sub>=Co-419.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 3 sub-plots/main-plot. (b) 42.7 m.×32.0 m. (iii) 6. (iv) (a) 10.7 m.×10.7 m. (b) 9.1 m.×8.5 m. (v) 76 cm.×107 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Stray attack of *Pyrilla* stem and top shoot borers. Endrine sprayed for 60 (126) and no incidence for 62 (108). (iii) Cane yield. (iv) (a) 1959-1962 (failed in 1961). (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

## 5. RESULTS :

(i) 816.7 Q/ha. (ii) (a) 83.4 Q/ha. (33 d. f. made up of Treatments×years interaction and pooled error) (b) 84.3 Q/ha. (88 d. f. made up of Treatments×years interaction and pooled error). (iii) Main effect of D and V are highly significant. (iv) Av. yield of cane in Q/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	802.0	789.8	697.7	809.2	774.7
V <sub>2</sub>	843.0	855.8	781.9	827.9	827.1
V <sub>3</sub>	864.6	870.9	781.8	876.7	848.5
Mean	836.5	838.8	753.8	837.9	816.7

C. D. for D marginal means =40.2 Q/ha.

C. D. for V marginal means =34.2 Q/ha.

**Crop :- Sugarcane**

**Ref :- Gj. 60(141), 61(167), 62(157), 63(156), 64(163).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'CV'.**

**Object :-** To find out the best time of planting for different varieties of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sann* (G.M.) for 60 (141), 62 (157), Cotton for 61 (167), 63 (156), *Jowar* for 64 (163). (c) Nil for 60 (141); 62 (157); 44.8 Kg/ha. of N for 61 (167); 44.8 Kg/ha. of N+12.4 C.L./ha. of F.Y.M. for 63 (156), 64 (163). (ii) Medium black. (iii) As per treatments. (iv) (a) 2 to 5 ploughings+1 to 5 harrowings (b) Dry planting. (c) 24710 setts (3 budded). (d) 107 cm. between rows. (e) —. (v) 24.7 C.L./ha. of F.Y.M.+134.5 Kg/ha. of N. (vi) As per treatments. (vii) Irrigated. (viii) 2 to 6 interculturings, (ix) 145 cm.; 84 cm.; 84 cm.; 124 cm.; 99 cm. (x) 23.12.1961 to 5.2.1962; 13 to 22.12.1962; 3 to 9.1.1964; Jan. to Feb. 1965; Jan. to Feb. 1966.

## 2. TREATMENTS :

## Main-plot treatments

4 times of planting :  $T_1$ =Last week of October,  $T_2$ =Last week of November,  $T_3$ =Last week of Dec. and  $T_4$ =Last week of January.

## Sub-plot treatments

3 varieties :  $V_1$ =Co-740,  $V_2$ =Co-775 and  $V_3$ =Co-419.

## 3. DESIGN :

(i) Split-plot. (2) (a) 4 main plots/replication ; 3 sub-plots/main plot. (b) N.A. (iii) 4. (iv) (a) 10.7 m.  $\times$  10.7 m. (b) 9.1 m.  $\times$  8.3 m. (v) 76 cm.  $\times$  107 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Slight attack of pyrilla for 60 (141) ; Slight attack of stem borer and pyrilla for 61 (167) ; Attack of pyrilla, mealy bugs and red rot (50% gamarine was dusted) for 63 (156) ; No incidence for 62 (157) ; 64 (163). (iii) Yield of cane. (iv) (a) 1960-1964. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Uneven distribution of rains during monsoon affected the crop to some extent for 61 (167). (vii) As the sub-plot error variances are heterogeneous, the results of individual years are presented below.

## 5. RESULTS :

## 60(141)

(i) 868.7 Q/ha. (ii) (a) 96.8 Q/ha. (b) 110.1 Q/ha. (iii) Main effect of T is significant. (iv) Av. yield of cane in Q/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$V_1$	785.8	822.0	863.2	968.6	859.9
$V_2$	853.4	958.6	864.2	886.0	890.6
$V_3$	756.5	821.0	889.8	954.6	855.5
Mean	798.6	867.2	872.4	936.4	868.7

C.D. for T marginal means=89.4 Q/ha.

## 61(167)

(i) 985 Q/ha. (ii) (a) 205.0 Q/ha. (b) 117.6 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$V_1$	1015	926	1036	950	982
$V_2$	1112	982	1104	814	1003
$V_3$	934	980	1064	900	970
Mean	1020	963	1068	888	985

## 62(157)

(i) 1229 Q/ha. (ii) (a) 131.7 Q/ha. (b) 169.8 Q/ha. (iii) Main effects of T and V are significant. (iv) Av. yield of cane in Q/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	Mean
$V_1$	1300	1327	1225	1328	1295
$V_2$	1193	954	1021	1285	1113
$V_3$	1184	1173	1359	1397	1278
Mean	1226	1151	1202	1337	1229

C. D. for T marginal means=121.6 Q/ha.

C. D. for V marginal means = 123.9 Q/ha.

63(156)

- (i) 581.5 Q/ha. (i') (a) 120.8 Q/ha. (b) 143.5 Q/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of cane in Q/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
V <sub>1</sub>	762.1	640.7	619.2	784.5	701.6
V <sub>2</sub>	553.6	349.8	509.4	428.3	460.3
V <sub>3</sub>	511.0	479.6	698.7	641.0	582.6
Mean	608.9	490.0	609.1	617.9	581.5

C. D. for V marginal means=215.8 Q/ha.

64(163)

- (i) 296.1 Q/ha. (ii) (a) 37.0 Q/ha. (b) 18.4 Q/ha. (iii) Main effect of V alone is significant. (iv) Av. yield of cane in Q/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	Mean
V <sub>1</sub>	279.7	288.9	301.8	287.0	289.4
V <sub>2</sub>	288.9	292.2	293.4	290.9	291.4
V <sub>3</sub>	298.8	297.0	294.1	339.9	307.5
Mean	289.2	292.7	296.4	305.9	296.1

C. D. for V marginal means=13.4 Q/ha.

**Crop :- Sugarcane.**

**Ref :- Gj. 60(147), 61(204).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'CV'.**

**Object :-** To find out the suitable time of planting for different varieties of Sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60 (147) and 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. for 61 (204). (ii) Medium black. (iii) As per treatments. (iv)(a) 2 ploughings and 5 harrows for 60 (147) ; 6 ploughings and 5 harrows for 61 (204). (b) Dry method. (c) 24710 setts/ha. (d) 107 cm. between rows. (e) Single sett. (v) 24.7 C.L./ha. F.Y.M.+134.5 Kg/ha. of N as G.N.C. and A/S in 1 : 1 ratio for 60 (147) and 12.4 C.L./ha. of F.Y.M.+134.5 Kg/ha. of N+Sann (G.M.) for 61 (204). (vi) As per treatments. (vii) Irrigated. (viii) 5 interculturations for 60 (147), 3 interculturations and 6 weedings for 61 (204). (ix) 108 cm. for 60 (147) ; N.A. for 61 (204). (x) 27.12.1961 to 19.2.1962 and January, 1963.

**2. TREATMENTS :**

**Main-plot treatments :**

4 times of planting : D<sub>1</sub>=Last week of Oct., D<sub>2</sub>=Last week of Nov., D<sub>3</sub>=Last week of Dec. and D<sub>4</sub>=Last week of January.

**Sub-plot treatments :**

3 varieties : V<sub>1</sub>=Co-740, V<sub>2</sub>=Co-775 and V<sub>3</sub>=Co-419.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 3 for 60 (147) and 6 for 61 (204). (iv) (a) 10.7 m. × 10.7 m. (b) 9.1 m. × 8.5 m. (v) 76 cm. × 107 cm. (vi) Yes.



## 4. GENERAL :

(i) Normal. (ii) Endrex sprayed. (iii) Cane yield. (iv) (a) 1960-1961. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the sub-plot variances are heterogeneous, the results of individual years are presented below.

## 5. RESULTS :

60(147)

(i) 325.1 Q/ha. (ii) (a) 44.7 Q/ha. (b) 59.3 Q/ha. (iii) Main effects of D and interaction  $D \times V$  are significant. (iv) Av. yield of Sugarcane in Q/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	398.4	299.0	273.4	261.9	308.2
V <sub>2</sub>	389.4	363.5	315.6	335.7	351.0
V <sub>3</sub>	291.0	323.9	333.7	315.3	316.0
Mean	359.6	328.8	307.6	304.3	325.1

C. D. for D marginal means = 51.6 Q/ha.

C. D. for D means at the same level of V = 98.1 Q/ha.

C. D. for V means at the same level of D = 102.5 Q/ha.

61(204)

(1) 315.0 Q/ha. (ii) (a) 25.6 Q/ha. (b) 19.2 Q/ha. (iii) All the effects are highly significant. (iv) Av. yield of cane in Q/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	337.4	331.0	256.3	177.3	275.5
V <sub>2</sub>	508.3	350.2	346.2	217.8	355.6
V <sub>3</sub>	393.0	339.6	307.5	215.7	313.9
Mean	412.9	340.3	303.3	203.6	315.0

C. D. for D marginal means = 18.2 Q/ha.

C. D. for V marginal means = 11.2 Q/ha.

C. D. for V means at the same level of D = 22.4 Q/ha.

C. D. for D means at the same level of V = 25.8 Q/ha.

**Crop :- Sugarcane.**

**Ref :- Gj. 64(285), 65(53).**

**Site :- Agri. College Farm, Anand.**

**Type :- 'CM'.**

**Object :-** To study the effect of different times of planting and levels of N on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajri*. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 2 ploughings, 1 to 2 harrowings. (b) Wet planting. (c) 24710 setts/ha. (d) 107 cm. between rows. (e) Nil. (v) 400 Q/ha. of F.Y.M.+100 Kg/ha. of each of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O. (vi) C<sub>0</sub>-419. (vii) Irrigated. (viii) 3 weedings and one interculturing. (ix) 58 cm. (x) Harvesting between 11 and 13th month from planting time.

## 2. TREATMENTS :

**Main-plot treatments :**

4 dates of planting : D<sub>1</sub>=15th April, D<sub>2</sub>=15th May, D<sub>3</sub>=15th June and D<sub>4</sub>=15th July.

**Sub-plot treatments :**

5 levels of N : N<sub>1</sub>=100, N<sub>2</sub>=200, N<sub>3</sub>=300, N<sub>4</sub>=400 and N<sub>5</sub>=500 Kg/ha.

10% of N as A/S at planting time ; 15% as A/S+25% as G.N.C. 2 months after planting ; 10% N as A/S 4 month after planting and 15% N as A/S+25% as G.N.C. applied at earthing up.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 4.3 m. × 7.3 m. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Cane yield. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 733 Q/ha. (ii) (a) 126.9 Q/ha. (3 d.f. made up of Treatments × years interaction). (b) 144.4 Q/ha. (112 d.f. made up of various components of Treatments × years interaction and pooled error). (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	N <sub>4</sub>	N <sub>5</sub>	Mean
D <sub>1</sub>	575	760	735	740	725	707
D <sub>2</sub>	615	765	770	745	685	716
D <sub>3</sub>	740	865	865	790	740	800
D <sub>4</sub>	630	730	795	720	665	708
Mean	640	780	791	749	704	733

C.D. for N marginal means = 71.5 Q/ha.

**Crop :- Sugarcane.**

**Ref :- Gj. 61(72), 62(208).**

**Site :- Agri. Res. Stn., Jamnagar.**

**Type :- 'CM'.**

**Object :-** To find out the spacing and manurial requirements of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sann*. (c) Nil. (ii) Medium black. (iii) 6, 7.2.1961 ; 7, 8.3.1962. (iv) (a) 1 to 2 harrowings and 1 ploughing. (b) Dry planting followed by irrigation. (c) 24710 to 34595 setts/ha. (d) As per treatments. (e) Single sett. (v) G.M. (*Sann*). (vi) N.A. for 61(72); Local P.O.G. for 62(208). (vii) Irrigated. (viii) 5 to 7 weedings. (ix) 99 cm. ; 28 cm. (x) 7.3.1962 to 12.4.1962, 10.4.1963, to 2.5.1963.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=56.0 Kg/ha.

(2) 2 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0 and K<sub>1</sub>=112.1 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=91, S<sub>2</sub>=107 and S<sub>3</sub>=122 cm.

(2) 3 levels of N as A/S : N<sub>1</sub>=112.1, N<sub>2</sub>=224.2 and N<sub>3</sub>=336.3 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 4 for 61(72) ; 2 for 62(208). (iv) (a) 9.1 m. × 5.5 m. (b) 7.9 m. × 4.3 m. for 61(72) ; 7.3 m. × 3.7 m. for 62(208). (v) 61 cm. × 61 cm. for 61(72) ; 91 cm. × 91 cm. for 62(208). (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) No incidence for 61(72) ; Attack of top shoot borers and damage due to rats in some plots for 62(208). (iii) Cane yield. (iv) (a) 1961-1962. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Expt. could not be conducted in 1963 and 1964 due to non availability of irrigation facilities. As the sub-plot variances are heterogeneous, the results of the individual years are presented below.

## 5. RESULTS :

61(72)

(i) 137.2 Q/ha. (ii) (a) 43.8 Q/ha. (b) 40.0 Q/ha. (iii) Main effect of S alone is highly significant. Main effect of N and interaction N×P is significant. (iv) Av. yield of sugarcane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
S <sub>1</sub>	155.8	168.9	146.9	161.4	153.0	153.5	160.9	157.2
S <sub>2</sub>	161.0	170.6	139.5	158.3	155.7	158.5	155.5	157.0
S <sub>3</sub>	102.0	101.3	89.2	91.3	103.7	101.5	93.5	97.5
Mean	139.6	146.9	125.2	137.0	137.5	137.8	136.6	137.2
K <sub>0</sub>	138.5	149.8	125.3	141.7	134.0			
K <sub>1</sub>	140.7	144.0	125.2	132.3	140.9			
P <sub>0</sub>	136.0	136.5	138.5					
P <sub>1</sub>	143.2	157.3	112.0					

C.D. for N or S marginal means =16.2 Q/ha.

C.D. for N means at the same level of P=22.8 Q/ha.

C.D. for P means at the same level of N=24.3 Q/ha.

62(208)

(i) 141.3 Q/ha. (ii) (a) 102.0 Q/ha. (b) 78.5 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of sugarcane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
S <sub>1</sub>	153.7	178.0	176.1	177.5	161.0	152.9	185.6	169.2
S <sub>2</sub>	111.2	147.6	164.9	121.8	160.7	126.4	156.0	141.2
S <sub>3</sub>	78.5	93.4	168.2	111.8	114.9	92.2	129.6	113.4
Mean	114.5	139.7	169.7	137.0	145.5	125.5	157.1	141.3
K <sub>0</sub>	113.1	137.0	126.4	117.9	133.7			
K <sub>1</sub>	115.9	142.3	213.0	156.8	157.4			
P <sub>0</sub>	108.4	122.7	180.0					
P <sub>1</sub>	120.5	156.7	159.5					

**Crop :- Sugarcane.**

**Site :- Reg. Sugarcane Res. Stn., Kodinar.**

**Ref :- Gj. 62(214), 63(225).**

**Type :- 'CM'.**

**Object :-** To find out the effect of molasses on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Sugarcane-Groundnut-Sann. (b) Sann (G.M.). (c) Nil. (ii) Medium black soil. (iii) 8.4.1962 ; 5.3.1963. (iv) (a) 1 to 2 ploughings, clod crushing and ridging. (b) Wet planting in furrows. (c) 24710 setts/ha. (d) 91 cm. between rows. (e) Nil. (v) 224.2 Kg/ha. of N+112.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+112.1 Kg/ha. of K<sub>2</sub>O. (vi) Co-419(late). (vii) Irrigated. (viii) Weeding as and when required. (ix) 88 cm., 138 cm. (x) 11, 12.4.1963 ; 26.3.1964 to 7.4.1964.

## 2. TREATMENTS :

5 sett treatments :  $T_1$ =Setts to be soaked in plain water overnight,  $T_2$ =Setts to be soaked in 35% molasses solution overnight,  $T_3$ = $T_1$ +spraying of 20% molasses solution on 4th, 6th and 8th months of planting at 22.4 Kg/ha.,  $T_4$ = $T_1$ +spraying equal quantity of plain water on 4th, 6th and 8th months of planting and  $T_5$ = $T_1$ +Applying 20% molasses solution through irrigation at 4th, 6th and 8th months of planting at 22.4 Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 16.6 m.  $\times$  4.6 m. for 62(214); 16.5 m.  $\times$  11.9 m. for 63(225). (b) 13.6 m.  $\times$  2.7 m. for 62(214); 13.4 m.  $\times$  10.1 m. for 63(225). (v) 152 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Slight attack of stem borer. (iii) Cane yield. (iv) (a) 1962-1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 569.2 Q/ha. (ii) 92.5 Q/ha. (28 d.f. made up of pooled error and Treatments  $\times$  years interaction). (iii) Treatment differences are significant. (iv) Av. yield of cane in Q/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	565.4	621.8	600.1	479.2	579.5
	C.D. = 94.7 Q/ha.				

**Crop :- Sugarcane (Rabi). Ref :- Gj. 61(210), 62(216), 63(223), 64(200), 65(155).**

**Site :- Reg. Sugarcane Res. Sub Stn., Kodinar.**

**Type :- 'CM'.**

Object :- To study the effect of N, P, K and spacings on the yield of Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61(210); Sugarcane-Groundnut for others. (b) N.A. for 61(210); Sann for G.M. for 62(216), 63(223), 64(200); Groundnut for 65(155). (c) N.A. for 61(210); 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 65(155); Nil for others. (ii) Medium black. (iii) 4 to 7.1.1961; 10.1.1962; 17 to 22.12.1962; 13 to 19.12.1963; 10 to 14.12.1964; (iv) (a) 1 ploughing for 61(210); 1 ploughing and 1 harrowing for 65(155); 2 ploughings, clod crushing and ridging for others. (b) Wet planting in furrows. (c) 24710 setts/ha. (d) As per treatments. (e) N.A. (v) Nil for 61(210), 65(155); Sann (G.M.) for others. (vi) Co-419 (late). (vii) Irrigated. (viii) 3 interculturings for 61(210); weedings as and when required for others. (ix) 131 cm.; 88 cm.; 138 cm.; 106 cm.; 35 cm. (x) 9.3.62 to 25.3.62; 28.1.63 to 6.2.63; 13.12.63 to 24.1.64; 10.1.65 to 2.2.1965; 25.1.66 to 15.2.66.

## 2. TREATMENTS :

**Main-plot treatments :**

3 spacings between rows :  $S_1=91$ ,  $S_2=107$  and  $S_3=122$  cm.

**Sub-plot treatments :**

3 levels of N as A/S :  $N_1=112.1$ ,  $N_2=224.2$  and  $N_3=336.2$  Kg/ha.

**Sub-sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of  $K_2O$  :  $K_0=0$  and  $K_1=112.1$  Kg/ha.

(2) 2 levels of  $P_2O_5$  :  $P_0=0$  and  $P_1=56.0$  Kg/ha.

N as A/S,  $P_2O_5$  as Super and  $K_2O$  as Pot. Sul. applied in furrows. N applied in 4 doses 10% at planting, 25% two months after, 25% four month after and 40% at earthing up.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot; 4 sub-sub-plots/sub-plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  12.2 m. for  $S_1$  and  $S_3$ ; 10.7 m.  $\times$  12.2 m. for  $S_2$ . (b) 7.3 m.  $\times$  9.1 m. for  $S_1$  and  $S_3$ ; 7.5 m.  $\times$  9.0 m. for  $S_2$ . (v) 183 cm.  $\times$  153 cm. for  $S_1$  and  $S_3$ ; 161 cm.  $\times$  161 cm. for  $S_2$ . (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Slight attack of stem borer. (iii) Yield of cane. (iv) (a) 1961-1965. (b) and (c) Nil. (v) and (vi) Nil. (vii) Error variances for sub-plot as well as sub-sub-plot Treatments are heterogeneous, therefore results of individual years are presented below.

## 5. RESULTS :

61(210)

(i) 628.8 Q/ha. (ii) (a) 112.7 Q/ha. (b) 119.0 Q/ha. (c) 112.0 Q/ha. (iii) Main effects of N and P are highly significant. Interaction N×P is highly significant. (iv) Av. yield of cane in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	562.1	611.1	570.9	492.1	670.6	600.0	562.9	581.4
N <sub>2</sub>	611.4	614.1	610.8	582.7	641.5	603.1	621.1	612.1
N <sub>3</sub>	688.2	707.8	682.9	671.9	714.0	687.7	698.2	693.0
Mean	620.6	644.3	621.5	582.2	675.4	630.3	627.4	628.8
K <sub>0</sub>	644.3	629.9	616.6	575.4	685.2			
K <sub>1</sub>	596.8	658.6	626.4	589.0	665.6			
P <sub>0</sub>	561.6	508.8	596.3					
P <sub>1</sub>	679.6	700.0	646.7					

C.D. for N marginal means = 51.0 Q/ha.  
 C.D. for P marginal means = 37.1 Q/ha.  
 C.D. for P means at the same level of N = 64.3 Q/ha.  
 C.D. for N means at the same level of P = 84.9 Q/ha.

62(216)

(i) 540.6 Q/ha. (ii) (a) 205.4 Q/ha. (b) 140.0 Q/ha. (c) 134.7 Q/ha. (iii) Main effect of P alone is highly significant. (iv) Av. yield of cane in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	571.5	546.6	487.2	464.4	605.9	522.6	547.6	535.1
N <sub>2</sub>	579.4	571.9	539.0	481.4	641.6	547.3	575.7	561.4
N <sub>3</sub>	522.0	557.0	496.7	415.1	635.6	534.8	515.8	525.2
Mean	555.7	558.6	507.6	453.6	627.7	534.9	546.5	540.6
K <sub>0</sub>	533.3	568.5	502.9	431.2	638.5			
K <sub>1</sub>	578.1	548.7	512.4	476.0	616.7			
P <sub>0</sub>	489.7	461.6	409.5					
P <sub>1</sub>	621.7	655.6	605.8					

C.D. for P marginal means = 44.6 Q/ha.

63(223)

(i) 707.1 Q/ha. (ii) (a) 168.2 Q/ha. (b) 184.7 Q/ha. (c) 122.6 Q/ha. (iii) Main effect of P and interaction S×K are highly significant. (iv) Av. yield of cane in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	817.3	695.8	670.8	650.5	805.4	699.3	756.6	727.9
N <sub>2</sub>	735.8	735.1	695.6	605.7	838.6	685.4	758.9	722.1
N <sub>3</sub>	734.2	673.3	606.5	548.2	794.5	682.0	660.7	671.3
Mean	762.4	701.4	657.6	601.4	812.8	688.9	725.4	707.1
K <sub>0</sub>	796.1	646.6	624.0	576.9	800.9			
K <sub>1</sub>	728.7	756.2	691.3	626.0	824.8			
P <sub>0</sub>	653.8	614.7	535.8					
P <sub>1</sub>	871.1	788.0	779.4					

C.D. for P marginal means =40.6 Q/ha.

C.D. for K means at the same level of S=70.4 Q/ha.

C.D. for S means at the same level of K=152.7 Kg/ha.

64 (200)

(i) 771.4 Q/ha. (ii) (a) 239.0 Q/ha. (b) 181.4 Q/ha. (c) 135.1 Q/ha. (iii) Main effect of P is highly significant. Interaction S×P is significant. (iv) Av. yield of sugarcane in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	711.3	686.5	855.4	673.4	828.8	727.2	774.9	751.1
N <sub>2</sub>	764.7	766.7	823.5	697.8	872.1	822.3	747.7	785.0
N <sub>3</sub>	763.4	692.5	878.7	685.4	871.0	<b>783.3</b>	<b>773.1</b>	778.2
Mean	746.5	715.2	852.5	685.5	857.3	777.6	765.2	771.4
K <sub>0</sub>	762.1	712.1	858.1	688.0	867.3			
K <sub>1</sub>	730.9	717.8	847.0	683.1	847.3			
P <sub>0</sub>	622.4	659.2	775.0					
P <sub>1</sub>	870.5	771.3	930.1					

C.D. for P marginal means =44.8 Q/ha.

C.D. for P means at the same level of S=77.6 Q/ha.

C.D. for S means at the same level of P=152.7 Kg/ha.

65(155)

(i) 673.2 Q/ha. (ii) (a) 239.8 Q/ha. (b) 99.5 Q/ha. (c) 77.5 Q/ha. (iii) Main effect of P is highly significant and interaction P×N×S is significant. (iv) Av. yield of cane in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>1</sub>	682.4	664.8	609.9	525.4	779.4	648.0	656.8	652.4
N <sub>2</sub>	717.0	679.1	658.2	563.6	806.0	703.0	666.6	684.8
N <sub>3</sub>	697.6	690.5	665.7	538.6	826.6	678.4	686.7	682.6
Mean	697.0	678.1	644.6	542.5	804.0	676.5	670.0	673.2
K <sub>0</sub>	702.1	670.4	656.9	545.2	807.9			
K <sub>1</sub>	691.9	685.8	632.3	539.9	800.2			
P <sub>0</sub>	570.2	535.6	521.7					
P <sub>1</sub>	823.8	820.6	767.5					

C.D. for P marginal means =25.1 Q/ha.

**Crop :- Sugarcane.****Ref :- Gj. 60(92), 61(35), 62(117), 63(123).****Site :- Agri. Res. Stn., Vyara.****Type :- 'CM'.**

**Object :-**To study the effect of different depths of planting with and without  $P_2O_5$  on the yield of Sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) Sugarcane—Paddy. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +G.M. (ii) Black soil. (iii) 28.1.1960, 20.1.1961, 20.1.1962 and 18.1.1963. (iv) (a) 3 ploughings, 1 harrowing and 1 to 2 ridgings. (b) Wet planting (end to end). (c) 24710 setts/ha. (d) 107 cm. between rows. (e) Single sett. (v) 24.7 C.L./ha. of F.Y.M. for all the expts. Besides 134.5 Kg/ha. of N for 62(117) and 224.2 Kg/ha. of N for 63(123). (vi) Co—4:9 (medium). (vii) Irrigated. (viii) 8 hand weedings for 60(92), 61(35); 5 weedings +2 earthings for 62(117); 5 weedings+6 interculturings for 63(123). (ix) 161 cm.; 185 cm.; 104 cm.; 185 cm. (x) 3.2.1961; 27.1.1962; 30.31.1.1963; 13, 14.1.1964.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 depths of planting :  $D_1$ =Normal ploughing 15 cm. deep with wooden plough and  $D_2$ =Deep ploughing 46 cm. deep.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=84.1$  Kg/ha.

Normal ploughing with earthing up and deep ploughing without earthing up.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 4. (b) 13.6 m.×29.9 m. (iii) 3. (iv) (a) 13.6 m.×7.5 m. (b) 11.4 m×5.3 m. (v) 107 cm.×107 cm. (vi) Yes.

**4. GENERAL :**

(i) Good ; Lodging in October 1963 for 63(123). (ii) Incidence of pest and Pyrilla for 60(92) only. B.H.C. 5% dusted for 60(92) and 63(123). (iii) Cane yield. (iv) (a) 1959-1963. (b) No. (c) Result of combined analysis given under 5. (v) N.A. (vi) Heavy rains during the months of July and August, 1961 and in October, 1963. (vii) Expt. No. 59(112) has also been included in pooled analysis. Error variances are homogeneous and interaction is absent.

**5. RESULTS :**

(i) 767 Q/ha. (ii) 69.3 Q/ha. (42 d.f. made up of different components of Treatments×years interaction and pooled error). (iii) Main effect of P alone is significant. (iv) Av. yield of cane in Q/ha.

	$D_1$	$D_2$	Mean
$P_0$	741	753	747
$P_1$	766	809	788
Mean	753	781	767

C.D. for P marginal means=37.1 Q/ha.

**Crop :- Sugarcane.****Ref :- Gj. 61(44), 62(155), 63(196), 64(143).****Site :- Agri. Res. Stn., Vyara.****Type :- 'CM'.**

**Object :-**To find out the optimum dose of manures and suitable spacings for Sugarcane.

## 1. BASAL CONDITIONS :

(i) (a) Paddy—Sugarcane. (b) Paddy. (c) G.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 61(44) and 62(155); 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for others. (ii) Black soil. (iii) 24.1.1961; 24.1.1962; 15.1.1963; 1.2.1964. (iv) (a) 3 ploughings, 1 harrowing and 1 to 2 ridgings. (b) Wet planting. (c) 24710 setts/ha. (d) As per treatments. (e) Nil. (v) Nil for 61(44), 64(143); 24.7 C.L/ha. of F.Y.M. for 62 (155), 63(196). (vi) Co-419 (medium). (vii) Irrigated. (viii) 8 hand weedings for 61(44); 5 weedings and 2 earthings for 62(155); 5 to 6 weedings and 5 to 7 interculturings for others. (ix) 178 cm.; 104 cm.; 185 cm.; 195 cms. (x) 15.3.1962; 10 to 15.1.1963; 15 to 19.1.1964; 8 to 17.2.1965.

## 2. TREATMENTS :

## Strip-plot treatments

Treatments in one direction

3 levels of N as A/S :  $N_1=112.1$ ,  $N_2=224.2$  and  $N_3=336.2$  Kg/ha.

Treatments in perpendicular direction

3 spacings between rows :  $S_1=91$ ,  $S_2=107$  and  $S_3=122$  cm.

## Sub-plot treatments

All combinations of (1) and (2)

(1) 2 levels of  $P_2O_5$  as super :  $P_0=0$  and  $P_1=56.0$  Kg/ha.(2) 2 levels of  $K_2O$  as Pot. Sol. :  $K_0=0$  and  $K_1=112.1$  Kg/ha.

N applied in furrows in four doses in the 1st, 3rd, 4th and 6th month and  $P_2O_5$  and  $K_2O$  applied in furrows before the planting of cane.

## 3. DESIGN :

(i) Strip-cum-split-plot. (ii) (a) 9 main-plots/replication; 4 sub-plots/main-plot. (b) 73.2 m×44.2 m. for 61(44); N.A. for others. (iii) 2. (iv) (a) 7.3 m×12.2 m for  $S_1$  and  $S_2$ ; 7.5 m×12.2 m. for  $S_3$  (b) 5.5 m.×8.1 m. for  $S_1$ , 5.3 m.×8.4 m. for  $S_2$ , 4.9 m.×9.1 m. for  $S_3$  (v) Varies from treatment to treatment. (vi) Yes.

## 4. GENERAL :

(i) Good for 61(44), Normal for 62(155), 64(143); Heavy lodging for 63(196). (ii) Nil for 61(44), 62(155), 63(196); but BHC 50% was applied to 62(155), 63(196); Attack of Pyrilla in Sept. 1964 for 64(143) but Endrin, B.H.C and 2-4-D were sprayed (iii) Yield of cane. (iv) (a) 1961-64. (b) No. (c) Nil. (v) Kodinar. (vi) Nil for 61(44), 62(155); Heavy rains with thunder and wind in the month of Oct. 63 for 63(196) adversely affected the crop; Nil for 64(143). (vii) Since the error variances for (N×S) are heterogenous therefore individual years results are presented below.

## 5. RESULTS :

## 61(44)

(i) 673.1 Q/ha. (ii) (a) 26.2 Q/ha. for S. (b) 108.1 Q/ha. for N (c) 50.2 Q/ha. for (N×S) and (d) 99.0 Q/ha. for (P×K) (iii) Main effect of S alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$S_1$	669.4	692.8	755.5	709.7	702.1	663.5	748.3	705.9
$S_2$	692.4	713.4	711.6	697.3	714.2	692.8	718.8	705.8
$S_3$	603.9	654.1	565.0	631.2	584.1	592.7	622.6	607.7
Mean	655.2	686.8	677.4	679.4	666.8	649.7	696.6	673.1
$K_0$	623.4	682.0	643.5	663.0	636.2			
$K_1$	687.1	691.5	711.2	695.7	697.3			
$P_0$	671.2	701.8	665.3					
$P_1$	639.3	671.7	689.5					

C.D. for S marginal means=32.5 Q/ha.



62(155)

(i) 566.7 Q/ha. (ii) (a) 58.7 Q/ha. for S. (b) 82.7 Q/ha. for M. (c) 48.6 Q/ha. for N×S and (d) 44.3 Q/ha. for (P×K). (iii) Main effect of P alone is significant. (iv) Av. yield of cane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
S <sub>1</sub>	574.1	595.5	589.0	570.2	602.2	576.8	595.6	586.2
S <sub>2</sub>	547.3	557.3	583.8	550.8	574.8	550.0	575.7	562.8
S <sub>3</sub>	559.2	524.2	569.6	543.4	558.6	545.3	556.7	551.0
Mean	560.2	559.0	580.8	554.8	578.5	557.4	576.0	566.7
K <sub>0</sub>	555.6	546.0	570.5	552.9	561.9			
K <sub>1</sub>	564.9	571.9	591.1	556.7	595.2			
P <sub>0</sub>	546.6	555.0	562.8					
P <sub>1</sub>	573.8	563.0	598.8					

C.D. for P marginal means = 21.4 Q/ha.

63(196)

(i) 793.2 Q/ha. (ii) (a) 47.2 Q/ha. for S. (b) 305.8 Q/ha. for N. (c) 224.7 Q/ha. for (N×S). and (d) 95.2 Q/ha. for (P×K). (iii) Interactions S×P, S×K and S×N×P are significant. (iv) Av. yield of cane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
S <sub>1</sub>	645.3	876.4	808.7	824.7	725.7	725.7	827.9	776.8
S <sub>2</sub>	691.4	847.2	859.6	777.1	821.6	808.9	789.8	799.4
S <sub>3</sub>	714.7	904.7	790.5	790.9	815.7	818.6	788.0	803.3
Mean	683.8	876.1	819.6	797.6	788.7	784.4	801.9	793.2
K <sub>0</sub>	662.0	873.6	817.6	783.9	784.9			
K <sub>1</sub>	705.6	878.6	821.6	811.3	792.5			
P <sub>0</sub>	670.3	893.9	828.6					
P <sub>1</sub>	697.3	838.3	810.6					

C.D. for P or K means at the same level of S = 79.7 Q/ha.

C.D. for S means of the same level of P or K = 126.1 Q/ha.

64(143)

(i) 836.7 Q/ha. (ii) (a) 232.3 Q/ha. for S. (b) 189.7 Q/ha. for N. (c) 187.1 Q/ha. for N×S and (d) 78.7 Q/ha. for (P×K). (iii) None of the effects is significant. (iv) Av. yield of cane in Q/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
S <sub>1</sub>	764.7	928.8	927.9	846.5	901.1	865.4	882.2	873.8
S <sub>2</sub>	696.8	838.3	943.5	835.4	817.0	837.8	814.6	826.2
S <sub>3</sub>	652.6	884.4	893.3	789.2	831.0	779.6	840.6	810.1
Mean	704.7	883.8	921.6	823.7	849.7	827.6	845.8	836.7
K <sub>0</sub>	710.8	857.9	914.1	816.6	838.8			
K <sub>1</sub>	698.6	909.7	929.1	830.8	860.8			
P <sub>0</sub>	684.5	894.8	891.6					
P <sub>1</sub>	724.9	872.8	951.6					

**Crop :- Sugarcane.****Ref :- Gj. 65(191).****Site :- Agri. Res. Stn., Vyara.****Type :- 'CM'.**

Object :- To find out the optimum spacing and manurial dose for sugarcane.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Sugarcane. (b) Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 25.2.1965. (iv) (a) 2 ploughings and 1 harrowing. (b) Wet planting. (c) 24700 setts of 3 eye/ha. (d) As per treatments. (e) Nil. (v) Nil. (vi) Co-419. (vii) Irrigated. (viii) 5 interculturings. (ix) 114.2 cm. (x) 26.2.66.

**2. TREATMENTS :****Main-plot treatments :**3 spacings between rows :  $S_1=91$ ;  $S_2=107$  and  $S_3=122$  cm.**Sub-plot treatments :**3 levels of N :  $N_1=112$ ,  $N_2=224$  and  $N_3=336$  Kg/ha.**Sub-sub-plot treatments**

All combinations of (1) and (2)

(1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=56$  Kg/ha.(2) 2 levels of  $K_2O$  as Pot. Sol. :  $K_0=0$  and  $K_1=112$  Kg/ha.**3. DESIGN :**

(i) Split-split plot. (ii) (a) 3 main plots/replication ; 3 sub-plots/main-plot and 4 sub-sub plots/sub-plot. (b) N.A. (iii) 2. (iv) (a) 7.3m × 12.2m for  $S_1$  7.5m × 12.2 m. for  $S_2$  and 7.3 m. × 12.2 m. for  $S_3$ . (b) 5.5m. × 8.1m. for  $S_1$ , 5.3 m. × 8.4 m. for  $S_2$  and 4.9 m. × 9.1 m. for  $S_3$ . (v) —. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. Endrin sprayed twice. (iii) Cane yield. (iv) (a) 1961—1965 (Design changed in 65). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 860.4 Q/ha. (ii) (a) 245.9 Q/ha. (b) 180.8 Q/ha. (c) 97.6 Q/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cane in Q/ha.

	$N_1$	$N_2$	$N_3$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$S_1$	725.5	901.6	1002.0	869.2	883.5	876.2	876.6	876.4
$S_2$	694.1	879.6	1046.4	857.6	889.2	873.8	873.0	873.4
$S_3$	734.0	888.7	871.6	810.6	852.2	822.4	840.5	831.4
Mean	717.9	890.0	973.3	845.8	875.0	857.5	863.3	860.4
$K_0$	722.5	871.3	978.5	827.3	887.5			
$K_1$	713.3	908.6	968.1	864.3	862.5			
$P_0$	724.7	889.4	923.3					
$P_1$	711.1	890.6	1023.3					

C.D. for N marginal means=198.4 Q/ha.

**Crop :- Sugarcane.****Ref :- Gj. 60(89).****Site :- Agri. Res. Stn., Vyara.****Type :- 'CM'.**

Object :- To standardise the optimum dose of N with P and distance between two rows.

## 1. BASAL CONDITIONS :

- (i) (a) Sugarcane, Paddy and Sugarcane. (b) G.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 2.2.1960. (iv) (a) 3 ploughings, 1 harrowing and ridging. (b) Wet planting. (c) 24710 setts/ha. (d) As per treatments. (e) Nil. (v) 24.7 C.L. of F. Y. M./ha. (vi) Co-419 (medium). (vii) Irrigated. (viii) 8 hand weedings. (ix) 161 cm. (x) 10.3.1961.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 spacings :  $S_1=91$ ,  $S_2=107$  and  $S_3=122$  cm.

(2) 3 levels of N :  $N_1=112.1$ ,  $N_2=140.0$  and  $N_3=168.1$  Kg/ha.

(3) 2 levels of  $P_2O_5$  :  $P_0=0$  and  $P_1=112.1$  Kg/ha.

Time and method of application of manures is N.A.

## 3. DESIGN :

- (i) Fact. in R.B.D. (ii) (a) 18. (b) 51.2 m.  $\times$  45.7 m. (iii) 4. (iv) (a) 15.2 m.  $\times$  8.2 m. for  $S_1$ , 15.2 m.  $\times$  8.5 m. for  $S_2$  and  $S_3$ . (b) 11.8 m.  $\times$  6.4m. for  $S_1$  and  $S_2$  and 12.5 m.  $\times$  6.1 m. for  $S_3$ . (v) N.A. (vi) Yes.

## 4. GENERAL :

- (i) Healthy condition. No lodging. (ii) No. (iii) Cane yield. (iv) (a) 1958-1960. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

- (i) 546.6 Q/ha. (ii) 42.2 Q/ha. (iii) Main effects of S and interaction  $N \times S$  are highly significant. Main effects of N, P and interaction  $N \times P \times S$  are significant. (iv) Av. yield of sugarcane in Q/ha.

	$N_1$	$N_2$	$N_3$	$P_0$	$P_1$	Mean
$S_1$	593.5	513.7	571.9	563.8	555.6	559.7
$S_2$	586.0	544.3	538.3	562.8	549.6	556.2
$S_3$	510.4	541.3	519.7	549.6	498.0	523.8
Mean	563.3	533.1	543.3	558.7	534.4	546.6
$P_0$	581.4	539.2	555.6			
$P_1$	545.2	527.0	531.0			

C.D. for N or S marginal means = 24.5 Q/ha.

C.D. for P marginal means = 20.0 Q/ha.

C.D. for body of  $N \times S$  table = 42.4 Q/ha.

**Crop :- Sugarcane.**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Ref :- Gj. 63(111).**

**Type :- 'IM'.**

Object :- To find out the number of Irrigations and requirements of Sugarcane in Bardoli conditions.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy in kharif. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Clay loam. (iii) 28.12.63. (iv) (a) 2 ploughings, 2 harrowings and 1 ridging. (b) Wet planting. (c) 75.3 Q/ha. (d) 92 cm. between rows. (e) Nil. (v) 12.4 C.L. of Press Mud (sugarcane by product)/ha. (vi) Co-419. (vii) As per treatments. (viii) Nil. (ix) 224 cm. (x) 19.12.64 to 18.2.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_1=112.1$  and  $N_2=168.1$  Kg/ha.

(2) 4 No. of irrigations :  $I_1=14$ ,  $I_2=16$ ,  $I_3=18$  and  $I_4=20$  irrigations.

Intensity and dates of irrigation are N.A. N applied in four equal doses.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 16.6 m. × 9.1 m. (b) 14.8 m. × 7.3 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Cane yield. (iv) (a) 1963 contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 759.8 Q/ha. (ii) 23.8 Q/ha. (iii) Main effect of I is highly significant and interaction I × N is significant. (iv) Av. yield of sugarcane in Q/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	Mean
N <sub>1</sub>	720.1	753.2	754.6	794.6	755.6
N <sub>2</sub>	723.6	722.0	763.6	846.9	764.0
Mean	721.8	737.6	759.1	820.7	759.8

C.D. for I marginal means = 24.8 Q/ha.

C.D. for body of I × N table = 35.0 Q/ha.

**Crop :- Cotton (Kharif).**

**Ref. :- Gj. 61(107), 62(55), 63(2), 64(27).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

Object :- To study the effect of N as A/S and castor cake with different levels of P on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil in 1961 ; Bajra, Jowar—Groundnut—Cotton in 1962, Cotton—Groundnut in 1963; Cotton—Jowar—Groundnut—Cotton in 1964. (b) Wheat ; Groundnut in 1962, 1963 and 1964. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1961 ; 5.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1962, 1963 and 1964. (ii) Medium black in 1961, 62 and 64, shallow light black in 63. (iii) 23.7.1961 ; 18.7.1962 ; 13.7.1963 ; 3.7.1964. (iv) (a) 1 ploughing and 1 harrowing ; 1 harrowing ; 2 harrowings and 3 harrowings. (b) Drilling ; Dibbling in 1962, 1963 and 1964. (c) 17 Kg/ha. ; 5 Kg/ha. ; 12 Kg/ha. in 1963 and 1964. (d) 61 cm. between rows in 1961 and 1962 ; 61 cm. × 15 cm. in 1963 and 1964. (e) N.A. in 1961 and 1963, 1 in 1962 and 1964. (v) Nil. (vi) C.J. 73 (early). (vii) Un-irrigated. (viii) 2 interculturings in 1961 ; 2 interculturings and 2 weedings in 1962 ; 3 interculturings in 1963 ; 3 interculturings and 3 weedings for 1964. (ix) 33 cm. ; 29 cm. ; 56 cm. ; 73 cm. (x) 8.1.1962 ; 3.11.1962 to 14.12.1962 ; 3.12.1963 to 6.1.1964 ; 12.12.1964 to 1.2.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=11.2 Kg/ha. and P<sub>2</sub>=22.4 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 sources of N : S<sub>1</sub>=A/S, S<sub>2</sub>=Castor cake and S<sub>3</sub>=½S<sub>1</sub>+½S<sub>2</sub>

(2) 2 levels of N : N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.

Manures applied by broadcast at the time of sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 4.9 m. (b) 4.9 m. × 3.7 m. in 1961, 5.2m. × 3.7 m. in 1962, 1963 and 1964. (v) 61 cm. × 61 cm. in 1961, 46 cm. × 61 cm. in 1962, 1963 and 1964. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory in 1961 and 1963. Below normal in 1962 and normal in 1964. (ii) Nil. (iii) Yield of seed cotton. (iv) (a) 1961 to 1964. (b) No. (c) —. (v) N.A. (vi) Drought conditions prevailed during 1961, 62 and 63. Hence poor yields. (vii) Main-plot and sub-plot error variances are heterogeneous.

## 5. RESULTS:

61(107)

(i) 127 Kg/ha. (ii) (a) 13.7 Kg/ha. (b) 72.3 Kg/ha. (iii) Main effect of P is highly significant. (iv) Av. yield of grain in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	132	104	120	116	122	119
P <sub>2</sub>	130	154	125	130	142	136
Mean	131	129	122	123	132	127
N <sub>1</sub>	138	133	98			
N <sub>2</sub>	124	125	146			

C.D. for P marginal means = 12.6 Kg/ha.

62(55)

(i) 114 Kg/ha. (ii) (a) 59.6 Kg/ha. (b) 39.0 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	94	133	95	111	104	107
P <sub>2</sub>	114	113	137	139	104	121
Mean	104	123	116	125	104	114
N <sub>1</sub>	132	125	118			
N <sub>2</sub>	76	121	114			

63(2)

(i) 360 Kg/ha. (ii) (a) 23.5 Kg/ha. (b) 82.8 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	364	356	368	329	396	363
P <sub>2</sub>	322	352	400	360	356	358
Mean	343	354	384	344	376	360
N <sub>1</sub>	336	338	359			
N <sub>2</sub>	350	370	409			

64(27)

(i) 282 Kg/ha. (ii) (a) 44.8 Kg/ha. (b) 60.5 Kg/ha. (iii) None of the effects is significant (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	309	263	300	272	309	290
P <sub>2</sub>	271	294	256	269	279	274
Mean	290	278	278	270	294	282
N <sub>1</sub>	290	252	269			
N <sub>2</sub>	290	305	287			

**Crop :- Cotton (Kharif).**

**Ref :- 62(53), 63(54).**

**Site :- Agri. Res. Sta., Amreli.**

**Type :- 'M'.**

**Object :-** To study the response of Cotton to micronutrients by foliar application.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 5.6 Kg/ha. of N. (ii) Medium Black. (iii) 10.7.1962 ; 12.7.1963. (iv) (a) 1 harrowing ; 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) 91 cm. × 15 cm. (e) 1. (v) 11.2 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> ; Nil. (vi) C.J.73. (vii) Unirrigated. (viii) 4 interculturings. (ix) 29 cm. and 56 cm. (x) 23.11.1962 and 6.12.1963, 2.1.1964.

**2. TREATMENTS :**

6 micronutrients treatments : T<sub>0</sub> = Control, T<sub>1</sub> = 6.7 Kg/ha. of Borax + 1.7 Kg/ha. of Betenite, T<sub>2</sub> = 26.9 Kg/ha. of Cu. Sul. + 26.9 Kg/ha. of limc, T<sub>3</sub> = 10.1 Kg/ha. of Mn. Sul. + 6.7 Kg/ha. of lime, T<sub>4</sub> = 10.1 Kg/ha. of Zn. Sul. + 6.7 Kg/ha. of lime and T<sub>5</sub> = 0.6 Kg/ha. of Sodium Molybdate.

All the above micronutrients were dissolved in 1364 litres of water. 1/3rd of the solution were sprayed one month after complete germination and 1/3rd at the time of flowering.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) 20.1 m. × 10.1 m. (b) 18.3 m. × 8.2 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Below normal ; Normal. (ii) Nil. (iii) Yield of seed cotton. (iv) (a) 1962—1963. (b) No. (c) No. (v) N.A. (vi) Drought conditions prevailed. (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

**62(53)**

(i) 327 Kg/ha. (ii) 21.7 Kg/ha. (iii) Treatment differences are not significant (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	328	330	328	312	328	333

**63(54)**

(i) 435 Kg/ha. (ii) 63.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	443	461	405	354	462	484

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(50).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

**Object :-**To study the response of Cotton to micronutrients by soil application.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 22.4 Kg/ha. of  $P_2O_5$  + 5.6 Kg/ha. of N. (ii) Medium black. (iii) 12.7.63. (iv) (a) 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) 91 cm.  $\times$  15 cm. (e) 1. (v) Nil. (vi) C.J. 73. (vii) Unirrigated. (viii) 4 interculturings. (ix) 56 cm. (x) 6.12.63 ; 2.1.64.

**2. TREATMENTS :**

7 micronutrients :  $T_0$ =Control,  $T_1$ =Manganese at 56.0 Kg/ha. of Mn. Sul.  $T_2$ =Zinc at 28.0 Kg/ha. of Zn. Sul.,  $T_3$ =Copper at 28.0 Kg/ha. of Cu. Sul.,  $T_4$ =Boron at 22.4 Kg/ha. of Borax ;  $T_5$ =Molybdenum at 1.1 Kg/ha. of Sodium molybdate and  $T_6$ =Mixture of all above micronutrients.

Micronutrients applied through soil at the time of sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 2. (iv) (a) and 13.7 m.  $\times$  7.3 m. (v) Nil. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of seed cotton. (iv) (a) to (c) No. (v) to (vii) Nil.

**5. RESULTS :**

(i) 296 Kg/ha. (ii) 129.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	303	304	272	251	324	337	280

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(29), 65(116).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

**Object :-**To study the effect of application of nitrogen at root zone when moisture is available on Cotton (Deep placement of N).

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar/Bajra-Groundnut-Cotton for 64(29). Nil for 65(116). (b) Groundnut. (c) 5.6 Kg/ha. of N as A/S + 22.4 Kg/ha. of  $P_2O_5$  as Super for 64(29), Nil for 65(116). (ii) Medium black. (iii) 1.7.64, 22.7.65. (iv) (a) 3 harrowings for 64(29), 1 ploughing + 2 harrowings for 65(116). (b) Dibbling for 64(29), Drilling for 65(116). (c) 12 Kg/ha. (d) 91 cm.  $\times$  15 cm. (e) 1 to 2 plants/hill. (v) Nil. (vi) C.J.-73. (vii) Unirrigated. (viii) 3 weedings and 4 interculturings for 64(29), 3 weedings, 3 interculturings for 65(116) (ix) 73 cm. for 64(29), 60.2 cm. for 65(116). (x) 11.12.64, 13.1.65 and 1.2.65 and 6.12.65.

**2. TREATMENTS :**

3 doses of N :  $N_0$ =control,  $N_1$ =22.4 Kg. of N at sowing and  $N_2$ =44.8 Kg/ha. of N. ( $\frac{1}{2}$  at sowing +  $\frac{1}{2}$  after one month of sowing).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 8.5 m.  $\times$  7.3 m. (b) 7.3 m.  $\times$  5.5 m. (v) 61.0 cm.  $\times$  91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal for 64(29), below normal for 65(116). (ii) Nil for 64(29), attack of spotted boll worm for 65(116). (iii) Yield of kapas. (iv) (a) 1964-66. (b) No. (c) Nil. (v) N.A. (vi) Rain received late in Sept., 1964. Nil for 65(116). (vii) Nil for 64(29) ; As sowing was done by drilling the germination was very poor for 65(116).

## 5. RESULTS :

64(29)

(i) 300 Kg/ha. (ii) 58.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
Av. yield	266	316	318	300

65(116)

(i) 240 Kg/ha. (ii) 29.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
Av. yield	206	256	260	240

C.D. = 37.8 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- Gj. 64(191), 65(95).

Site :- Cotton Breeding Station, Broach.

Type :- 'M'.

Object :- To find out optimum dose of N with optimum placement of fertilizer for cotton.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar*-Cotton. (b) *Jowar*. (c) 22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black-cotton soils. (iii) 13.6.64, 19.7.65. (iv) (a) 2 Harrowings. (b) Dibbling. (c) 7 Kg/ha. (d) 152 cm. × 61 cm. (e) 1 plant/hill. (v) 12.4 C.L./ha of F.Y.M. (vi) *Digvijay*. (vii) Unirrigated. (viii) 5 interculturings + 2 weedings for 64 (191), 6 interculturings + 2 weedings for 65 (95). (ix) 115 cm., 52 cm. (x) 30.1.65, 16.2.65, 11.3.65 and 15.1.66, 14.2.66, 15.3.66.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

- (1) 2 levels of N as A/S : N<sub>1</sub> = 33.6 and N<sub>2</sub> = 67.2 Kg/ha.  
 (2) 2 levels of P as super : P<sub>1</sub> = 33.6 and P<sub>2</sub> = 67.2 Kg/ha.  
 (3) 3 depths of fertilizer placement : D<sub>1</sub> = 15 cm, D<sub>2</sub> = 23 cm, and D<sub>3</sub> = 30 cm.

Note—N was applied by ring method on 21.7.64 and P<sub>2</sub>O<sub>5</sub> drilled on 21.7.64 for 64 (191), and fertilizers applied by ring method in two stages 1st dose on 28.7.65, 2nd dose on 18.8.65 for 65 (95).

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.68 m. × 11.0 m. (b) 7.6 m. × 9.8 m. (v) 152 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good, normal respectively. (ii) Nil. (iii) Kapas yield. (iv) (a) 1964 and 65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the variances are heterogeneous, and Treatments × years interaction is absent, hence the individual results on given blow.

## 5. RESULTS :

64 (191).

(i) 948 Kg/ha. (ii) 103.5 Kg/ha. (iii) Main effects of N is highly significant. (iv) Av. yield of Kapas in Kg/ha.



	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>1</sub>	898	880	926	898	944	901
N <sub>2</sub>	995	1017	973	991	999	995
Mean	947	948	949	924	972	948
P <sub>1</sub>	901	926	946			
P <sub>2</sub>	993	970	953			

C.D. for N marginal means=60.9 Kg/ha.

65 (95).

(i) 745 Kg/ha. (ii) 207.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>1</sub>	743	666	792	691	776	734
N <sub>2</sub>	770	682	817	761	751	756
Mean	756	674	804	726	764	745
P <sub>1</sub>	789	660	729			
P <sub>2</sub>	723	688	880			

**Crop :- Cotton.**

**Ref :- Gj. 64(190), 65(97).**

**Site :- Cotton Breeding Station, Broach.**

**Type :- 'M'.**

**Object :-**To find out the effect of F.Y.M. v/s equivalent of N, P, K in terms of fertilizer on cotton yield.

**1. BASAL CONDITIONS :**

(i) (a) *Jowar-Cotton*. (b) *Jowar*. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black cotton soils. (iii) 23.4.64, 19.7.65. (iv) (a) 2 harrowings for 64 (190), 1 harrowing for 65 (97). (b) Dibbling. (c) 7.4 Kg/ha. (d) 152.5 cm×61.0 cm. (e) 1 plant/hill. (v) Nil. (vi) Digvijay. (vii) Unirrigated. (viii) 5 interculturings, 2 weedings for 64 (190), 6 interculturings, 2 weedings for 65 (97). (ix) 115 cm. 52.3 cm. (x) 30.1.65, 16.2.65, 11.3.65 for 64 (190) and 25.1.66, 19.2.66, 15.3.66 for 65 (97).

**2. TREATMENTS :**

7 manurial treatments : T<sub>0</sub>=Control, T<sub>1</sub>=12.4 C.L./ha. of F.Y.M. T<sub>2</sub>=6.20 C.L./ha. of F.Y.M.+N, P, K equivalent to 6.2 C.L./ha. of F.Y.M., T<sub>3</sub>=N, P, K equivalent to 12.4 C.L./ha. F.Y.M. T<sub>4</sub>=12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N, T<sub>5</sub>=N, P, K equivalent to 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N, and T<sub>6</sub>=22.4 Kg/ha. of N alone.

**Note :-**N applied as A/S, P<sub>2</sub>O<sub>5</sub> as super, and K<sub>2</sub>O as Mur. Pot.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4 (iv) (a) 12.2 m×8.5 m. (b) 9.1 m×7.3 m. (v) 152.5 cm.×61.0 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1964 to 68. (b) No. (c) Nil. (v) N.A. (vi) N.A. for 64 (190). Inadequate rain fall for 65 (97). (vii) As the experiment is continued beyond 1965 the individual years results are given below.

## 5. RESULTS :

## 64 (190)

(i) 631 Kg/ha. (ii) 78.6 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	Mean
Av. yield	380	470	688	813	673	829	567	631

C.D. = 116.8 Kg/ha.

## 65 (97)

(i) 445 Kg/ha. (ii) 69.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment :	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	Mean
Av. yield :	365	435	394	498	435	512	477	445

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(94).**

**Site :- Cotton Breeding Stn., Broach.**

**Type :- 'M'.**

Object :—To study the suitability of Di-amm. Phosp. and Ammo. Sulph. Phos. as source of N and P<sub>2</sub>O<sub>5</sub> for cotton.

## 1. BASAL CONDITIONS :

(i) (a) Jowar-Cotton. (b) Jowar. (c) 22.4 Kg/ha. N × 11.2 Kg/ha. P<sub>2</sub>O<sub>5</sub>. (ii) Black cotton soils. (iii) 19.7.65. (iv) (a) 2 harrowing. (b) Dibbling. (c) 7.41 Kg/ha. (d) 152.5 cm. × 61.0 cm. (e) One plant/hill. (v) Nil. (vi) Digvijay (medium). (vii) Un-irrigated. (viii) 6 interculturings, 2 weedings. (ix) 523 cm. (x) 17.1.66, 15.2.66, 15.3.66.

## 2. TREATMENTS :

T<sub>0</sub> = Control (No fertilizer), T<sub>1</sub> = 44.8 Kg/ha. N + 22.4 Kg/ha. P<sub>2</sub>O<sub>5</sub> as Di-amm. Phos, T<sub>2</sub> = 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Ammo. Sul. Phos. and T<sub>3</sub> = 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Ammo. Sulphate + Super phosphate, fertilizers applied by ring method on 29.7.65 and 29.8.65.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) Nil. (iii) 4. (iv) (a) 18.3 m. × 7.6 m. (b) 17.1 m. × 4.6 m. (v) 61.0 cm. × 152.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1965-contd; (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 429 Kg/ha. (ii) 150.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

Treatment :	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	Mean
Av. yield :	306	458	483	468	429

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(192), 65(93)**

**Site :- Cotton Breeding Stn., Broach.**

**Type :- 'M'.**

Object :—To study the effect of different nitrogenous fertilizer with P<sub>2</sub>O<sub>5</sub> on cotton.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar-Cotton*. (b) *Jowar*. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Black cotton. (iii) 23.6.64, 19.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 7.4 Kg/ha. (d) 152.5 cm.×61.0 cm. (e) One plant/hill. (v) Nil. (vi) Digvijay. (vii) Unirrigated. (viii) 5 interculturings, 2 weedings for 64 (192), 6 interculturings, 2 weedings for 65 (93). (ix) 115 cm., 52.3 cm. (x) 17.2.65, 10.3.65, 30.3.65 for 64 (192), 13.1.66, 30.1.66, 16.2.66, 15.3.66 for 65 (93).

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 levels of N :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=22.4$  Kg/ha.

(3) 4 sources of N :  $S_1=Urea$ ,  $S_2=A/S$ ,  $S_3=C.A.N.$  and  $S_4=A.S.N.$

Note :—N and P applied by ring method.

## 3. DESIGN :

(i) F<sub>act.</sub> in R.B.D. (ii) (a) 24. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×9.8 m. (b) 6.1 m.×8.5 m. (v) 152.5 cm.×61.0 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1964 to 67. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

## 64 (192).

(i) 641 Kg/ha. (ii) 126.5 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of Kapas in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$P_0$	$P_1$	Mean
$N_0$	—	—	—	—	533	573	553
$N_1$	593	633	603	659	618	626	622
$N_2$	740	642	782	829	751	745	748
Mean	633	591	662	677	634	648	641
$P_0$	604	629	617	687			
$P_1$	663	554	708	668			

C.D. for N marginal means=92.5 Kg/ha.

## 65 (93)

(i) 638 Kg/ha. (ii) 189.9 Kg/ha. (iii) Main effect of N alone is highly significant. (vi) Av. yield of Kapas in Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$P_0$	$P_1$	Mean
$N_0$	—	—	—	—	523	669	596
$N_1$	644	378	670	483	540	548	544
$N_2$	908	608	842	736	870	676	773
Mean	711	500	711	629	644	632	638
$P_0$	654	570	660	693			
$P_1$	769	429	762	566			

C.D. for N marginal means=136.7 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 65(98).****Site :- D.F.R.S., Dhandhuka.****Type :- 'M'.**

Object :- To study the rate of decomposition of organic matter and its effect on Cotton yield.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Wheat. (b) Wheat. (c) Nil. (ii) Medium black soil. (iii) 7.8.65. (iv) (a) 5-6 harrowings. (b) Drilling. (c) 7.4 Kg/ha. (d) 91.5cm. row to row. (e) —. (v) Nil. (vi) Kalyan. (vii) Unirrigated. (viii) 1 weeding. (ix) 33.3 cm. (x) 20.3.66.

**2. TREATMENTS :**

6 levels of F.Y.M. :  $F_0$ =Control,  $F_1$ =12.4,  $F_2$ =24.7,  $F_3$ =61.8,  $F_4$ =123.6,  $F_5$ =247.1 C.L./ha. F.Y.M. broadcasted before sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 12.3 m. × 7.3 m. (b) 10.4 m. × 6.4 m. (v) 91.5 cm. × 45.7 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) Kapas yield. (iv) (a) 1965—contd. ; (b) No. (c) Nil. (v) and (vi) N.A. (vii) Nil.

**5. RESELTS :**

(i) 632 Kg/ha. (ii) 161.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

Treatment :	$F_0$	$F_1$	$F_2$	$F_3$	$F_4$	$F_5$	Mean
Av. yield :	418	896	670	568	548	695	632

**Crop :- Cotton (Kharif).****Ref :- Gj. 64(161), 65(64).****Site :- Agri. Res. Stn., Halwad.****Type :- 'M'.**

Object :- To study the the effect of deep placement of N-fertilizer to root-zones where moisture is available on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Bajra for 64 (161), Bajra and Wheat for 65 (64). (c) Nil. (ii) Medium black. (iii) 5.7.64. 6.8.65. (iv) (a) 1 ploughing and 1 harrowing for 64 (161), 2 ploughings and 2 harrowings for 65 (64). (b) Drilling. (c) 20 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) Kalyan. (vii) Unirrigated. (viii) 3 interculturings for 64 (161), 2 hoeings for 65 (64). (ix) 46 cm., 67 cm. (x) 14.2.65, 3.3.66.

**2. TREATMENTS :**

3 levels of N as A/S :  $N_0$ =0,  $N_1$ =22.4 Kg/ha. and  $N_2$ =44.8 Kg/ha.  
N was applied in two equal doses at root zone area.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 4.9 m. (b) 9.1 m. × 3.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1964 and 1965. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil, (vii) Error variances are homogeneous and interaction of Treatments × years is absent.

**5. RESULTS :**

(i) 446 Kg/ha. (ii) 89.3 Kg/ha. (based on 22 d.f. made up of pooled error + Treatments × years interaction)  
(iii) Treatment differences are significant. (iv) Av. yield of Kapas in Kg/ha.

Treatments :	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>
Av. yield :	378	454	506

C.D. = 76.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(194), 63(198).**

**Site :- Agri. Res. Stn., Halwad.**

**Type :- 'M'.**

Object :—To study the effect of foliar application of different micronutrients on Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Jowar, Bajra. (c) Nil. (ii) Medium black. (iii) 26.7.1962 ; 3.8.1263. (iv) (a) 3 harrowings ; 1 harrowing. (b) Drilling. (c) 17 Kg/ha. ; 20 Kg/ha. (d) 46 cm. × 10 cm. (e) 1. (v) Nil. (vi) Kalyan. (vii) Unirrigated, irrigated. (viii) 2 interculturings. (ix) 35 cm., 26 cm. (x) 22. 3.1963 ; 9.4.1964.

2. TREATMENTS :

6 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=3.4 Kg/ha. of Zinc Sulphate, T<sub>2</sub>=70 gm/ha. of Sodium molybdate, T<sub>3</sub>=2.2 Kg/ha. of Borax, T<sub>4</sub>=8.97 Kg/ha. of Copper Sulphate, and T<sub>5</sub>=3.4 Kg/ha. of Manganese Sulphate.

Micronutrients sprayed on 24.9.1962. and 10.11.1962.

3. DESIGN

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 10.1 m. × 20.1 m. ; 10.1 m. × 10.1 m. (b) 8.2 m. × 18.3 m. 10.1 m. × 10.1 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Normal ; not satisfactory. (ii) Nil ; Heavy attack of Jassids. (iii) Cotton yield. (iv) (a) 1962 to 1963. (b) No. (c) Results of combined analysis are presented under 5. (v) No. (vi) Nil. ; low rainfall. (vii) Error variances are homogeneous and interaction of Treatments × years is absent.

5. RESULTS :

(i) 510 Kg/ha. (ii) 191.6 Kg/ha. (based on 15 d.f. composed of pooled error and Treatments × years Interaction) (iii) The treatments are not significantly different. (iv) Av. yield of Kapas in Kg/ha.

Treatment :	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield :	566	435	496	618	408	536

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(199)**

**Site :- Agri. Res. Stn., Halwad.**

**Type :- 'M'.**

Object :—To study the effect of soil application of different Micronutrients on Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Bajra. (c) Nil. (ii) Medium black. (iii) 3.8.63. (iv) (a) 1 harrowing. (b) Drilling. (c) 20 Kg/ha. (d) 46 cm. × 10 cm. (e) —. (v) Nil. (vi) Kalyan. (vii) Irrigated. (viii) 2 interculturings. (ix) 26 cm. (x) 9, 14.4.1964.

2. TREATMENTS :

7 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Zinc as 28.0 Kg/ha. of Zn. Sul, T<sub>2</sub>=Molybdenum as 1.1 Kg/ha. of Sodium Molybdate, T<sub>3</sub>=Boran as 11.2 Kg/ha. of Borax, T<sub>4</sub>=Copper as 28.0 Kg/ha. of Cu. Sul, T<sub>5</sub>=Manganese as 56.0 Kg/ha. of Mn. Sul, T<sub>6</sub>=Mixture of all above Micronutrients applied through soil at the time of sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 2. (iv) (a) and (b) 10.1 m. × 10.1 m. (v) Nil. (vii) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Attack of Jassides. (iii) Seed cotton yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Reasons for poor yield N.A.

## 5. RESULTS :

(i) 198 Kg/ha. (ii) 154.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment :	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield :	251	72	237	277	206	104	242

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(206).**

**Site :- I.D.F. Jam nagar.**

**Type :- 'M'.**

Object :—To study the effect of different micronutrients on cotton by foliar sprayings.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 22.7.62 (iv) (a) 3 ploughings, and 2 harrowings. (b) Dibbling. (c) N.A. (d) 91 cm. × 30 cm. (e) 1. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) 170-Co<sub>2</sub>. (vii) Irrigated. (viii) 2 interculturings, and 2 weedings. (ix) 28 cm. (x) 30.1.63, 15.2.63, 4.3.63, 16.3.63.

## 2. TREATMENTS :

6 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Zinc as 3.36 Kg/ha. of Zinc sulphate, T<sub>2</sub>=Molybdenum as 140 gm/ha. of Sodium Molybdate, T<sub>3</sub>=Boron as 2.24 Kg/ha. of Borax, T<sub>4</sub>=Copper as 8.97 Kg/ha. of Copper Sulphate and T<sub>5</sub>=Manganese as 3.36 Kg/ha. of Manganese Sulphate.

Micronutrients dissolved in 1123 litres of water and sprayed by foliar spraying in 2 stages, 1st spraying after one month of germination and 2nd at the time of flowering.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) and (b) 20.12 m × 10.06 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Not good. (ii) Attack of Top shoot borers, black arms. (iii) Kapas yield. (iv) (a) to (c) No. (v) N.A. (vi) Nil. (vii) Due to poor soils, the yield is low.

## 5. RESULTS :

(i) 231 Kg/ha. (ii) 59.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	171	172	282	224	261	273

**Crop :- Cotton.**

**Ref :- Gj. 63(214).**

**Site :- I.D.F. Jamnagar.**

**Type :- 'M'.**

Object :—To study the effect of different Micronutrients applied through soil on cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 10.7.63.  
 (iv) (a) 1 ploughing, and 1 harrowing. (b) Drilling. (c) 12 Kg/ha. (d) 91 cm. × 30 cm. (e) 1. (v) Nil.  
 (vi) 170-CO<sub>2</sub>. (vii) Irrigated. (viii) 6 weedings, and 2 interculturings. (ix) 29 cm. (x) 22.1.64, 14.2.64,  
 28.2.64, 23.3.64.

## 2. TREATMENTS :

7 micronutrient treatments : T<sub>0</sub>=Control. T<sub>1</sub>=Manganese as 56.01 Kg/ha. of manganese sulphate, T<sub>2</sub>=Zinc as 28.0 Kg/ha. of Zinc Sulphate, T<sub>3</sub>=Copper as 28.0 Kg/ha. of Copper Sulphate, T<sub>4</sub>=Boron as 11.2 Kg/ha. of Borax, T<sub>5</sub>=Molybdenum as 1.1 Kg/ha. of Sodium Molybdate and T<sub>6</sub>=Mixture of above all together.

Micronutrients applied through soil application at sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 2. (iv) (a) and (b) 10.1 m. × 10.1 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of top shoot borers, and red leaf. (iii) *Kapas* yield. (iv) (a) to (c) No. (v) N.A. (vi) Nil. (vii) Crop was raised on soaking dose of canal water.

## 5. RESULTS :

(i) 399 Kg/ha. (ii) 60.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	363	482	364	524	320	410	328

**Crop :- Cotton.**

**Ref :- Gj. 62(79), 63,(63), 64(247).**

**Site :- Central Exptl. Stn. Junagarh.**

**Type :- 'M'.**

Object :—To compare the effects of Solvent extracted cake, ordinary expelled cake and Amm-sulphate on cotton.

## 1. BASAL CONDITIONS :

(i) (a) Ground nut-cotton for 64(247), Nil for others. (b) *Bajra* for 62(79), *Jowar* for 63(63). G. nut for 64(247). (c) Nil for 64(247), 12 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kgs/ha. of  $P_2O_5$  for others.  
 (ii) Medium black soil. (iii) 10.7.62. 29.6.63, 5.7.64. (iv) (a) 2 harrowing for 62(79), 1 ploughing+4 harrowings for 63(63), 4 harrowings for 64(247). (b) Dibbling. (c) 7 Kg/ha. (d) 91 cm. × 61 cm. (e) 3-4 seeds/dibble for 62(79), 63(63), 1 plant/hill for 64(247). (v) 12.4 C.L./ha. of F.Y.M. for 62(79), 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of  $P_2O_5$  for others. (vi) 170-CO<sub>2</sub>. (vii) Irrigated. (viii) 3 interculturings for 63(63), 4 interculturings for others. (ix) 62 cm., 57 cm., 137 cm. (x) 21.1.63, 12.2.63, 6.3.64, 15.3.64 and 9.4.64, 11.2.65 and 11.3.65.

## 2. TREATMENTS :

3 sources of 44.8 Kg/ha. of N : S<sub>1</sub>=Amn. Sulphate, S<sub>2</sub>=solvent extracted cake and S<sub>3</sub>=ordinary expelled cake.

Note :—A/S applied in two doses, half at sowing and half one month after rowing. Cake applied at the time of sowing by broad-cast.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 10.97 m × 6.40 m. (b) 9.14 m × 4.57 m. (v) 91 cm × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good, normal, fairly good in respective years. (ii) Nil for 63(63), attack of *Jassides* for others. 20% Endrin was sprayed in each exptt. (iii) *Kapas* yield. (iv) (a) 1962 to 64. (b) No. (c) Nil. (v) and (vi) Nil. (vii) As the error variances are heterogeneous and Treatments × years interaction is absent, the individual results are given below.

## 5. RESULTS :

## 62(79)

(i) 1627 Kg/ha. (ii) 225.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
Av. yield	1666	1669	1547

## 63(63)

(i) 735 Kg/ha. (ii) 141.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
Av. yield	822	734	650

## 64(247)

(i) 795 Kg/ha. (ii) 79.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
Av. yield	824	767	794.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(66), 64(244), 65(219).**

**Site :- Central Exptl. Stn., Jamnagar.**

**Type :- 'M'.**

**Object :-** To study the response of Chilean Nitrate v/s Amn. Sulphate on cotton yield and their effect on soils.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 62(66), Groundnut-Cotton for others. (b) *Bajra* for 62(66), Groundnut for others. (c) 12.4 C.L./ha. of F.Y.M.+112.1 Kg/ha. A/S+140.1 Kg/ha. of Super for 62(66), 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(244) and nil for 65(219). (ii) Medium black soil. (iii) 10.7.62, 5.7.64, 22.7.65. (iv) (a) 2 harrowings for 62(66), 4 harrowings for 64(244), 2 ploughings+2 harrowings for 65(219). (b) Dibbling. (c) 6 Kg/ha. for 62(66), 7 Kg/ha. for others. (d) 92 cm. × 61 cm. (e) 3-4 seeds/dibble for others, 1 plant/hill for 64(244). (v) Nil for 62(66), 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for others. (vi) 170-Co-2. (vii) Irrigated. (viii) 6 interculturings for 62(66), 4 interculturings for 64(244), 4 interculturings and 5 weedings for 65(219). (ix) 60 cm., 137 cm., 59 cm. (x) 22.1.63 and 13.2.63, 12.2.65 and 16.3.65, 7.1.66 and 6.2.66.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

(2) 2 sources of 44.8 Kg/ha. of N : S<sub>1</sub>=Chilean Nitrate and S<sub>2</sub>=A/S.

Note :- F.Y.M. was broadcasted and N was applied in two equal doses on 14.8.62 and 11.9.62, 28.8.64 and 22.10.64 in respective years. Dates of replication for 65(219) is not available.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m × 6.4 m. (b) 9.1 m × 4.6 m. (v) 92 cm. × 92 cm. (vi) Yes.

## GENERAL :

(i) Good for 62(66), Normal for others. (ii) Attack of Jassides, 20 % of Endrine was sprayed twice for 62(66). Nil, and Mico Endrin was sprayed twice for 64 (244). Nil, and Endrin was sprayed twice for 65(129). (iii) *Kapas* yield. (iv) (a) 1962-65. Not conducted in 63. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Errorvariances are homogeneous and Treatment × years interaction is absent.

## 5. RESULTS :

(i) 1506 Kg/ha. (ii) 212.2 Kg/ha. (based on 51 d.f. made up of pooled error+Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.



	F <sub>0</sub>	F <sub>1</sub>	Mean
S <sub>1</sub>	1521	1465	1493
S <sub>2</sub>	1537	1502	1520
Mean	1529	1483	1506

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(80).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :- To study the effect of different micronutrients on Cotton (soil application).

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. + 11.2 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 9.7.62. (iv) (a) 2 ploughings, 4 harrowings. (b) Drilling. (c) 15 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) 170-Co-2. (vii) Irrigated. (viii) 5 interculturings. (ix) 62 cm. (x) 31.12.62 and 9.2.63.

**2. TREATMENTS :**

6 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Manganese at 56.0 Kg/ha. of Mn. Sul. T<sub>2</sub>=Copper at 28.0 Kg/ha. of Cu. Sul. T<sub>3</sub>=Borax at 11.2 Kg/ha. of Borax, T<sub>4</sub>=Molybdenum at 1.1 Kg/ha. of Sodium molybdate and T<sub>5</sub>=Zinc at 28.0 Kg/ha. of Zn. Sul.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 20.1 m. × 10.1 m. (b) 17.7 m. × 8.2 m. (v) 122 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of seed cotton and stalks. (iv) (a) to (c) No. (v) to (vii) Nil.

**5. RESULTS :**

(i) 766 Kg/ha. (ii) 124.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	760	736	771	806	710	811

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(144), 61(156), 62(169).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'M'.**

Object :- To find out the time of application of N with different forms of Fertilizers.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A., Jowar, Sugarcane. (c) N.A. 22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, 134.5 Kg/ha. of N + 24.7 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 23.7.1960 ; 16.6.1961 ; 2.7.1962. (iv) (a) 2 harrowings, 10 harrowings, 3 harrowings. (b) Dibbling. (c) N.A. ; N.A. ; 7 Kg/ha. (d) 152 cm. × 61 cm. (e) 3 to 4 ; 3 to 4 ; 1 to 2. (v) 12.4 C.L./ha. of F.Y.M. ; 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> ; 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Cotton 2087. (vii) Irrigated ; Irrigated ; unirrigated. (viii) 2 interculturings ; 10 interculturings ; 3 weedings and 5 interculturings. (iv) 103 cm. ; 108 cm. ; N.A. (x) 10, 21.2.1961, 7.3.1961, 16.3.1962, 16.4.1962, 7.5.1962, 11.2.1963 to 18.2.1963.

## 2. TREATMENTS :

All combinations of (1) and (2)+a control (no manure).

(1) 2 sources of 50 Kg/ha. of N :  $S_1$ =Urea and  $S_2$ =A/S.

(2) 6 times of application of N :  $T_1$ =At sowing,  $T_2$ =At thinning,  $T_3$ =at flowering,  $T_4$ = $\frac{1}{2}$  at sowing+ $\frac{1}{2}$  at flowering,  $T_5$ = $\frac{1}{3}$  at sowing+ $\frac{1}{3}$  at thinning+ $\frac{1}{3}$  at flowering, and  $T_6$ = $\frac{1}{3}$  at flowering+ $\frac{1}{3}$  one month after flowering.

N applied by line placement.

## 3. DESIGN :

(i) R B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) 1/198 ha. (b) 1/247 ha. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory ; Normal. (ii) Attack of aphids and wooly mites, Endrex was sprayed ; Nil ; Nil. (iii) Kapas yield. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments $\times$ years interaction is present.

## 5. RESULTS :

(i) 416 Kg/ha. (ii) 100.4 Kg/ha. (based on 24 d.f. made up of Treatments $\times$ years interaction). (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	Mean
$S_1$	398	368	382	437	453	387	404
$S_2$	425	412	437	414	425	481	432
Mean	412	390	410	426	439	434	418

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(206), 65(152).**

**Site :- Agri. Res. Stn., Kothara.**

**Type :- 'M'.**

Object :- To study the effect of different manures on Cotton under uncertain rainfall conditions.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar-Sesamum ; Cotton-Jowar and Mung. (b) Sesamum and Mung. (c) Nil. (ii) Sandy loam soil. (iii) 18.7.1964 and 24.7.1965. (iv) (a) 2 ploughings and 2 harrowings. (b) Dibbling. (c) —. (d) 61 cm.  $\times$  23 cm. (e) 3 to 4 seedling/hill. (v) Nil. (vi) Kalyan (late). (vii) Unirrigated. (viii) 2 weedings and 3 interculturings. (ix) 37 cm. and 33 cm. (x) 6.2.1965 and 5.4.1966.

## 2. TREATMENTS :

**Main-plot treatments :**

2 levels of  $P_2O_5$  as Super :  $P_1$ =11.2 and  $P_2$ =22.4 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 levels of N :  $N_1$ =11.2 and  $N_2$ =22.4 Kg/ha.

(2) 3 levels of N :  $S_1$ =A/S,  $S_2$ =Castor cake and  $S_3$ =A/S and castor cake in the ratio of 1 : 1.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/main-plot ; 6 sub-plots/main-plot. (b) Nil. (iii) 4. (iv) (a) 4.9 m.  $\times$  6.1 m. (b) 3.7 m.  $\times$  4.9 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Medium. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1961 to 1965. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Experiment failed in 1961 ; for 1962 date are N.A. and experiment not conducted in 1963. Both the error variances are homogeneous and Treatments $\times$ years interaction are absent.

## 5. RESULTS :

(i) 258 Kg/ha. (ii) (a) 104.1 Kg/ha. (based on 7 d.f. composed of pooled error + Treatments  $\times$  years interaction) (b) 58.4 (c) (based on 69 d.f. composed of pooled error + Treatments  $\times$  years interaction). (iii) None of the effects is significant. (iv) Av. yield of seed cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	232	252	260	241	255	248
P <sub>2</sub>	262	265	278	282	255	268
Mean	247	269	269	262	255	258
N <sub>1</sub>	262	246	277			
N <sub>2</sub>	232	272	261			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 61(84), 62(193), 63(193), 64(141).**

**Site :- Dry Farming Res. Stn., Rajkot.**

**Type :- 'M'.**

Object :- To find out the suitable level and source of N with different doses of P for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra-Jowar or Cotton in 1961 ; Groundnut-Cotton in 1962 ; and Bajra-Cotton in 1963 and 1964. (b) Bajra ; Groundnut ; Bajra ; Bajra. (c) Nil for 61 (84) and 12.4 C.L./ha. of F.Y.M. for other years. (ii) Medium black. (iii) 11.7.1961 ; 17.7.1962 ; 12.7.1963 ; 4.7.1964. (iv) (a) One ploughing and two harrowings in 1961 ; one ploughing, 2 harrowings and 1 planking in 1962 ; 1 harrowing and 1 ploughing in 1963 and 1 ploughing and 1 planking in 1964 (b) Drilling. (c) 11 Kg/ha. for 61 (84) and 13.5 Kg/ha. for other years. (d) 61 cm.  $\times$  17 cm. for 61 (84) and 61 cm. row to row for other years. (e) —. (v) 12.4 C.L./ha. of F.Y.M. during 1961 and Nil for others. (vi) Kalyan. (vii) Unirrigated. (viii) 2 weedings ; 3 weedings ; 3 weedings ; 2 interculturings and 1 gap filling and thinning ; 3 weedings and 2 interculturings. (ix) 56 cm. ; 40.5 cm. ; 50 cm. and 76.5 cm. (x) 17.2.1962 and 24.3.1962 ; 12.1.1963 ; 16.3.1964 ; 23.1.1965 and 24.2.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=11.2 and P<sub>2</sub>=22.4 Kg/ha.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 sources of N : S<sub>1</sub>=A/S, S<sub>2</sub>=C.C. and S<sub>3</sub>=A/S and C.C. in the ratio of 1 : 1

(2) 2 levels of N : N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha. of N.

Manures broadcasted at the time of sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 6 sub-plots/main-plot. (b) 36.6 m.  $\times$  11.0 m. (iii) 4. (iv) (a) 6.1 m.  $\times$  5.5 m. for 61 (84) ; 4.9 m.  $\times$  3.7 m. for other years. (b) 4.9 m.  $\times$  3.7 m. (v) 61 cm.  $\times$  91 cm. for 61 (84) and Nil for other years. (vi) Yes.

## 4. GENERAL :

(i) Break of rains for a month during 1961 has given a bad start from the early stage and Normal during other years. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1961 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) Jamkhambelia. (vi) Nil. (vii) Both the errors are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 305.3 Kg/ha. (ii) (a) 60.7 Kg/ha. (based on 15 d.f. composed of pooled error and Treatments  $\times$  years interaction). (b) 65.1 Kg/ha. (based on 144 d.f. composed of pooled error and two and three factors interactions with years). (iii) Main effect of S alone is significant. (iv) Av. yield of Cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	313.8	291.5	332.5	302.2	323.0	312.6
P <sub>2</sub>	310.2	283.5	300.5	305.0	291.2	298.1
Mean	312.0	287.5	316.5	303.6	307.1	305.3
N <sub>1</sub>	320.5	293.2	297.0			
N <sub>2</sub>	303.5	281.8	336.0			

C. D. for S marginal means=47.2 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(50), 61(147), 62(140).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

**Object :-** To study the effect of foliar application of urea on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar in 1960, 1961 ; Wheat in 1963. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1960 and 1961 ; G.M.+22.4 Kg/ha. of N in 1962. (ii) Deep black soil. (iii) 28.6.1960 ; 26.6.1961. ; N.A. (iv) (a) N.A. in 1960 ; 3 harrowings in 1961 and 1 harrowing in 1962. (b) Dibbling. (c) 6 Kg/ha. (d) 153 cm. × 61 cm. (e) N.A. in 1960, 1961 ; 1 in 1962. (v) Nil. (vi) Vijalpa 2087. (vii) Un-irrigated. (viii) 3 interculturings, 3 weedings and 1 thinning in 1960 ; 4 interculturings in 1961 and 2 interculturings in 1962. (ix) 87 cm. ; 122 cm. and 62 cm. (x) 12.4.1961, 18.4.1962 to 13.5.1962 ; 9.3.1963.

**2. TREATMENTS :**

**Main-plot treatments :**

3 quantities of water used for solution of 5.6 Kg/ha. of N as Urea ; M<sub>1</sub>=898.6, M<sub>2</sub>=674.0 and M<sub>3</sub>=449.3 litres of water/ha.

**Sub-plot treatments :**

4 spraying treatments : S<sub>0</sub>=Control (water only), S<sub>1</sub>=11.2 Kg/ha. of N in two equal doses at the time of square formation and at flowering stage, S<sub>2</sub>=16.8 Kg/ha. of N in three equal doses on 3rd, 23rd of Oct. and 13th of Nov. and S<sub>3</sub>=22.4 Kg/ha. of N in four doses on 3rd and 23rd of Oct., 13th of Nov. and 4th of Dec. respectively during the years 1960, 1961 and 1962.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.7 m. × 6.1 m. in 1960 and 9.1 m. × 6.1 m. in 1961 and 1962. (b) 4.3 m. × 3.1 m. in 1960 and 6.1 m. × 3.7 m. in 1961 and 1962. (v) 122 cm. × 152 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal in 1960 and 1962 ; Not satisfactory in 1961. (ii) Slight attack of boll worms during all years and that of woolly mites during 1961 and 1962. (iii) Cotton seed yield. (iv) (a) 1960—contd. (modified in 1963). (b) No. (c) Nil. (v) N.A. (vi) Due to continuous rains in July and August, 61 growth was hampered. (vii) Sub-plot errors are heterogenous.

**5. RESULTS :**

**60(50)**

(i) 475 Kg/ha. (ii) (a) 72.9 Kg/ha. (b) 63.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>1</sub>	490	467	508	479	486
M <sub>2</sub>	400	472	474	474	455
M <sub>3</sub>	465	448	518	502	483
Mean	452	462	500	485	475

61(147)

(i) 295 Kg/ha. (ii) (a) 144.0 Kg/ha. (b) 102.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>1</sub>	271	299	298	405	318
M <sub>2</sub>	295	257	340	307	300
M <sub>3</sub>	234	280	291	260	266
Mean	267	279	310	324	295

62(140)

(i) 320 Kg/ha. (ii) (a) 153.8 Kg/ha. (b) 96.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>1</sub>	182	359	300	373	303
M <sub>2</sub>	378	406	300	275	340
M <sub>3</sub>	244	336	331	353	316
Mean	268	367	310	334	320

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(141), 63(151), 64(73), 65(225).**

**Site :- Agri. Res. Stn., Surat.**

**Type:- 'M'.**

**Object :-** To study the effect of different sources of P<sub>2</sub>O<sub>5</sub> in combination with different doses of N on Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Cotton-*Jowar* in 1962 to 1964 ; Nil in 1965. (b) *Jowar* in 1962 to 1964 ; Fallow in 1965. (c) N,P,K and F.Y.M. in 1962 ; N.A. in 1963, Nil in 1964, 1965. (ii) Deep black soil. (iii) 1.7.1962 ; 28.6.1963 ; 15.7.1964 ; 3.7.1965. (iv) (a) 1 harrowing, 2 harrowings ; 1 harrowing and 2 harrowings in 1962, 63, 64, 65 respectively. (b) Dibbling. (c) 6 Kg/ha. in 1962 to 1964 ; — in 1965. (d) 152 cm. × 61 cm. (e) 1 during 1962 to 1964 ; 1 to 2 seedlings in 1965. (v) 12.4 C.L/ha. of F.Y.M. (vi) Digvijay 2087 (late). (vii) Un-irrigated in 1962 ; irrigated in 1963 to 1965. (viii) 4 interculturings in 1962 and 1965, 5 interculturings and 3 weedings in 1963 ; 3 interculturings and 2 weedings in 1964. (ix) 62 cm. ; 120 cm. ; 213 cm. (x) 5.3.1963 ; 24.3.1964 ; 11.3 to 14.4.1965.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 sources of 44.8 Kg/ha. of  $P_2O_5$  :  $S_0$ =Super and  $S_1$ =Digested B.M.

(2) 3 levels of N as A/S :  $N_0$ =0,  $N_1$ =22.4 and  $N_2$ =44.8 Kg/ha. of N.

(1) P applied at sowing and N applied on 22.8.1962 by ring method.

(2) Super, B.M., A/S applied on 6.7.1963, 17.8.1963 and 3.8.1963 respectively by ring method.

Fertilizers applied by spot method on 14.9.1964.

N and  $P_2O_5$  applied on 2.10.1965 by spot application.

## 3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.8 m×10.7 m. (b) 10.4 m.×7.6 m. (v) 122 cm.×152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal in 1962 to 1965 and low yields due to absence of late rains in Sept. (ii) Light attack of boll worms, woolly mites 1962, light attack of boll worms dusting of Sevin in 1963. Attack of woolly mites in 1964 spraying of Metasyston in 1965. Heavy attack of aphids, jassides, boll worm, folidol applied twice. (iii) *Kapas* yield. (iv) (a) 1962 to 1965. (b) No. (c) Nil. (v) N.A. (vi) Nil in 1962 ; Severe cold in Feb. 64 ; 3.7 cm. rain in 26.11.1963. Heavy rains throughout monsoon in 1964 affected the crop adversely, absence of late rains in Sept. 1965. (vii) Error variances are heterogeneous and interaction of Treatments× years is absent.

## 5. RESULTS :

62(141)

(i) 447 Kg/ha. (ii) 114.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean
$S_0$	491	450	433	458
$S_1$	484	516	311	437
Mean	487	483	772	447

63(151)

(i) 611 Kg/ha. (ii) 162.3 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean
$S_0$	424	656	637	572
$S_1$	382	610	958	650
Mean	402	633	798	611

C.D. of N marginal means =49.5 Kg/ha.

64(73)

(i) 507 Kg/ha. (ii) 46.5 Kg/ha. (iii) Main effect of N alone is highly significant and interaction N×P is significant (iv) Av. yield of *Kapas* in Kg/ha.

	$N_0$	$N_1$	$N_2$	Mean
$S_0$	383	539	598	507
$S_1$	469	477	577	508
Mean	426	508	587	507

C.D. for N marginal means =49.4 Kg/ha.

C.D. of means in the body of the table=72.0 Kg/ha.

65(225)

(i) 120.4 Kg/ha. (ii) 67.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>0</sub>	55	114	159	109
S <sub>1</sub>	156	114	125	132
Mean	106	114	142	121

**Crop :- Cotton (Kharif).****Ref :- Gj. 62(132), 63(147), 64(69), 65(222).****Site :- Agri. Res. Stn., Surat.****Type :- 'M'.**

Object :—To study the effect of Chilean Nitrate v/s A/S on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Cotton. (b) *Jowar* for 62(132), Cotton for others. (c) Nil for 62(132), As per treatments for others. (ii) Deep black soil. (iii) 1.7.62, 28.6.63, 14.7.64, resowing on 3.7.65. (iv) (a) 1 harrowing for 62(132), 64(69), 2 harrowings for others. (b) Dibbling. (c) 6 Kg/ha. 63(147), 64(69), N.A. for others. (d) 153 cm. × 61 cm. (e) 1-2 seeds/Dibble. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(222), Nil for others. (vi) Digvijay for 65(222), 208 for others. (vii) Unirrigated for 62(132), 64(69), Irrigated for others. (viii) 4 interculturings for 62(132), 65(222), 7 interculturings and 3 weedings for 63(147) and 5 interculturings for 64(69). (ix) 62 cm., 120 cm., 213 cm., 89 cm. (x) 28.2.63, 24.3.64, 9.3.65, 8.3.66 and on wards.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 levels of F.Y.M : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 Kg/ha.(2) 2 sources of N @ 44.8 Kg/ha. : S<sub>1</sub>=Chilean Nitrate and S<sub>2</sub>=A/S.**3. DESIGN :**

(i) Fact in R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0m. × 7.6 m. (b) 8.5 m. × 4.6 m. (v) 122 cm. × 152 cm. (vi) Yes.

**4. GENERAL :**

(i) Crop effected by heavy rains 64(69). Normal for others. (ii) Attack of boll worms and wooly mites in 62(132), mites for 63(147), attack of boll worms for 64(69). Folidol was applied against Mites. for 65(222) (iii) *Kapas* yield. (iv) (a) 1962-contd. (b) No. (c) Nil. (v) N.A. (vi) Nil for 62(132), Severe cold in Feb. 64 for 63(147), heavy rains for 64(69), absence of 1st rain in Sept. effected for 65(222). (vii) As the experiment is continued beyond 65, the results of individual experiments are given below.

**5. RESULTS :****62(132)**(i) 538 Kg/ha. (ii) 88.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	536	504	520
F <sub>1</sub>	614	498	556
Mean	574	501	538

**63(147)**(i) 649 Kg/ha. (ii) 143.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* as in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	641	668	654
F <sub>1</sub>	690	597	643
Mean	665	632	649

64(69)

(i) 416 Kg/ha. (ii) 52.5 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	469	339	404
F <sub>1</sub>	532	326	429
Mean	500	332	416

C.D. for S marginal means=45.7 Kg/ha.

65(222)

(i) 442 Kg/ha. (ii) 63.5 Kg/ha. (iii) Main effect of S is alone highly significant and interaction F×S is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	544	349	447
F <sub>1</sub>	468	407	437
Mean	506	378	442

C.D. for S marginal means=55.2 Kg/ha.

C.D. for means in the body of F×S table=135.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(224).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

Object :- To study the effect of different micronutrients by *foliar application* on Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black soil. (iii) 3.7.65. (iv) (a) 2 ploughings. (b) Dibbling. (c) — (d) 153 cm. × 61 cm. (e) 1 to 2 seeds/dibble. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) Irrigated. (viii) 5 interculturings. (ix) 89.2 cm. (x) 14.3.66.

#### 2. TREATMENTS :

8 micronutrients : T<sub>0</sub>=Control, T<sub>1</sub>=Boran as 0.9 Kg/ha. of Borax, T<sub>2</sub>=Copper as 3.6 Kg/ha. of a Cu. Sul. +3.6 Kg/ha. of lime, T<sub>3</sub>=Zinc as 1.4 Kg/ha. of Zn. Sul.+0.9 Kg/ha. of lime, T<sub>4</sub>=Manganese as 1.4 Kg/ha. of Mn. Sul.+0.9 Kg/ha. of lime, T<sub>5</sub>=Molybdenum as 0.1 Kg/ha. of Sodium Molybdate, T<sub>6</sub>=Ferrous as 4.5 Kg/ha. of Fe. Sul.+4.5 Kg/ha. of lime and T<sub>7</sub>=Mixture of above all together.

Above micronutrients dissolved in 455 litres of water and applied through foliar spraying twice.



## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 11.0 m. × 9.1 m. (b) 8.5 m. × 6.10 m. (v) 122 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Heavy attack of aphids, jassides and boll worms folidol applied 4 times. (iii) Seed Cotton yield. (iv) (a) 1964-65 (but could not properly worked in 1964). (b) No. (c) Nil. (v) N.A. (vi) Absence of rains in Sept. affected the yield.

## 5. RESULTS :

(i) 87 Kg/ha. (ii) 18.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	75	96	73	88	101	67	95	104

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(142), 64(70).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

Object :—To study the effect of foliar spraying of urea on yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63 (142), Nil for 64 (70). (ii) Deep black soil. (iii) 29.6.63, 16.7.64 (resowing on 28.7.64). (iv) (a) 2 harrowings for 63 (142), 1 harrowing for 64 (70). (b) Dibbling. (c) 6 Kg/ha. for 63 (142), 7 Kg/ha. for 64 (70). (d) 152 cm. × 61 cm. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) ISC-67. (vii) Irrigated. (viii) 5 interculturings. (ix) 120 cm., 213 cm. (x) 20.3.64, 19.4.65.

## 2. TREATMENTS :

3 spraying treatments : T<sub>0</sub>=Control, T<sub>1</sub>=11.2 Kg/ha. of N as urea in 674 litres of water applied by foliar application in two equal dose. 1st doses at the time of square formation and 2nd dose at the flowering stage ; T<sub>2</sub>=11.2 Kg/ha. of N as urea by soil application.

## 3. DESIGN :

(i) R.B.D. (ii) (a) N.A. (b) N.A. (iii) 8. (iv) (a) 16.5 m × 6.1 m. (b) 14.0 m. × 3.1 m. (v) 122 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 63(142), poor for 64(70). (ii) Light attack of aphids and boll worms, foidol and endrix were sprayed for 63 (142), Heavy infection of bollo worms aphids and jassides, endrin, folidol was sprayed 6 times dusting of BHC+D.D.T. 2 times. (iii) *kapas* yield. (iv) 1963 and 64. (b) No. (c) Nil. (v) N.A. for 63(142), Nil for 64(70). (vi) Nil. (vii) As the error variances are heterogeneous and Treatments × years interaction is absent the individual years results are given below.

## 5. RESULTS :

## 63 (142).

(i) 1060 Kg/ha. (ii) 72.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Av. yield	1008	1099	1081

C.D. = 77.8 Kg/ha.

## 64 (70).

(i) 135 Kg/ha. (ii) 39.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Av. yield	131	147	127

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(51), 61(143), 62(139).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

**Object :** To study the effect of foliar application of urea on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) 22.4 Kg/ha. of N and  $P_2O_5$  each. (ii) Deep black soil. (iii) 2.7.60, 26.6.61, 1.7.62. (iv) (a) N.A. for 60 (51), 3 harrowings for 61 (143), 1 harrowing for 62 (139). (b) Dibbling. (c) 6 Kg/ha. (d) 152 cm × 61 cm. (e) 1 plant/hill. (v) Nil for 60 (51), 12.4 C.L./ha. of F.Y.M. (vi) Digvijay 170-Co-2. (vii) Unirrigated. (viii) 3 interculturing, 3 weeding, 1 thinning for 60 (51), 4 interculturings for others. (ix) 87 cm., 122 cm., 62 cm. (x) 12.4.61, 15.4.62, 11.2.63.

**2. TREATMENTS :**

**Main-plot treatments :**

3 quantities of water used for solutions of 5.6 Kg/ha. of N as urea :  $M_1 = 898.6$ ,  $M_2 = 674.0$  and  $M_3 = 449.2$  litres of water/ha.

**Sub-plot treatments :**

4 spraying treatments :  $S_0 = \text{Control (water only)}$ ,  $S_1 = 11.2$  Kg/ha. of N in two equal doses at the time of square formulation and at flowering stage,  $S_2 = 16.8$  Kg/ha. of N in 3 equal doses (with 20 days interval), and  $S_3 = 22.4$  Kg/ha. of N in 4 equal doses (with 20 days interval).

Note :—3 equal doses of  $S_3$  will applied on 3.11.60, 23.11.60, 13.12.60 in 1960 ; 3.10.61, 23.10.61, 13.11.61. in 1961, 3.10.62, 23.10.62, 13.11.62, in 1962.

4 equal doses of  $S_2$  were applied on 3.11.60, 23.11.60, 13.12.60, 4.1.61 for 1960 ; 3.10.61, 23.10.61, 13.11.61, 4.12.61 for 1961, 3.10.62, 23.10.62, 13.11.62, 4.12.62. for 1962.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication. 4 sub-plots/main-plots. (b) N.A. (iii) 4 (iv) (a) 8.5 m. × 6.1 m. for 61 (143), 62(139) and 4.9 m. × 6.1 m. for 60 (51). (b) 6.1 m. × 3.1 m. for 62 (139). 61(143) and 3.1 m. × 3.7 m. for 60 (51). (v) 91 cm. × 122 cm. for 60 (51) 122 cm. × 152 cm. for others. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory for 61 (143), Normal for others. (ii) Slight attack of boll worm for 60 (51), light attack of boll worm and woolly mites for 61 (143), 62 (139). (iii) Kapas yield. (iv) (a) 1960-62. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous, the individual years results are presented under 5.

**5. RESUSTS :**

**60(51).**

(i) 296 Kg/ha. (ii) (a) 114.0 Kg/ha. (b) 55.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	$S_0$	$S_1$	$S_2$	$S_3$	Mean
$M_1$	279	275	384	314	313
$M_2$	282	258	319	319	294
$M_3$	224	350	262	292	282
Mean	262	294	322	308	296

**61 (143).**

(i) 393 Kg/ha. (ii) (a) 89.0 Kg/ha. (b) 120.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>1</sub>	219	430	360	447	364
M <sub>2</sub>	454	488	360	390	423
M <sub>3</sub>	353	404	397	414	392
Mean	342	441	372	417	393

62 (139).

(i) 847 Kg/ha. (ii) (a) 124.3 Kg/ha. (b) 114.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>1</sub>	936	903	902	787	882
M <sub>2</sub>	777	824	848	809	814
M <sub>3</sub>	786	827	791	981	846
Mean	833	851	847	859	847

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(223).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

Object :- To study the effect of different Micronutrients by soil application on cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Fallow. (c) Nil. (ii) Black soil. (iii) 3.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) Nil. (d) 153 cm. × 61 cm. (e) 1 to 2 seeds/dibble. (v) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) Irrigated. (viii) 5 interculturings. (ix) 89 cm. (x) 2.4.66.

**2. TREATMENTS :**

8 micronutrients treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Boron as 11.2 Kg/ha. of Borax, T<sub>2</sub>=Copper as 28.0 Kg/ha. of Cu. Sul. T<sub>3</sub>=Zinc as 28.0 Kg/ha. of Zn. Sul. T<sub>4</sub>=Manganese as 56.0 Kg/ha. of Mn. Sul. T<sub>5</sub>=Molybdenum as 1.1 Kg/ha. of Sodium molybdate, T<sub>6</sub>=Ferrous as 56.0 Kg/ha. of Fe. Sul. and T<sub>7</sub>=Mixture of above all together.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (b) 11.0 m. × 9.1 m. (b) 8.5 m. × 6.2 m. (v) 122 cm. × 152 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Heavy attack of jassid, aphids, boll worms. Folidol applied 4 times. (iii) Seed cotton yield. (iv) (a) 1964—1965. (but could not be conducted in 1964), (b) No. (c) Nil. (v) N. A. (vi) Absence of last rains in Sept. affected the yield. (vii) Nil.

**5. RESULTS :**

(i) 144 Kg/ha. (ii) 52.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	173	128	137	217	114	113	132

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 63(154).**  
**Type :- 'M'.**

**Object :-**To study the effect of micronutrients on yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Deep black soil. (iii) 28.6.63. (iv) (a) 3 harrowings. (b) Dibbling. (c) 6 Kg/ha. (d) 152 cm×61 cm. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) 2087. (vii) Irrigated. (viii) 5 inter-culturings. (ix) 120 cm. (x) 28.3.64.

**2. TREATMENTS :**

6 spraying treatments : T<sub>0</sub>=Control (water only), T<sub>1</sub>=Zinc at 3.4 Kg/ha. of Zinc Sulphate+2.2 Kg/ha. lime, T<sub>2</sub>=Molybdenum at 140 gms/ha. of Sodium Molybdate, T<sub>3</sub>=Boron at 2.2 Kg/ha. of borax+0.6 Kg/ha. of Bentonite, T<sub>4</sub>=Copper at 9.0 Kg/ha. of Copper Sulphate+9.0 Kg/ha. of lime and T<sub>5</sub>=Manganese at 3.4 Kg/ha. of Manganese Sulphate+2.2 Kg/ha. of lime.

Micronutrients dissolved in 1123 litres of water and sprayed on 21.8.1963.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 11 m×9.1 m. (b) 8.5 m×6.1 m. (v) 122 cm×152 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) N.A. (vi) Severe cold in Feb. 1964. 36.5 m.m. rain on 26th Nov. (vii) Nil.

**5. RESULTS :**

(i) 796 Kg/ha. (ii) 320.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

TREATMENT	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	1135	713	916	612	623	777

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(141), 64(78), 65(228).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

**Object :-**To study the cumulative effect of fertilizers on different crops and soil.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) 44.8 Kg/ha. of N and F.Y.M. for 65(228), nil for others. (ii) Black soil. (iii) 29.6.63, 26.6.64, 20.6.65. (iv) (a) 2 harrowings, (b) Dibbling. (c) 6 Kg/ha. (d) 152.5 cm×61.0 cm. (e) 1 plant/hill. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(141), 64(78), nil for 65(228). (vi) Digvijay for 65(228), 2087 for others. (vii) Unirrigated for 63(141), Irrigated for others. (viii) 7 inter-culturings and 7 weedings for 63(141), 5 inter-culturings for 64(78), 4 inter-culturings for 65(228). (ix) 120 cm., 213 cm., N.A. (x) 5.3.64, 20.4.65, 7.3.66.

**2. TREATMENTS :**

All combinations of (1) and (2)

(i) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.21, C.L/ha.

(ii) 6 sources of N at 44.8 Kg/ha. : S<sub>0</sub>=0, S<sub>1</sub>=urea, S<sub>2</sub>=A/S/N S<sub>3</sub>=C/A/N. S<sub>4</sub>=A/S S<sub>5</sub>=Ammonium Sulphate Phosphorus.

## 3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 12. (b) N.A. (iii) 2. (iv) (a) 27.4 m × 18.3 m. (b) 25 × 15.2 m. for 63(141), 64(78), and 25.1 m × 15.2 m. for 65(228). (v) 122.0 cm × 152.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1963--contd. (b) Yes. (c) Nil. (v) N.A. (vi) Nil.

## 5. RESULTS :

## 63(141)

(i) 805 Kg/ha. (ii) 97.1 Kg/ha. (iii) Main effects of S alone is highly significant. (iv) Average yield of *Kapas* in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	Mean
F <sub>0</sub>	549	903	853	864	744	926	806
F <sub>1</sub>	689	961	844	861	640	824	803
Mean	619	932	848	862	692	875	805

C.D. for S marginal mean = 151.1 Kg/ha.

## 64(78)

(i) 627 Kgs/ha. (ii) 44.7 Kg/ha. (iii) Main effects of S is highly significant. (iv) Average yield of *Kapas* in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	Mean
F <sub>0</sub>	587	630	671	676	633	638	639
F <sub>1</sub>	518	646	601	678	633	621	616
Mean	552	638	636	677	633	629	627

C.D. for S marginal mean = 69.6 Kg/ha.

## 65(228)

(i) 381 Kg/ha. (ii) 67.4 Kg/ha. (iii) Main effects of F, S and Control V/S. others are highly significant. (iv) Average yield of *Kapas* in Kg/ha.

	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	S <sub>5</sub>	Mean
F <sub>0</sub>	278	529	585	363	392	392	423
F <sub>1</sub>	271	436	529	369	214	315	339
Mean	274	483	507	366	303	354	381

C.D. for F marginal mean = 66.3 Kg/ha.

C.D. for S marginal mean = 105.0 Kg/ha.

C.D. for Control V/S. others = 77.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Surat.**

**Ref :- GJ. 63(148), 65(261)**

**Type :- 'M'.**

**Object :-** To study the effect of Chilean Nitrate V/S Ammonium Sulphate on Cotton *Jowar* rotation.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) As per treatments. (ii) Black soil. (iii) 28.6.63, 3.7.65. (iv) 2 harrowings. (b) Dibbling. (c) 6 Kg/ha. (d) 152.5 cm × 61.0 cm. (e) 1-2 Seed/Dibble. (v) Nil for 63(148), 22.4 Kg/ha. of P for 65(261). (vi) 2087 for 63(148), Digvijay for 65(261). (vii) Irrigated. (viii) 5 inter-culturings+4 weedings for 64(148), 4 interculturings for 65(261). (ix) 120 cm., 89.3 cm. (x) 3.4.64, 8.3.66 and onwards.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=12.4$  C.L/ha.

(2) 2 sources of N @44.8 Kg/ha.  $S_1$ =Chillean Nitrate, and  $S_2$ =Ammonium Sulphate.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 × 7.6 cm. (b) 8.5 m × 4.6 m. (v) 122 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil for 63(148), Aphides, Jassides, Boll worm attack Folidol applied for 65(261). (iii) *Kapas* yield. (iv) (a) 1962—Continued (alternative years). (b) No for 63(148), years for 65(261). (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

## 63(148)

(i) 846 Kg/ha. (ii) 136.1 Kg/ha. (iii) Main effect of S is highly significant. (iv) Average yield of *Kapas* in Kg/ha.

	$S_1$	$S_2$	Mean
$F_0$	962	676	819
$F_1$	947	801	874
Mean	954	738	846

C.D. for S marginal mean=118.3 Kg/ha.

## 65(261)

(i) 351 Kg/ha. (ii) 82.0 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *Kapas* in Kg/ha.

	$S_1$	$S_2$	Mean
$F_0$	373	399	386
$F_1$	359	272	315
Mean	366	336	351

Crop :- Cotton (*Kharif*).

Site :- Agri. Res. Stn. Surat.

Ref :- Gj. 62(137).

Type :- 'M'.

Object :- To study the effect of different micronutrients on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) 1.7.62. (iv) (a) 1 harrowing. (b) Dibbling. (c) 6 Kg/ha. (d) 152 cm. × 61 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) 2078-Vijalpa. (vii) Unirrigated. (viii) 3 interculturings. (ix) 62 cm. (x) 1.3.63.

## 2. TREATMENTS :

6 micronutrient treatments :  $T_0$ =Control (water only),  $T_1$ =Zinc at 3.4 Kg/ha. of Zinc Sulphate,  $T_2$ =Molybdenum at 70 gm/ha. of Sodium molybdate,  $T_3$ =Boron at 2.2 Kg/ha. of borax,  $T_4$ =Copper at 8.9 Kg/ha. of Copper Sulphate and  $T_5$ =Manganese at 3.4 Kg/ha. of manganese sulphate.

The micronutrients were dissolved in 1123 litres of water and sprayed through foliar application.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 18.3 m. × 9.1 m. (b) 15.9 m. × 6.1 m. (v) 122 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Light attack of boll worms and wooly winter. (iii) *Kapas* yield. (iv) (a) 1962-contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 360 Kg/ha. (ii) 58.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	389	394	328	316	358	376

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 65(257).**

**Type :- 'M'.**

Object : To study the effect of placement of Super Phosphate on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-jowar. (b) Jowar. (c) 44.8 Kg. N/ha. (ii) Black soil. (iii) 23.6.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) Nil. (d) 152.5 cm. × 61.0 cm. (e) 1-2 seeds/dibble. (v) 44.8 Kg/ha. (vi) Digvijay. (vii) Irrigated. (viii) 4 interculturings. (ix) 89.3 cm. (x) 13.3.66.

## 2. TREATMENTS :

All combinations of (1) and (2)+controls (2 plots)

(1) 3 levels of  $P_2O_5$  :  $P_1=22.4$ ,  $P_2=44.8$  and  $P_3=67.2$  Kg/ha.

(2) 4 methods of application of  $P_2O_5$  :  $M_1$ =Broadcasted,  $M_2$ =applied at 7.5 cm depth,  $M_3$ =Applied at 30 cm depth,  $M_4$ =Applied at 45 cm depth.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) Nil. (iii) 2. (iv) (a) 6.71 m. × 7.6 m. (b) 4.3 m. × 4.6 m. (v) 122.0 cm. × 152.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of Aphids and Bollworms. Folidol applied 6 times. (iii) Seed cotton yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) Absence of rains in september. (vii) Nil.

## 5. RESULTS :

(i) 528.5 Kg/ha. (ii) 135.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control =524 Kg/ha.

	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
M <sub>1</sub>	585	591	457	545
M <sub>2</sub>	448	612	511	524
M <sub>3</sub>	618	387	503	503
M <sub>4</sub>	642	488	590	573
Mean	573	520	515	536

Crop :- Cotton (Kharif).

Ref :- Gj. 62(134), 63(145), 64(72), 65(254).

Site :- Agri. Res. Stn., Surat.

Type :- 'M'.

Object :- To study the effect of different doses of P<sub>2</sub>O<sub>5</sub> with N on cotton and its' residual effect on succeeding legume crop Tur.

## 1. BASAL CONDITIONS :

(i) (a) Jowar-Cotton-Tur. (b) Jowar. (c) N.A. (ii) Deep black soil. (iii) 1.7.62, 29.6.63, 15.7.64, 3.7.65. (iv) (a) 1 harrowing for 62(134), 1 ploughing for 64(72), 2 harrowings for others. (b) Dibbling. (c) 6 Kg/ha. (d) 152.5 cm. × 61.0 cm. (e) 1 to 2 plants/hill. (v) Nil for 65(254) and 12.4 C.L./ha. of F.Y.M. for others. (vi) Digvijay for 65(254), 2087 for others. (vii) Unirrigated for 62(134), Irrigated for others. (viii) 4 to 5 interculturings. (ix) 62 cm., 120 cm., 213 cm., 89 cm. respectively. (x) 8.3.63, 3.4.64, 12.3.65 and 14.4.65, 31.3.66 onwards.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 Kg/ha.(2) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=44.8, N<sub>2</sub>=67.3 Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 9.1 m. (b) 6.1 m. × 6.7 m. (v) 122 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Heavy attack of Bollworm and wooly witer for 62(134) nil for 63(145), attack of wooly witer. spraying of metasystox for 64(72), Heavy attack of Aphids, Jassids, Bollworm, nalaothis. Folidol applied twice for 65(254). (iii) *Kapas* yield. (iv) (a) 1962-contd. (b) Yes for 65(254), nil for others. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

## 62(134)

(i) 498 Kg/ha. (ii) 119.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	468	536	542	515
P <sub>1</sub>	526	452	524	501
P <sub>2</sub>	453	475	509	479
Mean	482	488	525	498



63(145)

(i) 834 Kg/ha. (ii) 82.2 Kg/ha. (iii) Main effects of N is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	681	932	901	838
P <sub>1</sub>	696	995	894	862
P <sub>2</sub>	654	868	884	801
Mean	677	932	892	834

C.D. for N marginal means=69.3 Kg/ha.

64(72)

(i) 738 Kg/ha. (ii) 104.8 Kg/ha. (iii) Main effect of N is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	557	787	847	730
P <sub>1</sub>	580	802	861	748
P <sub>2</sub>	542	737	932	737
Mean	560	775	880	738

C.D. for N marginal means=88.4 Kg/ha.

65(254)

(i) 359 Kg/ha. (ii) 53.7 Kg/ha. (iii) Main effect of N is highly significant. (v) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	282	347	416	348
P <sub>1</sub>	308	384	395	362
P <sub>2</sub>	340	342	421	368
Mean	310	357	411	359

C.D. for N marginal means=45.2 Kg/ha.

**Crop :- Cotton.**

**Ref :- 60(48).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'M'.**

Object : To study the role of organic manures and fertilizers in crop production and maintainance of soil fertility.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Deep black. (iii) 7.7.'60. (iv) (a) N.A. (b) Dibbling. (c) 12 Kg/ha. (d) 152 cm. × 61 (e) cm. N.A. (v) Nil. (vi) 2087 Vijalpa. (vii) Unirrigated. (viii) Weeding and interculturing twice. (ix) 87 cm. (x) 9.3.'61 to 12.4.'61.

## 2. TREATMENTS :

9 manurial treatments :  $T_0$ =Control,  $T_1$ =12.4 C.L./ha. of F.Y.M,  $T_2$ =Half of  $T_1$ ,  $T_3$ =(NPK),  $T_4$ =Half of  $T_3$ ,  $T_5$ = $T_1+T_3$ ,  $T_6$ = $T_1+T_4$ ,  $T_7$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5+T_3$ ,  $T_8$ =Half of  $T_7$ .

(NPK)=N, P, K fertilizers equivalent to 12.4 C.L./ha. of F.Y.M.

F.Y.M. was applied on 5.7. 60 and fertilizers were applied on 9.9. 60.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  7.6 m. (b) 7.3 m.  $\times$  4.6 m. (v) 183 cm.  $\times$  152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Light attack of bollworms. (iii) Yield of seed cotton. (iv) (a) 1958-contd. (modified in 1961). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 623 Kg/ha. (ii) 151.2 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of kapas in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$	$T_7$	$T_8$
Av. yield	358	368	294	912	511	888	612	991	670

C.D.=220.7 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 61(140), 62(135), 63(144), 64(71), 65(226).**

**Site :- Agri. Res. Stn., Surat. Type :- 'M'.**

Object :—To study the roll of organic manures and fertilizers in crop production and maintainance of soil fertility.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil in 1961, 1964 and 1965 ; 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  in 1962 and 1963. (ii) Deep black soil. (iii) 27.6.1961, 1.7.1962. (iv) (a) 2 harrowings in 1961 and 1965, 1 harrowing in 1962 and 1964 and 3 harrowings in 1963. (b) Dibbling. (c) —. (d) 152  $\times$  61 cm. (e) 1-2 seeds (dibble) in different years. (v) Nil. (vi) 2087 (late). (vii) Unirrigated. (viii) 3 interculturings. (ix) 122 cm., 62 cm., 120 cm., 213 cm. and 88 cm. (x) 23.4.1962, 1.3.1963, 4.4.1964, 14.4.1965, 10.3.1966 and onwards.

## 2. TREATMENTS :

10 manurial treatments :  $T_0$ =Control,  $T_1$ =Bulky manure=12.4 C.L/ha of F.Y.M. (usual dose),  $T_2$ =6.2 C.L/ha of F.Y.M.+N, P, K, fertilizers equilateral to half of usual dose,  $T_3$ =N, P, K, fertilizers equivalent to 12.4 C.L/ha of F.Y.M.,  $T_4$ =12.4 C.L/ha of F.Y.M.+44.8 Kg/ha of N+22.4 Kg/ha of  $P_2O_5$ ,  $T_5$ =6.2 C.L/ha of F.Y.M.+44.8 Kg/ha of N+22.4 Kg/ha of  $P_2O_5$ ,  $T_6$ =N, P, K fertilizers equivalent to 12.4 C.L/ha of F.Y.M.+44.8 Kg/ha of N+22.4 C.L/ha of  $P_2O_5$ ,  $T_7$ =44.8 Kg/ha of N+22.4 Kg/ha of  $P_2O_5$ ,  $T_8$ =44.8 Kg/ha of N and  $T_9$ =67.2 Kg/ha of N.

N, P, and K applied as A/S, Super and Pot. Sulphate respectively.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) 14.6 m  $\times$  9.1 m. (b) 12.2 m  $\times$  6.1. (v) 122 cm  $\times$  162 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal in 1961 to 1964. low yield in 1965 due to absence of rains in Sept. 1965. (ii) High attack of Boll worms wooly mites in 1961, 1962, Heavy attack of stem borer in 1963, Attack of wooly mites and spray of *Metasystox* and *Folidol* sprayed in 1964. Heavy attack of aphids, Jassids and boll worms, *Folidol* applied twice. (iii) Yield of seed cotton. (iv) (a) 1958 to 1965 (modified in 1961). (b) No. (c) Results of combined analysis given under 5. (v) Nil. (vi) Due to continuous rains in the months of July and August, the growth was hampered in 1961, severe cold in Feb. 64, 3.7 cm. rains in Nov. 63. Heavy rains throughout monsoon which affected crop adversely in 1964, absence of late rains in Sept. 1965. (vii) Error variances are heterogenous and interaction of Treatments  $\times$  years is present.

## 5. RESULTS :

(i) 527 Kg/ha. (ii) 135.6 Kg/ha (36 d.f.). (iii) Treatment differences are highly significant. (iv) Av. yield of Seed Cotton in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>
Av. yield	377	406	509	508	542	545	704	556	555	566

C.D. = 87.1 Kg/ha.

**Crop :- Cotton.**

**Ref :- Gj. 62(144), 64(108).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'M'.**

Object :—To study the effect of C/N V/S, and A/S, on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Bajra-wheat. (b) Wheat for 62(144), Bajra for 64(108). (c) 44.8 Kg/ha of N+22.4 Kg/ha of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 10.7.62, 30.6.64. (iv) (a) 4 ploughings for 62(144), 1 ploughing and 3 harrowings for 64(108). (b) Dibbling. (c) 10 Kg/ha for 62(144), N.A. for 64(108). (d) 152 cm×61 cm. (e) 1 to 2. (v) Nil. (vi) 170-CO<sub>2</sub>. (vii) Irrigated. (viii) 4 weedings, 7 interculturings for 62(144), 5 weedings, 7 interculturings for 64(108). (ix) 66 cm., 77 cm. (x) 21.2.63, 19.3.63 and 4.3.65, 12.3.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L/ha.

(2) 2 sources of N 44.8 Kg/ha : S<sub>1</sub>=Chillean Nitrate and S<sub>2</sub>=Ammonium Sulphate.

## 3. DESIGN :

(i) Fact in R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m×7.6 m. (b) 8.5 m×4.6 m. (v) 122 cm×152 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 62(144), normal for 64(108). (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1962-contd. (b) Yes. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

## 62(144)

(i) 3018 Kg/ha. (ii) 513.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	2853	2840	2846
F <sub>1</sub>	3520	2862	3191
Mean	3186	2851	3018

## 64(108)

(i) 776 Kg/ha. (ii) 265.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	658	745	701
F <sub>1</sub>	946	754	850
Mean	802	749	775

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Umralla.**

**Ref :- Gj. 62(74), 63(79).**  
**Type :- 'M'.**

Object :—To study the effect of different Micronutrients on Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat ; Sesamum. (c) Nil. (ii) Medium black. (iii) 12.7.1962, 14.7.1963. (iv) (a) 1 ploughing and 2 harrowings, 1 ploughing and 1 harrowing. (b) Drilling. (c) 17 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) Nil. (vi) C.J. 73. (vii) Unirrigated. (viii) 2 weedings and 1 interculturing 1 weeding and 2 interculturings. (ix) 35 cm., 46 cm. (x) 15.12.1962, 25.12.1962, 22.1.1963 ; 7.12.1963, 20.12.1963, 17.1.1964 and 31.1.1964.

2. TREATMENTS :

6 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Zinc, T<sub>2</sub>=Molybdenum, T<sub>3</sub>=Boron, T<sub>4</sub>=Copper and T<sub>5</sub>=Manganese.  
 Micronutrients were sprayed twice on 19.8.1962 and 24.9.1962, 21.8.1963 and 18.9.1963. Other details N.A.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) and (b) 20'1 m × 10'1 m. (v) Nil. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Attack of Jassides. (iii) Yield of *Kapas*. (iv) (a) 1962 to 1963. (b) No. (c) Results of combined analysis given under 5. (v) to (vi) Nil. (vii) Error variances are homogeneous, Treatments × years interaction is absent.

5. RESULTS :

(i) 811 Kg/ha. (ii) 117.6 Kg/ha. based on 15 d.f. composed of pooled error and Treatments × years interaction. (iii) The treatments differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	890	785	844	884	678	786

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 61(100) 62(49), 63(46), 64(6).**

**Site : Dry Farming Res. Stn., Vallabhipur. Type :- 'M'.**

Object :—To study the response of N and P on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat : *Jowar* ; Wheat ; Groundnut. (c) 11.2 Kg/ha of N ; Nil ; 11.2 Kg/ha of N ; Nil. (ii) (a) Medium black. (iii) 9.7.1961 ; 12.7.1962 ; 11.7.1963 ; 12.7.1964 (resowing on 18.7.1964. (iv) (a) 2 harrowings ; 1 ploughing ; 4 harrowings ; 1 ploughing and 4 harrowings. (b) Drilling. (c) 13 Kg/ha ; 22 Kg/ha ; 17 Kg/ha ; 17 Kg/ha. (d) 61 cm. between rows ; 61 cm. × 15 cm ; 61 cm × 15 cm. (e) N.A. (v) 12.4 C.L./ha of F.Y.M. (vi) C.J. 73. (vii) Unirrigated. (viii) 3 interculturings ; 3 interculturings ; 5 interculturings and 4 weeding ; 3 interculturings and weeding. (ix) 60 cm ; 53 cm ; 60 cm ; 83 cm. (x) 12.11.1961 to 16.12.1961 ; 9.11.1962 to 9.12.1962 ; 12.11.1963 to 29.12.1963 ; 16.12.1964.

## 2. TREATMENTS :

## Main-plot treatments :

2 levels of  $P_2O_5$  as Super :  $P_1=11.2$  and  $P_2=22.4$  Kg/ha.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 sources of N :  $S_1=A/S$ ,  $S_2=$ Castor cake ; and  $S_3=A/S$  and castor cake in the ratio 1 : 1.

(2) 2 levels of N :  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.  $P_2O_5$  applied in furrows and N applied in furrows after sowing in 1961 ; N and P drilled on 12.7.1962. P drilled before sowing and N applied by hand hoeing after sowing in 1963.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m  $\times$  4.9 m. (b) 4.9 m.  $\times$  3.7 cm. (v) 61 cm  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory ; Normal ; Below Normal. (ii) Nil ; Nil ; attack of spotted bollworms Endrin (20 %) was sprayed twice ; in 1963 and 1964. (iii) Seed cotton yield. (iv) (a) 1961 to 1964. (b) No. (c) Nil. (v) Nil. (vi) Rainfall not sufficient in 1961 ; others Nil. (vii) As sub plot error variances are heterogeneous therefore the results of individual years are given.

## 5. RESULTS :

## 61(100)

(i) 309 Kg/ha. (ii) (a) 78.2 Kg/ha. (b) 101.2 Kg/ha. (iii) Main effect of S and interaction  $N \times S$  is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$S_1$	$S_2$	$S_3$	$N_1$	$N_2$	Mean
$P_1$	379	294	274	286	346	316
$P_2$	371	250	287	303	303	303
Mean	375	272	280	294	324	309
$N_1$	301	285	297			
$N_2$	450	260	264			

C.D. for S marginal means = 73.1 Kg/ha.

C.D. for means in the body of  $N \times S$  = 103.3 Kg/ha.

## 1962(45)

(i) 457 Kg/ha. (ii) (a) 32.2 Kg/ha. (b) 57.7 Kg/ha. (iii) Main effects of P and N are significant. Interaction  $N \times S$  is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$S_1$	$S_2$	$S_3$	$N_1$	$N_2$	Mean
$P_1$	490	450	498	477	487	479
$P_2$	460	394	453	432	440	436
Mean	475	422	476	454	460	457
$N_1$	443	442	478			
$N_2$	507	402	473			

C.D. for P marginal means = 29.6 Kg/ha.

C.D. for N marginal means = 34.0 Kg/ha.

C.D. for means in the body of  $N \times S$  table = 58.8 Kg/ha.

## 1963(46)

(i) 1861 Kg/ha. (ii) (a) 31.7 Kg/ha. (b) 69.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	194	186	210	205	188	196
P <sub>2</sub>	182	179	166	184	168	176
Mean	188	183	188	194	178	186
N <sub>1</sub>	184	170	230			
N <sub>2</sub>	192	196	146			

1964(6)

(i) 541 Kg/ha. (ii) (a) 107.3 Kg/ha. (b) 244.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>1</sub>	510	570	533	564	512	538
P <sub>2</sub>	548	562	525	507	583	544
Mean	529	566	529	536	547	541
N <sub>1</sub>	489	605	512			
N <sub>2</sub>	569	527	547			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(165), 61(193).**

**Site :- Soil Cons. Res. Demons. and Training Centre, Vasad. Type :- 'M'.**

**Object :-** To find out the effective dose of N to cotton along with G.M. of Sannhamp grown in situ in between cotton rows to serve as cover crop in early stages of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-*bajra*; *mung*. (b) *Bajra*, *mung*. (c) Nil. (ii) Sandly loam to loam. (iii) 26.6.1960; 25.6.1961. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) 9 Kg/ha. (d) 91 cm. × 30 cm. (e) 1, N.A. (v) Sann G.M. at 14627 Kg/ha.; 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+Sann G.M. at 1009 Kg/ha. (vi) 170 Co 2. (vii) Unirrigated. (viii) 3 weedings and 3 harrowings. (ix) 42 cm. ; 83 cm. (x) 11.11.1960 to 21.2.1961 ; 13. 2.1961 to 8.3.1962.

**2. TREATMENTS :**

4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4, N<sub>2</sub>=44.8 and N<sub>3</sub>=67.2 Kg/ha.  
N applied in bands at 15 cm. on other side of cottod plants on 9.8.60 and 8.8.1961.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 15.3 m. × 7.6 m. (b) 14.0 m. × 6.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1957 to 1961. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

60(165)

(i) 974 Kg/ha. (ii) 97.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>
Av. yield	957	944	1031	965

61(193)

(i) 498 Kg/ha. (ii) 54.7 Kg/ha. (iii) Treatments differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>
Av. yield	476	492	496	527

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(170), 65(54).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'M'.**

Object :—To find out the response of Nitrogeous fertilizer when applied in the root zone of Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton-jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 10.7.1964 ; 2.8.1965. (iv) (a) Nil ; 2 harrowings. (b) Drilling. (c) 14 Kg/ha. (d) 61 cm. × 23 cm. by thinning. (e) 1. (v) Nil. (vi) Kalyan. (vii) Unirrigated. (viii) 3 interculturings both years. (ix) 47 cm. ; 39 cm. (x) 21.1.1965 to 18.2.1965 ; 15.1.1966 to 8.2.1966.

2. TREATMENTS:

3 levels of N as A/S : N<sub>0</sub>=0 (control) ; N<sub>1</sub>=22.4 Kg/ha. in one dose and N<sub>2</sub>=44.8 Kg/ha. in two doses. N applied by placement at 15 cm. deep in furrows, 1st dose on 10.7.1964 and 2nd dose on 12.8.1964.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 7.3 m. × 11.0 m. (b) 6.1 m. × 9.1 m. (v) 61 cm. × 91 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1964 to 1965. (b) No. (c) Results of combined analysis given under 5. (v) Helvad. (vi) Nil. (vii) Error variances are homogeneous. Treatments × years interaction is present.

5. RESULTS :

(i) 603 Kg/ha. (ii) 148.9 Kg/ha. (based on 22 d.f.). (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>
Av. yield	536	611	661

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(171), 65(55).**

**Site :- Agri. Res. Stn. Viramgam.**

**Type :- 'M'.**

Object :—To study the effect of different Nitrogeous fertilizers on Cotton.

1. BASAL CO NDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 10.7.64, 22.7.65. (iv) (a) Nil for 64(171), 2 harrowings for 65(55). (b) Drilling. (c) 14 Kg/ha. (d) 61 cm. × 23 cm. (e) 1 plant/hill. (v) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 12.4 C.L./ha. of F.Y.M. for 64(171) ; 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(55). (vi) Kalyan. (vii) Unirrigated. (viii) 2 interculturings for 64(171), 3 interculturings for 65(55). (ix) 47 cm., 39 cm. (x) 21.1.65 and 18.2.65, 15.1.66 and 10.2.66.

## 2. TREATMENTS :

5 sources of 22.4 Kg/ha. of N :  $S_0$ =Control,  $S_1$ =A/S,  $S_2$ =C/A/N,  
 $S_3$ =Urea and  $S_4$ =Castor cake.  
 N applied by broadcast on 10.7.64 and 22.7.65 in respective years.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) 7.3 m. × 17.7 m. (b) 6.1 m. × 16.5 m. (v) 61 cm. × 61 cm.  
 (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1964 and 65. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 835 Kg/ha. (ii) 78.3 Kg/ha. [based on 12 d.f. made up of pooled error + Treatments × years interaction].  
 (iii) Treatment differences are not significant. (iv) Av. yield of Kapas in Kg/ha.

Treatment	$S_0$	$S_1$	$S_2$	$S_3$	$S_4$
Av. yield	818	848	881	832	796

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(207), 64(118), 65(57).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'M'.**

Object :- To study the role of organic manure in soil.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 2.8.63, 10.7.64, 23.7.65. (iv) (a) 2 harrowings for 63(207) and 65(57), Nil for 64(168). (b) Drilling. (c) 15.6 Kg/ha. for 65(57), 14 Kg/ha. for others. (d) 61 cm. × 23 cm. (e) 1 plant/hill. (v) Nil. (vi) Kalyan. (vii) Unirrigated. (viii) 2 interculturations for 63(207), 4 interculturations and 1 weeding for 64(168), 3 interculturations for 65(57). (ix) 56 cm., 47 cm., 39 cm. (x) 10.3.64, 19.1.65 and 11.2.65, 17.1.66 and 10.2.66.

## 2. TREATMENTS :

7 manurial treatments :  $M_0$ =Control,  $M_1$ =12.4 C.L./ha. of F.Y.M.,  $M_2$ =6.2 C.L./ha. of F.Y.M. + N-P-K equivalent to 6.2 C.L./ha. of F.Y.M.,  $M_3$ =N-P-K equivalent to 12.4 C.L./ha. of F.Y.M.,  $M_4$ =12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N as A/S,  $M_5$ =N-P-K equivalent to 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N as A/S and  $M_6$ =22.4 Kg/ha. of N as A/S.

Note :- F.Y.M. broadcasted at sowing,  $P_1O_5$  as Super,  $K_2O$  as Pot. Sul. drilled on 19.7.63, 10.7.64 and 5.7.65 in respective years, N as A/S broadcasted on 19.9.63, 17.9.64 and 24.9.65 respectively.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 4.9 m. × 30.5 m. (b) 3.7 m. × 27.7 m. (v) 61 cm. × 141 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory for 65(57), Normal for others. (ii) Nil. (iii) Kapas yield. (iv) (a) 1963 to 65. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

(i) 559 Kg/ha. (ii) 252.8 Kg/ha. (based on 48 d.f. made up of pooled error + Treatments × years interaction).  
 (iii) Treatment differences are not significant. (iv) Av. yield of kapas in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$
Av. yield	572	625	583	589	651	430	460



**Crop :- Cotton (Kharif).**

**Ref :- Gj. 61(174), 62(200), 63(204), 64(166).**

**Site :- Agri. Res. Stn., Viramgam. Type :- 'M'.**

Object :- To determine the optimum fertilizer requirements of Cotton under rainfed conditions.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black soil. (iii) 29.6.1961, 2.8.1962, 2.8.1963 and 10.7.1964. (iv) (a) 3 harrowings ; 3 harrowings ; 5 harrowings, Nil. (b) Drilling. (c) 17 Kg/ha. ; 13 Kg/ha. ; 12 Kg/ha. and 14 Kg/ha. (d) 61 cm. × 23 cm. (e) N.A., 1 to 2 ; 1 to 2 ; N.A. (v) 12.4 C.L/ha. of F.Y.M. in 1961 and Nil during other years. (vi) Kalyan (late). (vii) Unirrigated. (viii) 6 interculturings, 2 interculturings and 2 weedings, ; 3 interculturings ; 2 interculturings and 2 weedings. (ix) 69 cm., 77 cm., 56 cm. and 74 cm. (x) 3.3.1962 ; 27.2.1963, 21.2.1964 and 2.1 to 18.2.1965.

**2. TREATMENTS :**

**Main-plot treatments**

2 levels of  $P_2O_5$  as Super :  $P_1=11.2$  and  $P_2=22.4$  Kg/ha.

**Sub-plot treatments**

(1) 2 levels of N :  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.

(2) 3 sources of N :  $S_1=A/S$ ,  $S_2=$ Castor cake and  $S_3=\frac{1}{2}$  dose as A/S +  $\frac{1}{2}$  dose as Castor Cake.

manures applied on 5.9.1961 ;  $P_2O_5$  drilled on 4.7.1962, N applied by broadcast on 29.9.1962 ;  $P_2O_5$  drilled on 4.7.1963, N applied by broadcast on 18.9.1963 ;  $P_2O_5$  drilled on 27.6.1964 and N applied by broadcast on 10.7.1964.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.1 m. × 4.9 m. (b) 4.9 m. × 3.7 m. (v) 61 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Lodging and yellowing of plants due to continuous and heavy rains in August 1961 ; Growth retarded due to continuous rows after sowing, germination affected and there was water lodging after sowing in 1962, Normal in 1963 and 1964. (ii) Nil. (iii) Kapas yield. (iv) (a) 1961 to 1964. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) Nil. (vii) Both the error variances are homogeneous and the interactions Treatments × years are absent in both.

**5. RESULTS :**

(i) 688 Kg/ha. (ii) (a) 141.2 Kg/ha. based on 15 d.f. composed of pooled error and Treatments × years interaction. (b) 136.4 Kg/ha. based on 144 d.f. composed of pooled error and two and three factor interactions with years. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	$S_1$	$S_2$	$S_3$	$N_1$	$N_2$	Mean
$N_1$	705	650	699	694	674	684
$N_2$	686	696	692	672	710	691
Mean	696	673	694	683	692	688
$P_1$	689	665	696			
$P_2$	703	681	692			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(202).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'M'.**

Object :- To study the effect of foliar application of micronutrients on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black soil. (iii) 2.8.1963. (iv) (a) N.A. (b) Drilling. (c) 14 Kg/ha. (d) 61 cm. × 23 cm. (e) 1 to 2 plants/hill. (v) Nil. (vi) Kalyan. (vii) Unirrigated. (viii) 2 weedings and 2 interculturings. (ix) 56 cm. (x) 1st picking on 18.2.64.

## 2. TREATMENTS :

6 micronutrient treatments :  $T_0$ =Control,  $T_1$ =Boron as 2.2 Kg/ha. of Borax + 0.6 Kg/ha. of Bentonite,  $T_2$ =Copper at 8.9 Kg/ha. of Cu. Sul. + 8.9 Kg/ha. of lime,  $T_3$ =Zinc at 3.4 Kg/ha. of Zn. Sul. + 2.2 Kg/ha. of lime,  $T_4$ =Molybdenum at 0.2 Kg/ha. of Sodium Molybdate and  $T_5$ =Manganese at 3.4 Kg/ha. of Mn. Sul. + 2.2 Kg/ha. of lime.

All these micronutrients were dissolved in 1123 litres of water. 1st spraying after one month of complete germination of crop at 1123 litres/ha. Second spraying at the time of flowering at 2247 litres/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) and (b) 9.8 m. × 20.7 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed Cotton yield. (iv) (a) to (c) No. (v) to (vii) Nil.

## 5. RESULTS :

(i) 631 Kg/ha. (ii) 267.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	497	603	434	756	637	860

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(203).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'M'.**

Object :—To study the effect of soil application of different micronutrients on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-*Jawar*. (b) *Jowar*. (c) Nil. (ii) Medium black soil. (iii) 2.8.63. (iv) (a) N.A. (b) Drilling. (c) 14 Kg/ha. (d) 61 cm. × 23 cm. (e) Nil. (v) Nil. (vi) *Kalyan*. (vii) Unirrigated. (viii) 2 weedings and 2 interculturings. (ix) 56 cm. (x) 1st picking on 18.2.64.

## 2. TREATMENTS :

7 micronutrient treatments :  $T_0$ =Control,  $T_1$ =Boron as 22.4 Kg/ha. of Borax,  $T_2$ =28.0 Kg/ha. of Cu. Sul.,  $T_3$ =Zinc as 28.0 Kg/ha. of Zn. Sul.,  $T_4$ =Molybdenum as 1.1 Kg/ha. of Sodium molybdate and  $T_5$ =Manganese as 56.0 Kg/ha. as Mn. Sul. and  $T_6$ =Mixture of above all.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 2. (iv) (a) and (b) 1/98.84 ha. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed Cotton yield. (iv) (a) to (c) No. (v) to (vii) Nil.

## 5. RESULTS :

(i) 589 Kg/ha. (ii) 145.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	571	667	563	618	534	591	578

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62, 63, 64, 65(MAE).**

**Site :- M.A.E. Centre, Chalthan.**

**Type :- 'M'.**

Object :—Type V (a). To compare the utility of different methods for placement of different doses of N for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut and Wheat. (c) Nil. (ii) Medium black soil. (iii) 27.6.62, 30.6.63, 20.7.64, N.A. (iv) (a) 2 harrowings. (b) Dibbling. (c) 11 Kg/ha. (d) 152 cm. × 61 cm. (e) Nil. (v) 5600 Kg/ha. of F.Y.M. (vi) 2087. (vii) Irrigated. (viii) 5 interculturations. (ix) 137 cm. (x) 20.2.63, 11.3.63. and 9.5.63, 22.3.64, 7.4.64. and 25.4.64, 24.3.65 and 18.4.65 ; N.A.

## 2. TREATMENTS :

All combinations of (1) and (2)+a control

(1) 2 doses of N :  $N_1=56$  and  $N_2=112$  Kg/ha.

(2) 5 methods of application of N :  $M_1$ =Broadcast at sowing,  $M_2$ =By plough sole method to drop the fertilizer 12.5 cm. deep.  $M_3$ =Placement of fertilizer in the same line as seed by seed cum fertilizer drill,  $M_4$ =Placement of fertilizer about 4 cm. below the seed by seed cum fertilizer drill and  $M_5$ =B and placement of fertilisers about 5 cm. below and 5 cm. away from the seed.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 4. (iv) (a) 11.6 m. × 6.1 m. (b) 9.1 m × 3.1 m. (v) 61 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. Endrin sprayed twice. (iii) Yield of *Kapas*. (iv) (a) 1962—Contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Table of means for 1965 is N.A.

## 5. RESULTS :

## 1962

(i) 482 Kg/ha. (ii) 126.1 Kg/ha. (iii) Main effect of N and "control vs. others" are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control=190 Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	Mean
$N_1$	428	429	422	317	408	401
$N_2$	455	575	724	621	638	621
Mean	487	502	573	469	523	511

C.D. for N marginal means=81.8 Kg/ha.

C.D. for Control vs. others=134.9 Kg/ha.

## 1963

(i) 574 Kg/ha. (ii) 116.0 Kg/ha. (iii) "Control vs others" is highly significant. Main effect of N is significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control=379 Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	Mean
$N_1$	558	456	541	539	624	544
$N_2$	603	627	636	705	649	644
Mean	581	542	589	622	636	594

C.D. for N marginal means=77.8 Kg/ha.

C.D. for Control vs. others=124.1 Kg/ha.

## 1964

(i) 505 Kg/ha. (ii) 102.3 Kg/ha. (iii) Main effect of N and Control vs. others are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control=343 Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	Mean
N <sub>1</sub>	382	427	513	506	514	468
N <sub>2</sub>	523	536	644	545	624	574
Mean	452	482	579	526	569	521

C.D. for N marginal means=66.0 Kg/ha.

C.D. for Control vs. others =109.4 Kg/ha.

**1965**(i) 288 Kg/ha. (ii) 118.0 Kg/ha. (iii) Control vs. others is significant. (iv) Av. yield of *Kapas* in Kg/ha.

Control=210 Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	N <sub>1</sub>	N <sub>2</sub>
Av. yield	337	328	279	281	260	295	299

C.D. for Control vs. others=120.0 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 61(MAE).****Site :- Trial-cum-Demons. Farm, Umralla.****Type :- 'M'.**

Object :- To study the direct, residul and cummulative effect of three levels of N,P,K and bulky manure on a fixed two course rotation under irrigated condition.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Fallow-Jowar-Wheat. (b) Wheat. (c) As per treatments. (ii) Medium black. (iii) 26.6.61 Resowing on 5.7.61. (iv) (a) One ploughing and 2 harrowings. (b) Drilling. (c) 11.2 Kg/ha. (d) 91 cm. between rows. (e) -. (v) Nil. (vi) Sanjay (medium). (vii) Unirrigated. (viii) 2 interculturings and 2 weedings. (ix) 15.0 cm. (x) 21.11.61 and 3.1.62.

**2. TREATMENTS :**

All combinations of (1), (2), (3) and (4).

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6 and N<sub>2</sub>=67.2 Kg/ha.(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.(3) 3 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0, K<sub>1</sub>=33.6 and K<sub>2</sub>=67.2 Kg/ha.(4) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=56.0 Kg/ha.

Fertilizers applied at sowing in furrows.

**3. DESIGN :**(i) 3<sup>3</sup>×2 confd. (ii) (a) 9 plots/block ; 6 blocks/replication. (b) N.A. (iii) 1. (iv) (a) 9.1 m.×4.6 m. (b) 7.3 m.×2.7 m. (v) 91 cm.×91 cm. (vi) Yes.**4. GENERAL :**(i) Germination was poor and hence resowing was done on 5.7.61. (ii) Nil. (iii) *Kapas* yield (iv) (a) 1959-contd. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.**5. RESULTS :**(i) 518 Kg/ha. (ii) 141.4 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	549	468	467	386	556	543	444	531	509	495
F <sub>1</sub>	507	591	528	511	579	536	579	538	509	542
Mean	528	529	497	448	567	539	511	529	509	518
K <sub>0</sub>	480	528	525	417	537	579				
K <sub>1</sub>	584	543	460	511	588	488				
K <sub>2</sub>	520	516	506	416	576	550				
P <sub>0</sub>	498	455	391							
P <sub>1</sub>	564	586	551							
P <sub>2</sub>	522	546	549							

C.D. for P marginal means=101.0 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60 and 61(MAE).**

**Site :- M.A.E. Centre, Umralla.**

**Type :- 'M'.**

Object :-To find out the most suitable time of application of N.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 60 ; Gram in *Rabi*. (c) Nil. (ii) Medium black. (iii) 9.7.1960 ; 27.6.1961. (iv) (a) 1 ploughing and 2 to 3 harrowings. (b) Drilling. (c) 11.2 Kg/ha. (d) 46 cm. between rows. (e) —. (v) 5600 Kg/ha. of F.Y.M. broadcast + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> before sowing. (vi) Sanjay (C.J. 73). (vii) Unirrigated. (viii) 2 interculturings and weedings. (ix) 44.0 cm. ; 38.0 cm. (x) 2.11.60, 15, 25.12.1960 ; 4.11.61 to 1.12.61.

#### 2. TREATMENTS :

All combinations of (1) and (2) + a control.

(1) 2 sources of N at 56.0 Kg/ha. : N<sub>1</sub>=A/S and N<sub>2</sub>=Urea.

(2) 6 times of application of N : T<sub>1</sub>=Full dose at sowing, T<sub>2</sub>=Full dose at first interculture. T<sub>3</sub>=Full dose at flowering, T<sub>4</sub>= $\frac{1}{2}$  at sowing +  $\frac{1}{2}$  at flowering, T<sub>5</sub>= $\frac{1}{3}$  at sowing +  $\frac{1}{3}$  at first interculture +  $\frac{1}{3}$  at flowering and T<sub>6</sub>= $\frac{1}{3}$  at flowering +  $\frac{1}{3}$  one month after flowering.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 13. (b) N.A. (iii) 3. (iv) (a) 9.1 m. × 5.5 m. (b) 7.3 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of Kapas. (iv) (a) 1956 to 1961. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Results of expts. 56, 57, 58, 59 (MAE) have also been taken while giving combined results.

#### 5. RESULTS :

(i) 711 Kg/ha. (ii) 186.2 Kg/ha. [60 d.f. made up of interaction of Treatments with years]. (iii) Control Vs. others' alone is significant. (iv) Av. yield of Kapas in Kg/ha.

Control=615 Kg/ha.

	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	Mean
N <sub>1</sub>	706	698	720	717	756	755	725
N <sub>2</sub>	757	696	721	674	779	648	712
Mean	732	697	720	695	767	702	719

C.D. for Control vs. others'=91.8 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 62, 63, 64, 65(MAE).****Site :- M.A.E. Centre Umralla.****Type :- 'M'.**

Object :—Type V (a). To compare the utility of different methods of placement of different doses of N for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut, Sesamum, Sesamum ; Wheat. (c) Nil. (ii) Medium black. (iii) 19.7.62 ; 9.7.63 ; 30.6.64 ; 11.7.65. (iv) (a) 1 to 2 ploughings and harrowings. (b) Hand sowing. (c) 12.5 Kg/ha. (d) 91 cm. row to row. (e) N.A. (v) 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) C J-73. (vii) Unirrigated. (viii) 2 weedings. (ix) 33 cm. ; 46 cm. ; 95 cm. ; 32 cm. (x) 15.11.62 and 10.12.62 ; 31.1.64 ; 7.12.64 ; 18.11.65 to 20.12.65.

**2. TREATMENTS :**

All combinations of (1) and (2)+a control.

(1) 2 levels of N as A/S : N<sub>1</sub>=28 and N<sub>2</sub>=56 Kg/ha.

(2) 5 methods of application of N : M<sub>1</sub>=Broadcast at sowing, M<sub>2</sub>=12.5 cm. deep before sowing, M<sub>3</sub>=Sown with seed (seed+fertilizer), M<sub>4</sub>=3.8 cm. below the seed and M<sub>5</sub>=5 cm. deep and 5 cm. away from the seed.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 11. (b) N.A. (iii) 4. (iv) (a) 11.0 m.×4.6 m. ; 11.0 m.×5.5 m. ; 10.0 m.×6.0 m. (b) 10.1 m.×3.7 m. ; 10.1 m.×3.7 m. ; 9.0 m.×4.0 m. (v) 46 cm.×46 cm. ; 46 cm.×91 cm. ; 50 cm.×100 cm. (vi) Yes.

**4. GENERAL :**

(i) Germination was poor due to insufficient rains for 62. Crop was lodged completely and shedding of squares occurred in 64 due to heavy rains on 18.9.64. (ii) Attack of boll worm, endrine sprayed. (iii) Seed cotton yield. (iv) (a) 1962-65. (b) No. (c) Results of combined analysis are given under 5. (v) Nil. (vi) Insufficient rains in 62. (vii) Table of means is N.A.

**5. RESULTS :**

(i) 638 Kg/ha. (ii) 224.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

Control=553 Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	N <sub>1</sub>	N <sub>2</sub>
Av. yield	687	649	690	600	610	662	633

**Crop :- Cotton.****Ref :- Gj. 62(MAE).****Site :- MAE Centre, Umralla.****Type :- 'M'.**

Object :—Type IX. To study the residual effect of Nitrophosphate applied to Wheat on succeeding Cotton crop.

## 1. BASAL CONDITIONS :

- (i) (a) Cotton-Wheat. (b) Wheat. (c) As per treatments. (ii) Medium black. (iii) 10.7.1962. (iv) (a) 2 ploughings and 2 harrowings. (b) Drilling. (c) 12.4 Kg/ha. (d) 46 cm. × 10 cm. (e) N.A. (v) Nil. (vi) C.J.-73. (vii) Irrigated. (viii) 2 weedings. (ix) 32.7 cm. (x) 27.11.62, 29.12.62.

## 2. TREATMENTS :

All combinations of (1), (2), (3)+4 additional treatments

(1) 3 types of phosphatic manures :  $P_1$ =Super,  $P_2$ =ODDA and  $P_3$ =PEC.

(2) 3 levels of manures :  $L_1$ =13.4 Kg/ha. of N+11.8 Kg/ha. of  $P_2O_5$ ,  $L_2$ =26.9 Kg/ha. of N+23.6 Kg/ha. of  $P_2O_5$  and  $L_3$ =53.8 Kg/ha. of N+47.1 Kg/ha. of  $P_2O_5$ .

(3) 3 methods of application :  $M_1$ =Broadcasting at puddling time,  $M_2$ =Dipping the seeds in mud slush mixed with fertilizers before transplanting and  $M_3$ =In the form of pallets to be placed near the roots.

4 additional treatments : 4 levels of N as A/S :  $N_0$ =0,  $N_1$ =13.4,  $N_2$ =26.9 and  $N_3$ =53.8 Kg/ha.

## 3. DESIGN :

- (i)  $3^3+4$  Fact. confd. (ii) (a) 13 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m. × 5.5 m. (b) 8.2 m. × 4.6 m. (v) 46 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

- (i) Due to scanty rains germination and growth were poor. (ii) Attack of boll worm in October ; Endrine was sprayed. (iii) Yield of seed cotton. (iv) (a) 1961-62 (residual effect in 62. (b) No. (c) Nil. (v) Nil. (vi) Scanty rains. (vii) Nil.

## 5. RESULTS :

- (i) 324 Kg/ha. (ii) 150.7 Kg/ha. (iii) Main effects of P and L and interactions  $P \times L$  and  $P \times M$  are significant. (iv) Av. yield of kapas in Kg/ha.

$N_0$ =288,  $N_1$ =252,  $N_2$ =272 and  $N_3$ =282 Kg/ha.

	$L_1$	$L_2$	$L_3$	$M_1$	$M_2$	$M_3$	Mean
$P_1$	349	301	316	333	341	292	322
$P_2$	304	352	646	337	594	371	434
$P_3$	256	256	341	406	214	233	284
Mean	303	303	434	359	383	299	347
$M_1$	275	344	457				
$M_2$	373	326	451				
$M_3$	261	239	396				

C.D. for P or L marginal means = 101.4 Kg/ha.

C.D. for means in the body of  $P \times L$  or  $P \times M$  table = 175.6 Kg/ha.

**Crop :- Cotton.**

**Ref :- Gj. 61 and 62(MAE).**

**Site :- M.A.E. Centre, Umralla.**

**Type :- 'M'.**

Object :- Type IX : To compare the effect of nitrophosphates by ODDA and PEC processes at different levels and different methods of application on Cotton.

## 1. BASAL CONDITIONS :

- (i) (a) N.A. for 61 ; Cotton-Groundnut for 62. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 27.7.1961 ; 10.7.1962. (iv) (a) 1 to 2 ploughings and harrowings. (b) Dibbling. (c) 12.5 Kg/ha. (d) 91 cm. × 15 cm. (e) Nil. (v) Nil. (vi) Sanjay cotton for 61 ; C.J.-73 for 62. (vii) Irrigated. (viii) 2 weedings. (ix) 38.0 cm ; 32.7 cm. (x) 5.1.1962 for 1961 ; 22.11.1962 and 24.12.1962 for 1962.

## 2. TREATMENTS :

All combinations of (1), (2), (3)+4 extra treatments

(1) 3 types of phosphate :  $P_1$ =Super,  $P_2$ =ODDA and  $P_3$ =PEC.

(2) 3 levels of fertilizers :  $L_1$ =13.4 Kg/ha. of N+11.8 Kg/ha. of  $P_2O_5$ ,  $L_2$ =26.9 Kg/ha. of N+23.6 Kg/ha. of  $P_2O_5$  and  $L_3$ =53.8 Kg/ha. of N+47.1 Kg/ha. of  $P_2O_5$ .

(3) 3 methods of application :  $M_1$ =Broadcasting at puddling time,  $M_2$ =Dipping the seeds in mud slush mixed with fertilizers before transplanting and  $M_3$ =In the form of pallets to be placed near the roots.

Extra treatments are :

4 levels of N as A/S :  $N_0$ =0,  $N_1$ =13.4,  $N_2$ =26.9 and  $N_3$ =53.8 Kg/ha.

## 3. DESIGN :

(i)  $3^3+4$  Fact. confd. (ii) (a) 13 plots/block, 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  5.5 m. for 61 and 62. (b) 7.3 m.  $\times$  3.7 m. for 61, 8.2 m.  $\times$  4.6 m. for 62. (v) 91 cm  $\times$  91 cm. for 61, 46 cm.  $\times$  46 cm. for 62. (vi) Yes.

## 4. GENERAL :

(i) Good for 61 ; Germination not uniform due to scanty rains for 62. (ii) Affected by boll worm and aphids, Endrin was sprayed. (iii) *Kapas* yield. (iv) (a) 1961 to 62. (b) No. (c) The results of combined analysis are presented under 5. (v) to (vii) Nil.

## 5. RESULTS :

(i) 298 Kg/ha. (ii) 108.3 Kg/ha. (84 d.f. made up of pooled error). (iii) Extra treatment vs. others' and interaction  $P \times L$  are significant. (iv) Av. yield of *Kapas* in Kg/ha.

$N_0$ =306,  $N_1$ =233,  $N_2$ =238 and  $N_3$ =315 Kg/ha.

	$L_1$	$L_2$	$L_3$	$M_1$	$M_2$	$M_3$	Mean
$P_1$	223	373	329	306	289	329	308
$P_2$	346	313	299	300	361	297	319
$P_3$	309	293	296	307	305	286	299
Mean	293	326	308	304	318	304	309
$M_1$	269	333	312				
$M_2$	292	329	334				
$M_3$	316	317	278				

C.D. for means in the body of  $P \times L$  table=88.0 Kg/ha.

C.D. for 'Extra vs. others' =37.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(MAE).**

**Site :- M.A.E. Centre, Umralla.**

**Type :- 'M'.**

Object :-Type XI : To study the effect of micronutrients on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) Nil. (ii) Medium black. (iii) 9.7.64. (iv) (a) 1 Ploughing and 1 harrowing. (b) Drilling. (c) 12 Kg/ha., 20 Kg/ha. (d) 91 cm between rows. (e) Nil. (v) Nil. (vi) CJ-73. (vii) Unirrigated. (viii) Weeding and interculturing. (ix) 95 cm. (x) 4.2.65.



## 2. TREATMENTS :

All combinations of (1) and (2)+3 extra treatments

(1) 2 methods of application of micronutrients :  $M_1$ =Soil application and  $M_2$ =Foliar application.

(2) 6 micronutrient treatments :  $S_1$ =Mn. as 56.0 Kg/ha. of Manganese Sulphate,  $S_2$ =Zn. as 28.0 Kg/ha. of Zinc Sulphate,  $S_3$ =Cu. as 28.0 Kg/ha. of Copper Sulphate,  $S_4$ =Boron as 16.8 Kg/ha. of Borax,  $S_5$ =Molybdenum as 1.1 Kg/ha. of Sodium Molybdate and  $S_6$ =all the above five micronutrients.

3 extra treatments :  $T_0$ =Control,  $T_1$ =NPK alone to soil and  $T_2$ =NPK+Spartin at 370.0 Kg/ha.

NPK=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+33.6 Kg/ha. of  $K_2O$  as mur. pot applied to all treatments except control.

## 3. DESIGN ;

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 4. (iv) (a) 13.3 cm×5.3 cm. (b) 10.6 cm×3.8 cm. (v) 136 cm×75 cm. (vi) Yes.

## 4. GENERAL :

(i) Due to heavy rains on 18.9.64, Crop was lodged completely and shedding of squares occurred for 1964.

(ii) Attack of Aphids and boll worms for 1964. (iii) *Kapas* yield. (iv) (a) 1964-1965 (modified). (b) No.

(c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 934 Kg/ha. (ii) 232.7 Kg/ha. (iii) " $T_0$  vs. T" alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

$T_0$ =699 Kg/ha.,  $T_1$ =1115 Kg/ha.,  $T_2$ =1107 Kg/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$S_5$	$S_6$	Mean
$M_1$	936	852	945	1037	814	939	920
$M_2$	867	909	961	1063	711	1049	927
Mean	902	881	953	1050	763	994	924

C.D. for  $T_0$  vs. T means=287.7 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- GJ. 65(MAE).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'M'.**

Object :- Type XI : To study the effect of Micronutrients on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black soil. (iii) 14.7.65. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 20 Kg/ha. (d) 75 cm×15 cm. by thinning. (e) Nil. (v) 50 Kg/ha. of N+25 Kg/ha. of  $P_2O_5$ +25 Kg/ha. of  $K_2O$  to all plots excepts control plot. (vi) C.J.—73. (vii) Unirrigated. (viii) 1 weeding, 1 interculturing. (ix) 32 cm. (x) 22.11.65 and 13.12.65.

## 2. TREATMENTS :

15 micronutrient treatments :  $T_0$ =Control,  $T_1$ =NPK alone to soil,  $T_2$ =NPK+Spartin at 370.0 Kg/ha.,  $T_3$ =Mn as Manganese Sulphate at 60 Kg/ha. soil application,  $T_4$ =Zn as  $ZnSO_4$  at 30 Kg/ha. soil application,  $T_5$ =Cu as  $CuSO_4$  at 30 Kg/ha. soil application,  $T_6$ =Boron as Borax at 17 Kg/ha. soil application,  $T_7$ =Molybdenum as Sodium Molybdate at 1.25 Kg/ha. soil application,  $T_8$ =Mixture of all the above five micronutrients to soil,  $T_9$ =Mn as Manganese Sulphate at 17.5 Kg/ha. foliar application,  $T_{10}$ =Zn as  $ZnSO_4$  at 12.5 Kg/ha. foliar application,  $T_{11}$ =Cu as  $CuSO_4$  at 12.5 Kg/ha. foliar application,  $T_{12}$ =Boron as Borax at 6.2 Kg/ha. foliar application,  $T_{13}$ =Molybdenum as Sodium Molybdate at .06 Kg/ha. foliar application,  $T_{14}$ =Mixture of all the above five micronutrients as foliar application.

NPK=33.6 Kg/ha. of N as A/S+33.6 Kg/ha. of  $P_2O_5$  as Super+33.6 Kg/ha. of  $K_2O$  as Mur. pot applied to all the treatments except control.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) Nil. (iii) 4. (iv) (a) 11.5 cm×4.5 cm. (b) 10.0 cm×4.5 cm. (v) 75 cm. on either side. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1964, 1967. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1319 Kg/ha. (ii) 244.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of *Kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	1280	1346	1187	1483	1300	1277	1267	1501
	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>	T <sub>11</sub>	T <sub>12</sub>	T <sub>13</sub>	T <sub>14</sub>	
	1428	1239	1377	1397	1207	1306	1196	

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62, 63, 64 (S.F.T.).**

**Site :- Rajkot (c.f.).**

**Type :- 'M'.**

Object :—Type A<sub>1</sub> : To study response curves of important cereal, cash and oilseed crops to nitrogen applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic Alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

(i) 7 manurial treatments : O=Control (no manure), N<sub>1</sub>=56 Kg/ha. of N, N<sub>2</sub>=112 Kg/ha. of N, P<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, N<sub>1</sub>P<sub>1</sub>=56 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>; N<sub>2</sub>P<sub>1</sub>=112 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, N<sub>2</sub>P<sub>2</sub>=112 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, N<sub>2</sub>P<sub>2</sub>K<sub>1</sub>=112 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.

## 3. DESIGN :

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one Revenue Circle or Thana in the zone and the Circle/Thana is changed once in two years within the same zone. Each field assistant is required to conduct 36 trials in a year, 9 on a *Kharif* cereal, 9 on *rabi* cereal 9 on Cash crops, 6 on an oil-seed crop and 3 on a leguminous crop. One-third of the number of trials conducted (other than leguminous crops) are of type A<sub>1</sub> another one-third are of type A<sub>2</sub> and the remaining one-third are of type A<sub>3</sub>. The three trials on legume are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the four zones at the rate of one experiment per village. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 (1965 N.A.) (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## SFT (62)

Treatment :	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of yield in Kg/ha.	183	181	128	270	272	340	366	53.5

Control yield=840 Kg/ha., Number of trials=11.

## SFT (63)

Treatment :	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of yield in Kg/ha.	87	189	25	36	163	40	233	132.0

Control mean=861 Kg/ha., Number of trials=9.

## SFT (64)

Treatment :	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of yield in Kg/ha.	167	265	118	272	386	579	578	590

Control mean=1373 Kg/ha., Number of trials=9.

**Crop :- Cotton (Kharif).****Ref :- Gj. 65(S.F.T).****Site :- Bhavnagar, Junagadh, Rajkot, Baroda, Surat, Kaira and Mehsana (c. f.).****Type :- 'M'.**Object :—Type A<sub>1</sub>—To study the response curve of important cereal, cash and oilseed crops to Nitrogen applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium for Bhavnagar, Junagadh and Rajkot, deep black for Baroda and Surat and grey brown for Kaira and Mehsana. (iii) to (vi) N.A. (vii) Irrigated for Junagadh and Unirrigated for others. (viii) to (x) N.A.

## 2. TREATMENTS :

## 7 manurial treatments :

- O = Control (no manure)  
 N<sub>1</sub> = 35 Kg/ha. of N  
 N<sub>2</sub> = 70 Kg/ha. of N  
 P<sub>1</sub> = 25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>  
 N<sub>1</sub>P<sub>1</sub> = 35 Kg/ha. of N+25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>  
 N<sub>2</sub>P<sub>1</sub> = 70 Kg/ha. of N+25 Kg/ha. of P<sub>2</sub>O<sub>5</sub>  
 N<sub>2</sub>P<sub>2</sub> = 70 Kg/ha. of N+50 Kg/ha. of P<sub>2</sub>O<sub>5</sub>  
 N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> = 70 Kg/ha. of N+50 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+25 Kg/ha. of K<sub>2</sub>O  
 N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> on page 395.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1965—1966. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## Bhavnagar

## S.F.T. (65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	40	96	106	160	163	202	210	55.4

Control yield=447 Kg/ha. ; No. of trials=8

## Junagadh

## S.F.T. 65)

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	143	208	105	243	273	316	372	64.9

Control yield=642 Kg/ha. ; No. of trials=7.

**Rajkot****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	259	407	251	412	516	666	824	123.6

Control yield=113 Kg/ha. ; No. of trials=9.

**Baroda****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	136	283	158	286	402	618	534	112.0

Control yield=1120 Kg/ha. ; No. of trials=9.

**Surat****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	11	164	217	158	169	261	386	62.6

Control yield=441 Kg/ha. ; No. of trials=12.

**Kaira****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	121	156	81	149	1851	223	269	1668.3

Control yield = 1486 Kg/ha. ; No. of trials=14.

**Mehsana****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Kapas in Kg/ha.	54	114	81	140	164	259	321	84.6

Control yield=1486 Kg/ha. No. of trials=10.

**Crop :- Cotton (Kharif).****Ref :- Gj. 63, 64 (S.F.T.).****Site :- Rajkot, (c.f.).****Type :- 'M'.**Object :—Type A<sub>2</sub>—To study response curves of important cereal, cash and oil seed crops to Phosphorus singly and in combination with other nutrients.**1. BASAL CONDITIONS :**

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

O =Control (no manure).

N<sub>1</sub> =56 Kg/ha. of N.P<sub>1</sub> =33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.P<sub>2</sub> =67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>1</sub> =56 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>1</sub>P<sub>2</sub> =56 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub> =112 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N<sub>2</sub>P<sub>2</sub>K<sub>2</sub>=112 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> on page 251.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1963—1966 [1965 N.A.] (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

## S.F.T. (63)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	115	173	366	147	295	342	472	73.0

Control mean=898 Kg/ha. ; No. of trial=8.

## S.F.T. (64)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Kapas in Kg/ha.	127	101	205	189	235	384	548	31.2

Control mean=1465 Kg/ha. ; No. of trials=10.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62, 65, (SFT) for Rajkot ; (65), S.F.T. for other centres.**

**Site :- Rajkot, Bhavnagar, Junagadh, Baroda, Kaira, Surat and Mehsana (c.f.),**

**Type :- 'M'.**

Object :—Type A<sub>2</sub>-To study response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagarh, Deep black for Baroda and Mehsana and grey brown for Kaira and Surat. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

- O =Control (no manure)
- N<sub>1</sub> =33.6 Kg/ha. of N
- P<sub>1</sub> =22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
- P<sub>2</sub> =44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
- N<sub>1</sub>P<sub>1</sub> =33.6 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
- N<sub>1</sub>P<sub>2</sub> =33.6 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
- N<sub>2</sub>P<sub>2</sub> =67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.
- N<sub>2</sub>P<sub>2</sub>K<sub>2</sub> =67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of K<sub>2</sub>O.

## 3. DESIGN :

Same as in Type A<sub>1</sub> on page 251.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot [1963 and 1964 N.A.] and 1965 to 1966 for others (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Rajkot**

## S.F.T. (62)

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Kapas in Kg/ha.	151	123	123	225	213	303	269	—

Control mean=470 Kg/ha. ; No. of trials=2

<b>Rajkot</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Kapas in Kg/ha.	173	67	172	131	251	368	562	74.8
Control mean=1083 Kg/ha. ; No. of trials=10								
<b>Bhavnagar</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	42	80	97	138	181	114	262	46.1
Control mean=415 Kg/ha. ; No. of trials=7.								
<b>Junagadh</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	56	101	225	259	354	396	413	70.5
Control mean=522 Kg/ha. ; No. of trials=7.								
<b>Baroda</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	346	167	346	323	489	691	819	102.4
Control mean=969 Kg/ha. ; No. of trials=9.								
<b>Kaira</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	193	706	160	306	340	449	596	85.6
Control mean=286 Kg/ha. ; No. of trials=3.								
<b>Surat</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	19	87	176	118	175	211	208	38.7
Control mean=434 Kg/ha. ; No. trials=12.								
<b>Mehsana</b>								
<b>S.F.T. (65)</b>								
Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of kapas in Kg/ha.	48	222	156	161	177	283	312	72.9
Control mean=1485 Kg/ha. ; No. of trials=8.								

**Crop :- Cotton (Kharif).**  
**Site :- Rajkot (c.f.).**

**Ref :- Gj. 62, 63, 64 (S.F.T.)**  
**Type :- 'M'.**

Object :—Type A<sub>3</sub>—To study the response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

O=Control (no manure)

N<sub>1</sub>=56 Kg/ha. of N.

K<sub>1</sub>=33.6 Kg/ha. of K<sub>2</sub>O.

K<sub>2</sub>=67.2 Kg/ha. K<sub>2</sub>O.

N<sub>1</sub>K<sub>1</sub>=56 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>K<sub>2</sub>=56 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.

N<sub>2</sub>K<sub>2</sub>=112 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=56 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.

3. DESIGN :

Same as in type A<sub>1</sub> on page 251.

4. GENERAL :

(i) to (iii) N.A. (iv (a) 1962 to 1966 [1965 N.A.]. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS :

SFT (62)

Treatment :	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S. E.
Av. response of kapas in Kg/ha.	212	84	66	144	193	250	367	87.5

Control mean=918 Kg/ha ; No. of trials=10

SFT (63)

Treatment :	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S. E.
Av. response of kapas in Kg/ha.	145	196	138	179	160	187	421	95.0

Control mean=796 Kg/ha. ; No. of trials=7

S.F.T. (64)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of kapas in Kg/ha.	135	100	186	257	263	437	462	51.0

Control mean=1234 Kg/ha. ; No. of trials=10.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62, 65 (S.F.T.) for Rajkot, 65(S.F.T.)**

**Site :- Rajkot, Bhavnagar, Junagadh, Barod, Kaira, for other Centres.**  
**Mehsana and Surat (c.f.).**

**Type :- 'M'.**

Object :—Type A<sub>3</sub>—To study the response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagadh, deep black for Baroda and Surat and grey brown for Kaira and Mehsana. (iii) to (vii) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O=Control (no manure).

$N_1=33.6$  Kg/ha. of N

$K_1=22.4$  Kg/ha. of  $K_2O$

$K_2=44.8$  Kg/ha. of  $K_2O$

$N_1K_1=33.6$  Kg/ha. of N+ $22.4$  Kg/ha. of  $K_2O$

$N_1K_2=33.6$  Kg/ha. of N+ $44.8$  Kg/ha. of  $K_2O$

$N_2K_2=67.2$  Kg/ha. of N+ $44.8$  Kg/ha. of  $K_2O$

$N_1P_1K_1=33.6$  Kg/ha. of N+ $22.4$  Kg/ha. of  $P_2O_5$ + $22.4$  Kg/ha. of  $K_2O$

N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. Pot.

## 3. DESIGN :

Same as in Type A<sub>1</sub> on page 250.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot [1963 and 1964 N.A.] and 1965 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Rajkot

## S.F.T. (62)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of Kapas in Kg/ha.	177	—91	55	110	132	144	268	—

Control mean=674 Kg/ha. ; No. of trials=1

Rajkot

## S.F.T. (65)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of Kapas in Kg/ha.	96	17	112	244	271	376	395	69.2

Control mean=1161 Kg/ha. ; No. of trials=6

Bhavnagar

## S.F.T. (65)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of kaps in Kg/ha.	61	36	42	229	100	150	224	85.6

Control yield=461 Kg/ha. ; No. of trials=6

Junagadh

## S.F.T. (65)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of kaps in Kg/ha.	109	132	245	216	309	395	420	40.3

Control yield=720 Kg/ha. ; No. of trials=7

Baroda

## S.F.T. (65)

Treatment	$N_1$	$K_1$	$K_2$	$N_1K_1$	$N_1K_2$	$N_2K_2$	$N_1P_1K_1$	S.E.
Av. response of kaps in Kg/ha.	61	68	175	249	341	363	609	101.9

Control yield=1031 Kg/ha. ; No. of trials=9



## Surat

## S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S. E.
Av. response of <i>kapas</i> in Kg/ha.	75	68	128	202	209	299	281	57.8

Control yield=530 Kg/ha. ; No of trials=12

## Kaira

## S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of <i>kapas</i> in Kg/ha.	85	68	123	124	178	241	305	135.9

Control yield=136 Kg/ha. ; No. of trials=3

## Mehsana

## S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of <i>kapas</i> in Kg/ha.	67	-65	-31	-10	39	121	180	71.2

Control yield=1372 Kg/ha ; No. of trials=10

**Crop :- Cotton (Kharif).****Gj. 61(129), 62(188), 64(134), 65(142).****Site :- Dry Farming Res. Stn., Jam Khambalia.****Type :- 'MV'.**

Object :-To study the response of N, P and K on different varieties of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut for 61, 65 ; *Jowar* for 62 ; *Gram* for 64. (c) 12.4 C.L./ha. of F.Y.M. for 64 ; 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65. (ii) Medium black soll. (iii) 8.7.61 ; 17.7.62 ; 16.7.64 ; 27.7.65. (iv) (a) 1 ploughing and 1 to 3 harrowings. (b) Drilling. (c) 17 Kg/ha. (d) 91 cm. between rows. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. for 62 and 65. (vi) As per treatments. (vii) Unirrigated. (viii) 1 to 4 interculturings ; 3 weedings. (ix) 103 cm. for 61 ; 54 cm. for 62, 4 cm. for 64, 29 cm. for 65. (x) 6.3.62 to 7.3.62 ; 18.2.65 to 28.2.63 ; 9.3.65 to 5.4.65, 19.2.66.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.(3) 2 varieties : V<sub>1</sub>=Dhumad and V<sub>2</sub>=Kalyan.

## Sub-plot treatments :

2 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0 and K<sub>1</sub>=44.8 Kg/ha.N top dressed and Super drilled at sowing, K<sub>2</sub>O applied at sowing.

## 3. DESIGN :

(i) Split plot-confd. (ii) (a) 6 main-plots/block ; 3 blocks/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 11.0 m.×6.4 m. (b) 9.1 m.×4.6 m. (v) 91 cm.×91 cm.

## 4. GENERAL :

(i) Not satisfactory for 61, 62 and 64, normal for 65. (ii) Leaf shoot borer attack in 61, root rot in 62, Endrex was sprayed. (iii) *Kapas* yield. (iv) (a) 1960-65 (experiment failed in 1960 and 1963). (b) No. (c) Nil. (v) N.A. (vi) Uneven rains. (vii) Replication I was completely vitiated in 62.

## 5. RESULTS :

## 61(129)

(i) 207 Kg/ha. (ii) (a) 57.1 Kg/ha. (b) 70.5 Kg/ha. (iii) Interaction N×P is highly significant. Interaction N×V and N×K are significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	233	199	162	169	210	215	194	202	198
V <sub>2</sub>	201	210	237	221	203	224	220	212	216
Mean	217	204	200	195	206	220	207	207	207
K <sub>0</sub>	203	187	230	203	203	215			
K <sub>1</sub>	230	221	169	187	210	224			
P <sub>0</sub>	181	184	221						
P <sub>1</sub>	307	141	173						
P <sub>2</sub>	164	289	205						

C.D. for K means at the same level of N=59.7 Kg/ha.  
 C.D. for N means at the same level of K=54.7 Kg/ha.  
 C.D. for means in the body of N×P table=69.5 Kg/ha.  
 C.D. for means in the body of N×V table=49.2 Kg/ha.

62(188)

(i) 146 Kg/ha. (ii) (a) 198.0 Kg/ha. (b) 65.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	174	99	178	125	217	109	150	150	150
V <sub>2</sub>	152	148	122	134	164	124	161	121	141
Mean	163	124	150	130	191	117	156	136	146
K <sub>0</sub>	178	146	143	157	213	97			
K <sub>1</sub>	148	101	158	103	168	136			
P <sub>0</sub>	163	91	135						
P <sub>1</sub>	239	213	120						
P <sub>2</sub>	86	68	196						

64(134)

(i) 292 Kg/ha. (ii) (a) 62.6 Kg/ha. (b) 54.0 Kg/ha. (iii) Main effect of V is highly significant and interaction NPK is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	272	281	242	268	262	265	268	262	265
V <sub>2</sub>	288	337	332	326	306	325	314	324	319
Mean	280	309	287	297	284	295	291	293	292
K <sub>0</sub>	283	316	274	284	281	304			
K <sub>1</sub>	277	302	300	306	287	286			
P <sub>0</sub>	289	318	284						
P <sub>1</sub>	257	321	274						
P <sub>2</sub>	294	288	303						

C.D. for V marginal means=30.7 Kg/ha.

65(142)

(i) 176 Kg/ha. (ii) (a) 102.2 Kg/ha. (b) 46.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	172	164	161	188	166	142	164	166	165
V <sub>2</sub>	169	214	176	199	185	174	196	176	186
Mean	170	189	168	194	175	158	180	171	176
K <sub>0</sub>	169	202	170	201	183	157			
K <sub>1</sub>	171	176	166	187	167	159			
P <sub>0</sub>	219	173	189						
P <sub>1</sub>	126	245	154						
P <sub>2</sub>	165	148	161						

**Crop :- Cotton (*Kharif*).** Ref :- Gj. 60(159), 61(125), 62(192), 63(194), 64(140).

**Site :- Dry Farming Res. Stn., Rajkot.** Type :- 'MV'.

Object :- To study the response of N, P and K on different varieties of Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Groundnut-*Bajra-jowar-cotton* for 60 and 61. Groundnut-Cotton 62 to 64. (b) *Bajra* for 60 and 61; Groundnut for 62 to 64. (c) 12.4 C.L./ha. of F.Y.M. for 62 and 63, other years nil. (ii) Medium black soil. (iii) 27.6.60; 10.7.61; 16.7.62; 12.7.63; 4.7.64. (iv) (a) 1 ploughing and 1 to 2 harrowings. (b) Drilling. (c) 11 Kg/ha. for 60 and 61; 13 Kg/ha. for 62 to 64. (d) 91 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 60, 61, 62 and 64. (vi) As per treatments. (vii) Unirrigated. (viii) 2 to 3 weedings, 5 harrowings, 1 Gap fillings and 1 thinning. (ix) 47 cm. for 60; 56 cm. for 61; 41 cm. for 62; 51 cm. for 63, 76 cm. for 64. (x) 5 to 29.3.61; 17.2.62 to 13.3.62; 8.1.63; 16.3.64; 17.1.65 to 17.2.65.

#### 2. TREATMENTS :

##### Main-plot treatments

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.
- (3) 2 varieties : V<sub>1</sub>=*Dhumad* and V<sub>2</sub>=*Kalyan*.

##### Sub-plot treatments

2 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0 and K<sub>1</sub>=44.8 Kg/ha.

N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O drilled at sowing.

#### 3. DESIGN :

(i) Split-plot confd. (ii) (a) 6 main-plots/block; 3 blocks/replication; 2 sub-plot/main plot. (b) N.A. (iii) 2. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm.

#### 4. GENERAL :

(i) Below normal in 60 and 61, normal in 62, 63 and 64. (ii) Attack of jassides in 62 to 64, folidol was sprayed. (iii) *Kapas* yield. (iv) (a) 1960 - 64. (b) No. (v) N.A. (vi) Absence of rains from August 1960. Crop was affected by frost in 63 and 64. (vii) Error variances are heterogeneous.

#### 5. RESULTS :

60(159)

(i) 209 Kg/ha. (ii) 31.2 Kg/ha. (b) 24.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	201	214	216	216	211	204	214	206	210
V <sub>2</sub>	194	221	209	210	200	213	208	208	208
Mean	198	217	212	213	205	208	211	207	209
K <sub>0</sub>	204	220	210	216	211	207			
K <sub>1</sub>	191	214	215	211	199	210			
P <sub>0</sub>	197	211	209						
P <sub>1</sub>	192	210	202						
P <sub>2</sub>	204	229	225						

61(125)

- (i) 397 Kg/ha. (ii) (a) 76.8 Kg/ha. (b) 45.0 Kg/ha. (iii) Main effect of N alone is highly significant.  
 (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	322	434	475	386	411	434	420	401	410
V <sub>2</sub>	333	406	414	365	365	422	385	383	384
Mean	327	420	444	375	388	428	403	392	397
K <sub>0</sub>	332	431	445	367	398	444			
K <sub>1</sub>	323	409	444	384	379	413			
P <sub>0</sub>	305	424	399						
P <sub>1</sub>	330	430	404						
P <sub>2</sub>	346	407	531						

C.D. for N marginal means=46.8 Kg/ha.

62(192)

- (i) 197 Kg/ha. (ii) (a) 66.3 Kg/ha. (b) 31.1 Kg/ha. (iii) Main effect of K is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	203	158	212	203	168	202	183	199	191
V <sub>2</sub>	192	193	222	191	188	228	195	210	202
Mean	198	175	217	197	178	215	189	204	197
K <sub>0</sub>	181	175	211	191	167	208			
K <sub>1</sub>	215	175	223	203	188	222			
P <sub>0</sub>	193	183	214						
P <sub>1</sub>	193	168	172						
P <sub>2</sub>	207	175	265						

C.D. for K marginal means=15.0 Kg/ha.

63(194)

- (i) 652 Kg/ha. (ii) (a) 107.5 Kg/ha. (b) 89.4 Kg/ha. (iii) Main effect of N is highly significant.  
(iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	531	654	740	670	642	613	612	671	642
V <sub>2</sub>	537	702	748	631	693	663	657	669	662
Mean	534	678	744	651	668	638	634	670	652
K <sub>0</sub>	513	689	700	617	658	628			
K <sub>1</sub>	555	667	788	685	677	648			
P <sub>0</sub>	518	677	757						
P <sub>1</sub>	557	721	725						
P <sub>2</sub>	528	636	750						

C.D. for N marginal means=65.5 Kg/ha.

64(140)

- (i) 566 Kg/ha. (ii) (a) 154.8 Kg/ha. (b) 62.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
V <sub>1</sub>	509	608	556	576	505	593	551	564	558
V <sub>2</sub>	558	618	546	501	606	617	580	569	574
Mean	534	613	551	538	555	605	566	566	566
K <sub>0</sub>	552	604	541	515	556	626			
K <sub>1</sub>	515	623	561	561	554	584			
P <sub>0</sub>	493	564	557						
P <sub>1</sub>	529	607	529						
P <sub>2</sub>	579	669	567						

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Amreli.**

**Ref :- Gj. 62(54), 63(53), 64(28), 65(117).**

**Type :- 'C'.**

**Object :-** To study the effect of ploughing in winter on the yield of succeeding crop of Cotton.

#### 1. BASAL CONDITIONS :

- (i) (a) Nil for 65 (117) and Bajra-Jowar-Groundnut-Cotton for others. (b) Groundnut. (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65 (117); 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+5.6 Kg/ha. of N for others. (ii) Medium black. (iii) 17.7.1962; 11.7.1963; 1.7.1964 and 22.7.1965. (iv) (a) As per treatments. (b) Dibbling. (c) 6 Kg/ha. for 62 (54) and 63 (53); 12 Kg/ha. for 64 (28) and 65 (117). (d) 91 cm. x 15 cm. (e) 3 to 4 seeds/hill. (v) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62 (54), 63 (53) and 64 (28); 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65 (117). (vi) C.J.-73. (vii) Unirrigated. (viii) 3-5 interculturings+2-3 weedings. (ix) 29 cm for 62 (54); 56 cm. for 63 (53); 73 cm. for 64 (28); and 60.2 cm. for 65(117) (x) 14.11.1962 and 14.12.1962; 30.11.1963 and 7.1.1964; 9.12.1964; 15.1.1965 and 2.2.1965; 8.12.1965 and 23.12.1965.

## 2. TREATMENTS :

3 cultural treatments :  $T_1$ =Ploughing in winter (November) ;  $T_2$ =Ploughing in summer (May) and  $T_3$ =  
Only harrowing after the harvest of Groundnut and before sowing in Summer.  
(Harrowing after groundnut harvest is common to all treatments).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) 15.9 m. × 19.2 m. (iii) 4 for 62 (54) and 63(53); 8 for 64(28) and 65 (117) (iv) (a) 15.9 m. × 6.4 (b) 14.0 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of **Kapas**. (iv) (a) 1962 to 1965. (b) and (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

**1962(54)**

213 Kg/ha. (ii) 64.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of **Kapas** in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	203	288	149

**1963(53)**

(i) 500 Kg/ha. (ii) 76.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of **Kapas** in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	481	567	452

**1964(28)**

(i) 291 Kg/ha. (ii) 72.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of **Kapas** in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	263	297	314

**1965(117)**

(i) 328 Kg/ha. (ii) 44.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of **Kapas** in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	318	332	335

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(50), 65(126).**

**Site :- Trial-cum-Demons. Form, Bardoli.**

**Type :- 'C'.**

Object :- To find out the best time for sowing of Cotton in Bardoli conditions.

## 1. BASAL CONDITIONS :

(i) (a) Nil in 1964 ; Wheat-Cotton in 1965. (b) Jowar in 1964 ; Wheat in 1965. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  in 1964 ; 74.2 Kg/ha. of N+37.1 Kg/ha. of  $P_2O_5$ . (ii) Clay-loam for 1964 ; Black soil in 1965. (iii) As per treatments. (iv) (a) 1 harrowing in 1964 ; 2 ploughings and 2 harrowings in 1965. (b) Dibbling. (c) 7 Kg/ha. (d) 152 cm. × 61 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. in 1964,65 and 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  in 1964. (vi) Digvijay 2087 (late). (vii) Irrigated. (viii) 3 interculturings in 1964 and 2 weedings and 2 interculturings in 1965. (ix) 224 cm. in 1964 ; 106 cm. 1965. (x) 9.3.1965, 12.2.1966 and 1.3.1966.

## 2. TREATMENTS :

3 dates of sowing :  $D_1$ =2nd week of June.  $D_2$ =4th week of June and  $D_3$ =2nd week of July.  
Exact dates of sowing are 14.6.1964, 28.6.1964, 9.7.1964, 15.6.1965, 28.6.1965 and 11.7.1965.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) —. (iii) 8. (iv) (a) 15.2 m. × 9.1 m. both years. (b) 15.2 m. × 9.1 m. in 1964. 12.8 m. × 6.2 m. in 1965. (v) Nil in 1964 ; 122 cm. × 152 cm. in 1965. (vi) Yes.

## 4. GENERAL :

(i) Normal in 1964 ; Good in 1965. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1964 to 1965. (b) Nil. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

## 5. RESULTS :

64(50)

(i) 465 Kg/ha. (ii) 68.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of seed Cotton in Kg/ha.

Treatment	$D_1$	$D_2$	$D_3$
Av. yield	446	477	472

65(126)

(i) 939 Kg/ha. (ii) 256.9 Kg/ha. (iii) Treatments differences are not significant. (iv) Av. yield of Seed Cotton in Kg/ha.

Treatment	$D_1$	$D_2$	$D_3$
Av. yield	1030	1010	776

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 61(39), 62(187), 64(135), 65(69).**

**Site :- Dry Farming Res. Stn., Jamkhabalia.**

**Type :- 'C'.**

Object :—To study the effect of different interculturings on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut for 65(69), Jowar for others. (c) Nil for 61(39), 62(184), 12.35 C.L/ha. of F.Y.M. for 64(135) and 11.21 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 65(69) (ii) Medium black soil. (iii) 7.7.61, 22.7.62, 14.7.64, 2.8.65. (iv) (a) 1-2 ploughings and harrowings. (b) Drilling. (c) 17 Kg/ha. (d) 91 cm. row to row. (e) N.A. (v) N.A. for 61(39), 12.35 C.L/ha. of F.Y.M. for others. (vi) Kalyan. (vii) Unirrigated. (viii) As per treatments. (ix) N.A. for 61(39), 54 cm. for 62(187), 48 cm. for 64(135) and 28.9 cm. for 65(69). (x) 1.4.1962, [16.3.1963, 31.3.1963], [6.3.1965, 4.4.1965], '0.3.1966.

## 2. TREATMENTS :

4 intercultural treatments :  $T_0=0$ ,  $T_1=1$  interculturing 6 weeks after sowing.  $T_2=2$  interculturings 4 and 6 weeks after sowing.  $T_3=3$  interculturings 4, 6 and 8 weeks after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 cm × 7.2 cm. (b) 7.3 cm × 5.5 cm. (v) 91 cm × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of shoot borers and Red Cotton bugs for 61(39), attack of root rot disease for 62 (187), control measure N.A., Nil for others. (iii) Yield of cotton. (iv) (a) 1959 to 1965 (experiment failed in 1960, not conducted in 1963. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous, interaction Treatments × years is absent.

## 5. RESULTS :

1961(39)

(i) 403 Kg/ha. (ii) 129.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of Kapas in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	391	377	415	428

**62(187)**

(i) 283 Kg/ha. (ii) 89.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	294	289	253	298

**64 (135)**

(i) 303 Kg/ha. (ii) 87.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	357	327	267	259

**65(69)**

(i) 405 Kg/ha. (ii) 54.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	343	447	436	394

C.D. = 94.3 Kg/ha.

**Crop :- Cotton (*Kharif*).**

**Ref :- Gj. 61(37), 62(186), 64(136).**

**Site :- Dry Farming Res. Stn., Jamkhambalia.**

**Type :- 'C'.**

Object :—To study the effect of different spacings and seed rate on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut, *Jowar* and Gram. (c) Nil during 1961, 1962 and 12.4 C.L/ha. of F.Y.M. in 1964. (ii) Shallow in 1961, Medium black soil in 1962 and 1964. (iii) 8.7.1961, 18.7.1962, and 15.7.1964. (iv) (a) 1 ploughing and 1 harrowing in 1961 and 1964, 2 harrowings in 1962. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil in 1961, 12.4 C.L/ha. of F.Y.M. in 1962 and 1964. (vi) *Kalyan* (Medium). (vii) Unirrigated. (viii) 1 interculturing, 2 weedings, 2 interculturings. (ix) N.A., 55 cm., 48 cm. (x) 28, 30.3.1962, 13, 25.3.1963, 2, 31.3.1965.

**2. TREATMENTS :****Main-plot treatments :**

3 spacings between rows : S<sub>1</sub>=46, S<sub>2</sub>=69 and S<sub>3</sub>=91 cm.

**Sub-plot treatments :**

3 seed rates, R<sub>1</sub>=11, R<sub>2</sub>=17 and R<sub>3</sub>=22 Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 13.7 m. × 9.1 m. (b) 11.9 m. × 7.3 m. in 1961, 11.0 m. × 7.3 m. in 1962 and 1964. (v) 91 m. × 91 m. in 1961, 137 cm. × 91 cm. in 1962 and 1964. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Shoot borer attack in 1961, attack of root rot in 1962 and Nil in 1964. (iii) Yield of *Kapas*. (iv) (a) 1959 contd. (treatments modified in 1965, expt. no. 65(70)). (b) No. (c) Nil. (v) Nil. (vi) Scanty rains during 1964. (vii) Experiment conducted in 1960 failed, experiment not conducted in 1963. Errors (b) is heterogeneous.



## 5. RESULTS :

61(37)

(i) 328 Kg/ha. (ii) (a) 121.7 Kg/ha. (b) 132.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	389	352	306	349
R <sub>2</sub>	296	278	315	296
R <sub>3</sub>	347	324	345	339
Mean	344	318	322	328

62(186)

(i) 500 Kg/ha. (ii) (a) 175.1 Kg/ha. (b) 163.9 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	501	347	606	485
R <sub>2</sub>	570	442	546	519
R <sub>3</sub>	578	342	569	496
Mean	550	377	574	500

C.D. for S marginal means = 98.0 Kg/ha.

64(136)

(i) 519 Kg/ha. (ii) (a) 127.6 Kg/ha. (b) 90.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	545	474	608	542
R <sub>2</sub>	494	480	548	507
R <sub>3</sub>	477	478	565	507
Mean	505	477	574	519

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(70).**

**Site :- Dry Farming Res. Stn., Jamkhambalia.**

**Type -- 'C'.**

**Object :-** To study the effect of different spacings and seed rates on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 3.8.1965. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 12.4 C.L. of F.Y.M/ha. (vi) *Kalyan*. (vii) Unirrigated. (viii) 4 interculturings. (ix) 29 cm. (x) 22.1.66 ; 14.3.66.

## 2. TREATMENTS :

## Main-plot treatments :

3 spacings between rows :  $S_1=45.7$ ,  $S_2=68.7$  and  $S_3=91.5$  cm.

## Sub-plot treatments :

3 seed rates :  $R_1=9.9$ ,  $R_2=12.4$  and  $R_3=14.8$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 13.7 m.  $\times$  9.1 m. (b) 11.0 m.  $\times$  7.3 m. (v) 137 m.  $\times$  92 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1959 to 1965 (modified in 1965). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Results of earlier years are presented separately.

## 5. RESULTS :

(i) 586 Kg/ha. (ii) (a) 117.7 Kg/ha. (b) 166.1 Kg/ha. (iii) None of the effects significant. (iv) Av. yield *Kapas* in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	617	634	510	587
$R_2$	482	586	604	557
$R_3$	565	681	600	615
Mean	555	634	571	586

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(163), 64(96), 65(236).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'C'.**

Object :—To find out the best time of sowing for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 63(163) and 64(96), Cotton-Groundnut-Wheat for 65(236). (b) Wheat for 63(163), Groundnut for 64(96), Nil for 65(236). (c) Nil. (ii) Medium black. (iii) As per treatments. (iv) (a) 1 ploughing and 2 harrowings. (b) Dibbling. (c) N.A. (d) 152 cm  $\times$  61 cm. (e) 1-2 plants/hill. (v) 12.4 C.L/ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (vi) Digvijay. (vii) Irrigated. (viii) 3-5 interculturing. (ix) 124 cm. for 63(163), 191 cm. for 64(96), 99 cm. for 65(236). (x) [26.2.1964, 20.3.1964, 11.4.1964], 15.2.1965, 28.2.1965, 20.3.1965], [10.1.1966, 25.1.1966, 16.2.1966].

## 2. TREATMENTS :

3 sowing times :  $T_1$ =Sowing in 2nd week of June,  $T_2$ =Sowing in 4th week of June,  $T_3$ =Sowing in 2nd week of July.

Date of Sowings : For 63(163) : 13.6.1963, 25.6.1963 and 12.7.1963. For 64(96) : 13.6.1964, 26.6.1964 and 13.7.1964. For 65(236) : 15.6.1965, 30.6.1965 and 13.7.1965.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 3. (iv) (a) 12.2 m.  $\times$  7.3 m. (b) 9.1 m.  $\times$  6.1 m. (v) 153 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of pink boll and endrin was applied as a control measure for 63(163), Nil for others. (iii) Yield of *Kapas*. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined are analysis given under 5. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 955 Kg/ha. (ii) 240.9 Kg/ha. (4 d.f. made up of interaction of Treatments and years). (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	1031	976	857

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(33), 61(138), 62(165).**

**Site :- Trial-cum-Demons. Farm, Kholwad. Type :- 'C'.**

Object :—To find out the suitable sowing dates for Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Cotton, Jowar. (c) 14.8 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>; 44.8 Kg/ha. of N ; 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) As per treatments. (iv) (a) 3 harrowings ; 4 harrowings ; 2 ploughings and 2 harrowings. (b) Dibbling. (c) N.A. ; 6 Kg/ha ; N.A. (d) 152 cm.×61 cm. (e) 2 to 3 ; N.A. ; 1. (v) 22.4 Kg/ha. of N as A/S applied on 14.9.1960 ; 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N ; 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N. (vi) 2087. (vii) Irrigated. (viii) 6 interculturings, 3 interculturings ; 5 interculturings. (ix) 96 cm ; 145 cm. ; 84 cm. (x) 19.1.1961, 7.2.1961, 22.2.1961, 17.3.1961 ; 2.3.1962, 12.3.1962, 24.3.1962, 31.3.1962, 7.4.1962 ; 11.2.1963, 9.3.1963.

2. TREATMENTS :

6 dates of sowings : D<sub>1</sub>=Sowing in dry, D<sub>2</sub>=Last week of June (Normal), D<sub>3</sub>=10th July, D<sub>4</sub>=20th July, D<sub>5</sub>=30th July and D<sub>6</sub>=10th August.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.2 m.×7.3 m. (b) 9.1 m.×6.1 m. (v) 152 cm.×61 cm. (vi) Yes.

4. GENERAL :

(i) Normal, Normal, Good. (ii) Nil, lightly attack of woolly mites, attack of pink boll worms. (iii) Seed cotton yield. (iv) (a) 1960—contd. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Treatments are modified from the year 1963. Error variances are heterogeneous, and interaction is present.

5. RESULTS :

(i) 750 Kg/ha. (ii) 677.9 Kg/ha. based on 10 d.f. composed of Treatments×years interaction. (iii) Treatments differences are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>
Av. yield	1255	1124	975	485	390	271

C.D. =616.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(100), 61(74), 62(99), 63(104), 64(36).**

**Site :- Dry. Farming Res. Stn., Rajkot. Type :- 'C'.**

Object :—To study the effect of interculturing on the yield of Cotton.

1. BASAL CONDITIONS :

(i) (a) Groundnut—*Bajra*—*Jowar* or Cotton for 60(100) and 61(74) and Groundnut—Cotton for others. (b) *Bajra* for 60(100) and 61(74) ; N.A. for others. (c) Nil for 60(100) and 61(74) ; 12.4 CL/ha. of F.Y.M. for others. (ii) Medium black. (iii) 25.6.1960, 10.7.1961 ; 20.7.1962 ; 11.7.1963 and 4.7.1964. (iv) (a) 1 ploughing and 2-3 harrowings. (b) Drilling. (c) 11 Kg/ha. for 60(100) and 61(74) and 13 Kg/ha. for others. (d) 91 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 60(100) and 61(74) ; N.A. for others. (vi) *Kalyan*. (vii) Unirrigated. (viii) 2 weedings and interculturings as per treatments. (ix) 47 cm. for 60(100), 56 cm. for 61(74) ; 40 cm. for 62(99) ; 50 cm. for 63(104) and 76 cm. for 64(36). (x) [6.3.61 and 25.3.61], [23.2.62 and 14.3.1962], [10.1.1963], [15.3.1964] and [22.1.1965 and 23.2.1965].

## 2. TREATMENTS :

4 Intercultural treatments:  $T_0$  = Control (No harrowing),  $T_1$  = 1 harrowing 6 weeks after sowing.  $T_2$  = 2 harrowings 4 and 6 weeks after sowing and  $T_3$  = 3 harrowings 4, 6 and 8 weeks after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) 27.4 m.  $\times$  9.1 m. (iii) 6. (iv) (a) 9.1 m.  $\times$  7.3 m. (b) 7.3 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal for 69(100), 61(74) and 62(99). Normal for 63(104) and good for 64(36). (ii) Nil for 60(100), 61(74) and 63(104). Attack of jassides, folidol spray as control measure for 62(99) and 64(36). (iii) Yield of *Kapas*. (iv) (a) 1960—1964. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are homogeneous. Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 306 Kg/ha. (ii) 70.1 Kg/ha. (12 d.f. made up of interaction of Treatments  $\times$  years). (iii) Treatment differences are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$
Av. yield	259	290	321	353

C.D. = 39.4 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(99), 61(83), 62(98), 63(103), 64(35).**

**Site :- Dry Farming Res. Stn., Rajkot. Type :- 'C'.**

Object :—To find out a suitable spacing and seed rate for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut, *Bajra*—*Jowar* or Cotton in 1960, 1961, Groundnut or *Bajra*—Cotton in 1962 to 1964. (b) *Bajra* in 1960, 1961, 1963 and 1964 Groundnut in 1962. (c) Nil. (ii) Medium black. (iii) 28.6.60, 10.11.7.1961, 19.7.1962, 11.7.1963 and 5.7.1964. (iv) (a) 1 ploughing and 2 to 3 harrowings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. in 1960, 1961, Nil in 1962 to 1964. (vi) C.J. 73 (early) in 1960, 1961, Kalyan in 1962 to 1964. (vii) Unirrigated. (viii) 3 weedings in 1960, 1962 to 1964; 2 weedings in 1961. (ix) 47 cm.; 56 cm. 40 cm.; 50 cm. and 76 cm. (x) N.A.; 10.12.61 to 26.2.62, 4.1.1963; 15.3.1964 and 28.1.1965 to 26.2.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

3 spacings between rows :  $S_1$  = 46,  $S_2$  = 69 and  $S_3$  = 92 cm.

**Sub-plot treatments :**

3 seed rates :  $R_1$  = 11,  $R_2$  = 17 and  $R_3$  = 22 Kg/ha.

## 3. DESIGN :

(i) Split—plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) 41.2 m.  $\times$  27.4 m. (iii) 6 (iv) (a) 13.7 m.  $\times$  9.1 m. (b) 11.0 m.  $\times$  7.3 m. (v) 137 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal in 1960, 1961, not satisfactory in 1962, Normal in 1963, Good in 1964. (ii) Nil in 1960, 1961, attack of Jassides in 1962 to 1964, Folidol sprayed in 1964. (iii) *Kapas* yield. (iv) (a) 1962—1964. (b) No. (c) Nil. (v) Jamkhambalia. (vi) Rainfall was below normal in 1960, complete break of rain from 27th July to 26th August 1962, Nil in 1963. (vii) Both the error variances are heterogeneous.

## 5. RESULTS :

**60(99)**

(i) 149 Kg/ha. (ii) (a) 32.0 Kg/ha. (b) 31.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	130	130	168	143
R <sub>2</sub>	134	159	167	153
R <sub>3</sub>	160	133	156	150
Mean	141	141	164	149

61(83)

(i) 288 Kg/ha. (ii) (a) 82.0 Kg/ha. (b) 50.3 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	259	308	313	293
R <sub>2</sub>	251	289	327	289
R <sub>3</sub>	265	289	289	281
Mean	258	295	310	288

C.D. for S marginal means = 60.9 Kg/ha.

62(98)

(i) 118 Kg/ha. (ii) (a) 50.6 Kg/ha. (b) 51.7 Kg/ha. (iii) Main effect of R alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	166	168	141	158
R <sub>2</sub>	117	105	117	113
R <sub>3</sub>	110	82	57	83
Mean	131	118	105	118

C.D. for R marginal means = 35.1 Kg/ha.

63(103)

(i) 482 Kg/ha. (ii) (a) 102.3 Kg/ha. (b) 57.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* is Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	491	510	500	500
R <sub>2</sub>	501	427	498	475
R <sub>3</sub>	478	441	497	472
Mean	490	459	498	482

64(35)

(i) 526 Kg/ha. (ii) (a) 84.0 Kg/ha. (b) 62.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	545	548	547	547
R <sub>2</sub>	452	540	554	515
R <sub>3</sub>	501	517	530	516
Mean	499	535	544	526

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 65(258).**  
**Type :- 'C'.**

Object :—To find out the best time of sowing for Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton—*Jowar*. (b) *Jowar*. (c) 22.4 Kg/ha. of N. (ii) Black soil. (iii) As per treatments. (iv) (a) 2 harrowings. (b) Dibbling. (c) N.A. (d) 153 cm. × 61 cm. (e) 1-2 seeds/hill. (v) 12.4 CL/ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) Irrigated. (viii) 5 interculturings. (ix) 89 cm. (x) Pickings : April 1966 onwards.

2. TREATMENTS :

3 sowing dates : D<sub>1</sub>=22.6.1965, D<sub>2</sub>=6.7.1965 and D<sub>3</sub>=20.7.1965.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 15.2 m. × 9.1 m. (b) 12.8 m. × 6.1 m. (v) 122 cm. × 152 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Attack of aphids, jassides and boll worm. Folidol applied 5 times. (iii) Yield of *kapas*. (iv) (a) 1965—confd. (b) No. (c) Nil. (v) N.A. (vi) Absence of rains in September. (vii) Nil.

5. RESULTS :

(i) 396 Kg/ha. (ii) 172.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>
Av. yield	403	431	355

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 63(150).**  
**Type :- 'C'.**

Object :—To find out the best time of sowing for Cotton.

1. BASAL CONDITIONS :

(i) (a) Cotton—*Jowar*. (b) Wheat. (c) N.A. (ii) Deep black soil. (iii) As per treatments. (iv) (a) 2 harrowings. (b) Dibbling. (c) 6 Kg/ha. (d) 152 cm. × 61 cm. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. + 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) 2087. (vii) Irrigated. (viii) 3 interculturings and 3 weedings. (ix) 120 cm. (x) 13.3.64.

## 2. TREATMENTS :

3 dates of sowing :  $D_1=8.6.1963$ ,  $D_2=22.6.1963$  and  $D_3=9.7.1963$ .

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 15.2 m.  $\times$  9.1 m. (b) 12.8 m.  $\times$  6.1 m. (v) 122 cm.  $\times$  152 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. Gamaxine 5% and 10%, and sevin were dusted as precautionary measure. (iii) Yield of *Kapas*. (iv) (a) 1963. (b) No. (c) Nil. (v) N.A. (vi) Severe cold in Feb., 64 and 36.5 mm. rain on 26th Nov. 63. (vii) Nil.

## 5. RESULTS :

(i) 1020 Kg/ha. (ii) 174.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$D_1$	$D_2$	$D_3$
Av. yield	968	1069	1023

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 64(74).**  
**Type :- 'C'.**

Object :—To study the effect of dibbling V/S transplanting of Cotton with different sowing periods.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) As per treatments. (iv) (a) 1 harrowing. (b) As per treatments. (c) 7 Kg/ha. (d) 122 cm.  $\times$  61 cm. (e) 1. (v) 67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ . (vi) ISC-67 (late). (vii) Irrigated. (viii) 3 interculturings and 6 weedings. (ix) 213 cm. (x) 7.4.65 to 22.4.65.

## 2. TREATMENTS :

## Main-plot treatments :

2 dates of sowing :  $D_1=17.6.1964$  and  $D_2=23.7.1964$ .

## Sub-plot treatments :

5 methods of sowings :  $M_1$ =Raising seedling in polythene bags without compost,  $M_2$ =Raising seedlings in polythene bags with compost,  $M_3$ =Dibbling seeds in field without spot application of compost,  $M_4$ =Dibbling seeds in field with spot application of compost and  $M_5$ =Raising seedlings in bed with compost @ 12.4 C.L./ha. of F.Y.M. and transplanting after 3-4 weeks.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 6.7 m.  $\times$  7.3 m. (b) 4.3m.  $\times$  4.9 m. (v) 122 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Heavy attack of bollworms, aphids, jassides. Approx. 20% damage. Endrin and folidol spraying dusting of sevin. (iii) Seed cotton yield. (iv) (a) 1964-contd. (b) No. (c) Nil. (v) N.A. (vi) Heavy rains. (vii) Nil.

## 5. RESULTS :

(i) 900 Kg/ha. (ii) (a) 92.0 Kg/ha. (b) 210.5 Kg/ha. (iii) Main effects of D and M are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	Mean
$D_1$	1051	1206	1049	905	769	996
$D_2$	978	824	895	875	450	804
Mean	1014	1015	972	890	609	900

C.D. for D marginal means=130.9 Kg/ha.

C.D. for M marginal means=307.2 Kg/ha.

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 64(76).**  
**Type :- 'C'.**

Object :—To study the effect of dibbling V/S. transplanting of Cotton with different sowing periods.

1. **BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) As per treatments. (iv) (a) 1 harrowing. (b) As per treatments. (c) 6 Kg/ha. (d) 152 cm. × 61 cm. (e) 1 plant/hill. (v) 67.2 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) Irrigated. (viii) 3 interculturings and 6 weedings. (ix) 213 cm. (x) 25.3.65 and 16.4.65.

2. **TREATMENTS :**

**Main-plot treatments**

2 dates of sowing : D<sub>1</sub>=17.6.64 and D<sub>2</sub>=23.7.64.

**Sub-plot treatments**

5 methods of sowing : M<sub>1</sub>=Raising seedlings in polythene bags with out compost, M<sub>2</sub>=Raising seedlings in polythene bags with compost, M<sub>3</sub>=Dibbling seeds in field without spot application of compost, M<sub>4</sub>=Dibbling seeds in field with spot application of compost @ 12.4 C.L./ha. of F.Y.M. and M<sub>5</sub>=Raising seedlings in bed with compost @ 12.4 C.L./ha. of F.Y.M. and transplanting after 3-4 weeks.

3. **DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication, 5 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.6 m. × 6.7 m. (b) 4.6 m. × 4.3 m. (v) 152 cm. × 122 cm. (vi) Yes.

4. **GENERAL :**

(i) Normal. (ii) Attack of boll worms, wooly mites, endrin and folidol sprayed. (iii) Seed cotton yield. (iv) (a) 1964-contd. (b) No. (c) Nil. (v) N.A. (vi) Heavy rains through out monsoon. (vii) Nil.

5. **RESULTS :**

(i) 698 Kg/ha. (ii) (a) 132.4 Kg/ha. (b) 114.8 Kg/ha. (iii) Main effect of M is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	Mean
D <sub>1</sub>	769	638	808	769	568	710
D <sub>2</sub>	671	820	765	684	495	687
Mean	720	729	786	726	531	698

C.D. for M maginal means=167.5 Kg/ha.

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 65(256).**  
**Type :- 'C'.**

Object :—To find out the best method and suitable time of sowing for Cotton.

1. **BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) 44.8 Kg/ha. of N. (ii) Black soil. (iii) As per treatments. (iv) (a) 2 harrowings. (b) As per treatments. (c) N.A. (d) 153 cm. × 61 cm. (e) 1 plant/hill. (v) 67.3 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) Irrigated. (viii) 6 interculturings. (ix) 89 cm. (x) 4.3.66 and onwards.



## 2. TREATMENTS:

**Main-plot treatments :**2 dates of sowing :  $T_1=22.6.65$  and  $T_2=19.7.65$ .**Sub-plot treatments**

All combinations of (1) and (2)

(1) 2 methods of sowing :  $M_1$ =Raising seedlings in polythene bag and  $M_2$ =Dibbling seeds in field.(2) 2 application of compost :  $C_0$ =Without compost and  $C_1$ =With compost.

## 3 DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) 6.7 m.  $\times$  7.6 m. (v) 4.3 m.  $\times$  4.6 m. (vi) 122 cm.  $\times$  153 cm. (vii) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids, jassides and bollworm, folidol applied 6 times as control measure. (iii) Yield of *Kapas*. (iv) (a) 1965. (b) No. (c) Nil. (v) N.A. (vi) Absence of rains in September. (vii) Nil.

## 5. RESULTS :

(i) 866 Kg/ha. (ii) (a) 222.7 Kg/ha. (b) 219.3 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$M_1$	$M_2$	$C_0$	$C_1$	Mean
$T_1$	1068	1083	984	1167	1076
$T_2$	566	748	643	671	657
Mean	817	915	814	919	866
$C_0$	753	874			
$C_1$	881	957			

C.D. for T marginal means=276.5 Kg/ha.

**Crop :- Cotton (Kharif).****Site :- Agri. Res. Stn., Surat.****Ref :- Gj. 65(255).****Type :- 'C'.**

Object :—To find out the best time and method of sowing for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) 44.8 Kg/ha. of N. (ii) Black soil. (iii) As per treatments. (iv) (a) 2 harrowings. (b) As per treatments. (c) N.A. (d) 122 cm  $\times$  61 cm. (e) 1 plant/hill. (v) 67.3 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$ . (vi) Gujarat-67. (vii) Irrigated. (viii) 6 interculturings. (ix) 89 cm. (x) 8.4.66 and onwards.

## 2. TREATMENTS :

**Main-plot treatments :**2 dates of sowing :  $D_1=23.6.65$  and  $D_2=19.7.65$ .**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 methods of sowing :  $M_1$ =Raising seedlings in polythene bags and  $M_2$ =Dibbling seeds in the field.(2) 2 levels of compost :  $C_0$ =No compost and  $C_1$ =Compost.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) 6.7 m.  $\times$  7.3 m. (v) 4.3 m.  $\times$  4.9 m. (vi) 122 cm.  $\times$  122 cm. (vii) Yes.

## 4. GENERAL :

(i) Normal. (ii) Heavy attack of aphids, jassids and bollworms. folidol applied 6 times. (iii) Yield of *Kapas*. (iv) (a) 1964. (b) No. (c) Nil. (v) N.A. (vi) Absence of rains in September. (vii) Nil.

## 5. RESULTS :

(i) 261 Kg/ha. (ii) (a) and (b) 97.9 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	C <sub>0</sub>	C <sub>1</sub>	Mean
D <sub>1</sub>	360	328	315	372	344
D <sub>2</sub>	156	201	174	182	178
Mean	258	264	245	277	261
C <sub>0</sub>	245	245			
C <sub>1</sub>	271	284			

C.D. for D marginal means = 121.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref. :- Gj. 64(297).**

**Site :- Soil. Cons. Res. Demons. and Trg. Centre, Vasad. Type :- 'C'.**

Object :- To study the effect of various tillage practices on crop seeds from slopy fields of ravines.

## 1. BASAL CONDITIONS :

(i) (a) Kodratur-Cotton. (b) Kodra and Tur. (c) Nil. (ii) Sandy to clay loam soil. (iii) 10.7.64. (iv) (a) As per treatments. (b) Dibbling. (c) N.A. (d) 91 cm. × 30 cm. (e) 1-2 plants/hill. (v) 12.5 C.L./ha. of F.Y.M. + 60 Kg/ha. of N (N as A/S+G.N.C in 50 : 50). (vi) 134-CO<sub>2</sub>-M. (vii) Unirrigated. (viii) 4 weeding, and 2 interculturings. (ix) Nil. (x) 5.12.64 to 8.2.65.

## 2. TREATMENTS :

4 cultural treatments : T<sub>1</sub>=Shallow cultivation : 2 ploughings (including cross wise) and harrowing with deshi plough ; T<sub>2</sub>=Deep cultivation : one ploughing with turuwrest plough followed by one harrowing to prepare seed bed ; T<sub>3</sub>=Deep cultivation : one ploughing with mouldboard plough (i.e. ridge and furrow) and planking and T<sub>4</sub>=Harrowing twice with blade harrow to be followed by two plankings.

## 3. DESIGN :

(i) L. Sq. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 20.7 m. × 11.7 m. (b) 18.9 m. × 9.9 m. (v) 90 cm. × 90 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids, jassides and borers. Endrex and B.H.C. sprayed twice. (iii) Yield of *Kapas*. (iv) (a) 1963. (b) Yes. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 2721 Kg/ha. (ii) 382.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	3152	2559	2535	2636

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(206), 64(169), 65(88).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'C'.**

Object :- To study the effect of different sowing dates and spacings on Cotton with and without F.Y.M.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) As per treatments. (iv) (a) 4 harrowings and 2 harrowings in 1964 and 1965 respectively. (b) Dibbling. (c) —. (d) As per treatments. (e) 1 or 2 seedling/dibble. (v) One experiment without F.Y.M. and the other set with 12.4 C.L./ha. of F.Y.M. (vi) Kalyan. (vii) Unirrigated. (viii) 3 interculturings both years. (ix) N.A. ; 47 cm. and 39 cm. (x) 4, 5.3.1964 19.2.1965 to 1.4.1965 and 9.2.1966 to 22.2.1966.

## 2. TREATMENTS :

## Main-plot treatments :

4 spacings :  $S_1=46$  cm.  $\times$  23 cm.,  $S_2=61$  cm.  $\times$  23 cm.,  $S_3=76$  cm.  $\times$  23 cm. and  $S_4=91$  cm.  $\times$  23 cm.

## Sub-plot treatments :

6 dates of sowings :  $D_1=1$ st week of July,  $D_2=3$ rd week of July,  $D_3=1$ st week of August,  $D_4=3$ rd week of August,  $D_5=1$ st week of September and  $D_6=3$ rd week of September.

Exact dates are for 1964 ; 6.7.1964 ; 21.7.1964 ; 7.8.1964 ; 21.8.1964 ; 8.9.1964 and 21.9.1964 and for 1965 are 9.7.1965 ; 20.7.1965 ; 3.8.1965, 21.8.1965 ; 10.9.1965 and 23.9.1965. [Two experiments with the above treatments one with a basal dressing of F.Y.M. and the other without F.Y.M were conducted].

## 3. DESIGN :

(i) Split-plot design. (ii) (a) 4 main-plots/replication ; 6 sub-plots/main-plot. (b) Nil. (iii) 3 for each set. (iv) (a) for  $S_1=10.1$  m.  $\times$  5.5 m. ;  $S_2=10.4$  m.  $\times$  5.5 m. ;  $S_3=10.7$  m.  $\times$  5.5 m. ;  $S_4=11.0$  m.  $\times$  5.5 m. (b) 9.1 m.  $\times$  4.6 m. (v) For  $S_1=92$  cm.  $\times$  92 cm ;  $S_2=122$  cm.  $\times$  92 cm. ; 152 cm.  $\times$  92 cm. and 182 cm.  $\times$  92 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Sub-plot treatments  $D_5$  and  $D_6$  failed completely during 1964 and 1965. Experiment for 1963 kept separately as it is. Error variances for both sets are homogeneous.

## 5. RESULTS :

## With F.Y.M.

(i) 547 Kg/ha. (ii) (a) 160.0 Kg/ha. (based on 15 d.f. composed of error (a) and Treatments  $\times$  years interaction). (b) 186.3 Kg/ha. (based on 92 d.f. composed of error (b) + years  $\times$  one and two factors interaction) (iii) Main effect of D alone significant. (iv) Av. yield of seed cotton in Kg/ha.

	$D_1$	$D_2$	$D_3$	$D_4$	Mean
$S_1$	758	698	434	501	598
$S_2$	718	639	500	429	572
$S_3$	752	535	414	313	504
$S_4$	672	568	442	381	516
Mean	725	610	448	406	547

C.D. for D marginal means = 107.0 Kg/ha.

## Without F.Y.M.

(i) 487 Kg/ha. (ii) (a) 94.0 based on 15 d.f. composed of error (a) and Treatments  $\times$  years interaction. (b) 108.0 Kg/ha. based on 92 d.f. composed of error. (b) and years  $\times$  one and two factors interaction. (iii) Main effect of D alone is highly significant. (iv) Av. yield of seed cotton in Kg/ha.

	$D_1$	$D_2$	$D_3$	$D_4$	Mean
$S_1$	620	566	368	402	489
$S_2$	692	670	478	323	541
$S_3$	712	517	450	281	490
$S_4$	558	437	416	294	426
Mean	646	548	428	325	487

C.D. for D marginal means = 62.1 Kg/ha.

**With F.Y.M.**

- (i) 344 Kg/ha. (ii) (a) 138.0 Kg/ha. (b) 85.2 Kg/ha. (iii) Main effect of D alone is highly significant. (iv) (Av. yield of *kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	Mean
S <sub>1</sub>	648	642	422	225	104	29	345
S <sub>2</sub>	751	615	684	242	72	36	400
S <sub>3</sub>	626	618	536	128	92	50	342
S <sub>4</sub>	556	592	395	57	68	58	288
Mean	645	617	509	163	84	43	828

C.D. for D marginal means=70.3 Kg/ha.

**Without F.Y.M.**

- (i) 305 Kg/ha. (ii) (a) 54.4 Kg/ha. (b) 113.1 Kg/ha. (iii) Main effects of S and D are highly significant. Interaction S×D is significant. (iv. yield of *kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	Man
S <sub>1</sub>	483	654	381	131	39	32	287
S <sub>2</sub>	808	787	647	120	40	20	404
S <sub>3</sub>	626	361	432	45	55	55	262
S <sub>4</sub>	530	462	458	59	61	35	267
Mean	612	566	479	89	49	35	959

C.D. for S marginal means =44.4 Kg/ha.

C.D. for D marginal means =93.3 Kg/ha.

C.D. for D means at the same level of S=186.6 Kg/ha.

C.D. for S means at the same level of D=175.9 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(56), 61(141), 62(136), 63(152).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'CV'.**

Object :-To find out the suitable period for sowing of different varieties of Cotton.

**1. BASAL CONDITIONS :**

- (i) (a) Cotton-Jowar. (b) Jowar. (c) Nil for 60(56) and 63(152); 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 1961(141), 63(152). (ii) Deep black. (iii) As per treatments. (iv) (a) N.A.; 2 harrowings; 1 harrowing; 2 harrowings. (b) Dibbling. (c) 6 Kg/ha. (d) 152 cm.×61 cm. (e) 1 for 1962(36), N.A. for others. (v) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+44.8 Kg/ha. of N. (vi) As per treatments. (vii) Un-irrigated. (viii) 4 interculturations, 5 weedings and 1 thinning; 3 interculturations; 5 interculturations; 2 interculturations. (ix) 87 cm.; 122 cm.; 62 cm.; 120 cm. (x) 27.2.1961 and 11.4.1961; 17.4.1962; 26.2.1963; 26.2.1964.

**2. TREATMENTS :****Main-plot treatments :**

3 varieties : V<sub>1</sub>=115 cotton, V<sub>2</sub>=Suyog and V<sub>3</sub>=2087 vijalpa.

**Sub-plot treatments :**

4 dates of sowing : D<sub>1</sub>=25th June, D<sub>2</sub>=5th July, D<sub>3</sub>=15th July and D<sub>4</sub>=25 July each year.

**3. DESIGN :**

- (i) Split-plot. (ii) (a) 3 main plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12.2 m.×9.1 m.; 12.2 m.×9.1 m.; 9.8 m.×7.6 m.; 12.2 m.×9.1 m. (b) 8.5 m.×6.1 m.; 9.8 m.×6.1 m.; 8.5 m.×4.6 m.; 9.8 m.×6.1 m. (v) 183 cm.×152 cm.; 122 cm.×152 cm.; 61 cm.×152 cm.; 122 cm.×152 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory during 1961. Normal during other years. (ii) Slight attack of boll worms ; flight attack of bollworms and wooly mites during 1961 and 1962 ; light attack of boll worms in initial stage. (iii) Kapas yield. (iv) (a) 1960 to 1964. (b) No. (c) Nil. (v) N.A. (vi) Due to continuous rains in July and August the growth was hampered during 1961. (vii) Sub-plot error variances are heterogeneous.

## 5. RESULTS :

## 1960(50)

(i) 583 Kg/ha. (ii) (a) 107.2 Kg/ha. (b) 72.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* is Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	628	541	576	618	591
V <sub>2</sub>	575	538	560	587	565
V <sub>3</sub>	626	670	547	524	592
Mean	610	583	561	576	583

## 1961(141)

(i) 402 Kg/ha. (ii) (a) 137.3 Kg/ha. (b) 70.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	377	478	362	438	414
V <sub>2</sub>	388	439	362	362	388
V <sub>3</sub>	328	385	439	469	405
Mean	364	434	388	423	402

## 1962(136)

(i) 783 Kg/ha. (ii) (a) 180.4 Kg/ha. (b) 156.6 Kg/ha. (iii) Main effect of D is highly significant, and interaction V × D is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	1193	946	691	241	768
V <sub>2</sub>	949	751	875	410	746
V <sub>3</sub>	1096	969	957	323	836
Mean	1079	889	841	325	783

C.D. for D marginal means = 131.1 Kg/ha.  
 C.D. for two D means at the same level of V = 227.1 Kg/ha.  
 C.D. for two V means at the same level of D = 250.3 Kg/ha.

## 1963(152)

(i) 728 Kg/ha. (ii) (a) 281.9 Kg/ha. (b) 142.5 Kg/ha. (iii) Main effect of D is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	896	829	600	522	712
V <sub>2</sub>	878	870	679	732	790
V <sub>3</sub>	880	729	506	618	683
Mean	885	809	595	624	728

C.D. for D marginal means=119.4 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(16).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'CM'.**

**Object :-**To find out the optimum spacing and manurial dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) N.A. ; Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. (iii) Medium black. (iii) 29.6 1960.  
(iv) (a) 1 harrowing during 1960. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1. (v) Nil.  
(vi) C.J. 73. (vii) Unirrigated. (viii) 3 interculturings. (ix) 33 cm. (x) 15.10.1960 to 23.11.1960 ;  
22.12.1961.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 3 row spacings : R<sub>1</sub>=46, R<sub>2</sub>=69 and R<sub>3</sub>=91 cm.

(2) 2 plant spacings : S<sub>1</sub>=15 and S<sub>2</sub>=23 cm.

**Sub-plot treatments :**

3 manurial doses : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and  
M<sub>2</sub>=2 M.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 6 main-plots/replication and 3 sub-plots/main plot. (b) N.A. (iii) 3. (iv) (a)  
9.1 m. × 7.3 m. (b) 8.2 m. × 5.5 m. (v) 46 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal during 1960. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1958 to 1961. (b) No. (c) Nil.  
(v) N.A. (vi) Nil. (vii) Due to low yields during 1959, the experiment has not been taken into considera-  
tion for pooling ; design adopted during 1961 is split-split plot. Hence results of two years 1958, and 1960  
were considered for pooling. Sub plot errors are heterogeneous.

**5. RESULTS :**

(i) 784 Kg/ha. (ii) (a) 123.9 Kg/ha. (b) 149.2 Kg/ha. (iii) Main effect of M alone is highly significant.  
(iv) Av. yield of *Kapas* in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	718	674	558	607	693	650
M <sub>2</sub>	694	842	812	740	826	783
M <sub>3</sub>	994	876	891	1007	833	920
Mean	802	797	754	785	784	784
S <sub>1</sub>	789	786	779			
S <sub>2</sub>	816	809	728			

C.D. for M marginal means=100.7 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 61(106).****Site :- Agri Res. Stn., Amreli.****Type :- 'CM'.**

Object :- To find out the optimum spacing and manurial dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 22.7.61. (iv) (a) N.A. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1. (v) Nil. (vi) C.J. 73. (vii) Un-irrigated. (viii) 2 interculturings. (ix) 33 cm. (x) 22.12.61.

**2. TREATMENTS :****Main-plot treatments :**3 spacings between rows :  $R_1=46$ ,  $R_2=69$  and  $R_3=91$  cm.**Sub-plot treatments :**2 spacings within rows :  $S_1=15$  and  $S_2=23$  cm.**Sub-sub-plots treatments :**3 levels of manures :  $M_0=0$ ,  $M_1=22.4$  Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  and  $M_2=$ Twice  $M_1$ . N and  $P_2O_5$  applied as A/S and Super at the time of sowing.**3. DESIGN :**

(i) Split-plot design. (ii) (a) 3 main plots/replication, 2 sub-plot/main plot and 3 sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 9.1 m.  $\times$  7.3 m. (b) 8.2 m.  $\times$  5.5 m. (v) 46 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1958 to 1961. (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains. (vii) Low yields due to lack of rains.

**5. RESULTS :**

(i) 63 Kg/ha. (ii) (a) 27.1 Kg/ha. (b) 15.8 Kg/ha. (c) 11.7 Kg/ha. (iii) Main effect of R and interaction  $S \times M$  are significant. (iv) Av. yield of *Kapas* in Kg/h a.

	$R_1$	$R_2$	$R_3$	$S_1$	$S_2$	Mean
$M_1$	44	76	61	56	65	60
$M_2$	39	80	74	65	63	64
$M_3$	47	80	69	55	76	65
Mean	43	78	68	59	68	63
$S_1$	34	76	66			
$S_2$	52	81	70			

C.D. for R marginal means = 25.1 Kg/ha.

C.D. for M means at the same level of S = 11.4 Kg/ha.

C.D. for S means at the same level of M = 14.0 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 60(38), 62(112).****Site :- Agri. Res. Stn., Bardoli.****Type :- 'CM'.**

Object :- To study the effect of N, P, K, F.Y.M. and spacings on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton in 1960 and Maize and Groundnut in 1962. (c) 12.4 C.L./ha. of F.Y.M. in 1960 and 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  in 1960 and 1962. (ii) Black soil in 1960, clay loam in 1962. (iii) 28.6.1960; 28.7.1962. (iv) (a) 3 harrowings; 2 harrowings. (b) Dibbling. (c) N.A.; 9 Kg/ha. (d) As per treatments. (e) 2-3 in 1960 and 1 to 2 in 1962. (v) Nil. (vi) 2087 (late). (vii) Irrigated. (viii) 6 interculturings and 3 weedings in 1960; 3 weedings in 1962. (ix) 117 cm.; 135 cm. (x) 7.2.1961 to 3.4.1961; 4.4.1963 to 23.5.1963.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2), (3) and (4)

- (1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=67.2$  Kg/ha.  
 (2) 2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=134.5$  Kg/ha.  
 (3) 2 spacings between rows :  $S_1=91$  and  $S_2=122$  cm.  
 (4) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=11209$  Kg/ha.

## Sub-plot treatments :

4 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha. Time and method of application of manures in 1960 N.A.

Fertilizers applied by ring method.

## 3. DESIGN :

- (i) Split-plot confd. (ii) (a) 8 main-plots/block ; 2 blocks/replication ; 4 sub-plots/main-plot. (b) N.A.  
 (iii) 1. (iv) (a) 7.3 m.  $\times$  13.4 m. (b) 3.7 m.  $\times$  11.0 m. (v) 183 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

- (i) Good. (ii) Nil. Malathion E.C. 20 sprayed twice in 1960. (iii) Seed cotton yield. (iv) (a) 1958 to 1962(modified in 1959). (b) No. (c) Nil. (v) N.A. (vi) Experiment conducted during 1961 failed.  
 (vii) Error (a) heterogeneous and Treatments  $\times$  years interaction absent, error. (b) Homogeneous.

## 5. RESULTS :

## 1960

- (i) 763 Kg/ha. (ii) (a) 560.0 Kg/ha. (b) 110.5 Kg/ha. (iii) Main effect of N is highly significant. Interaction  $N \times S$  is significant. (iv) Table of mean and differential response in Kg/ha.

Differential response

Mean response	P		K		S		F	
	-	+	-	+	-	+	-	+
P 261	-	-	190	332	81	441	149	373
K -91	-162	-20	-	-	7	-188	-324	142
S 302	122	482	400	204	-	-	433	171
F 42	-70	154	-191	275	173	-89	-	-

	$P_0$	$P_1$	$K_0$	$K_1$	$S_0$	$S_1$	$F_0$	$F_1$	Mean
$N_0$	436	611	601	446	335	712	472	574	523
$N_1$	575	799	707	667	593	781	686	689	687
$N_2$	694	1039	921	811	747	986	818	914	866
$N_3$	830	1127	1006	951	777	1182	995	964	978
Mean	633	894	809	719	613	914	742	785	763

C.D. for N marginal means = 78.6 Kg/ha.

C.D. for N means at the same level of S = 111.1 Kg/ha.

C.D. for S means at the same level of N = 398.9 Kg/ha.

- (i) 784 Kg/ha. (ii) (a) 163.0 Kg/ha. (b) 103.6 Kg/ha. (iii) Main effect of S is highly significant. Main effect of F, N and interaction  $P \times N$  are significant. (iv) Table of means and differential response.



## Differential response

Mean response		P		K		S		F	
		-	+	-	+	-	+	-	+
P	33	-	-	136	-70	-28	24	23	43
K	-61	42	-164	-	-	46	-168	-108	-43
S	222	161	283	329	115	-	-	227	217
F	-182	-192	-172	-229	-135	-177	-187	-	-

C.D. for 'F' or 'S' means response =143.9 Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>0</sub>	S <sub>1</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	651	807	761	697	641	817	783	674	729
N <sub>1</sub>	849	804	855	798	724	929	952	701	826
N <sub>2</sub>	737	794	750	781	667	864	860	671	765
N <sub>3</sub>	833	797	892	738	659	971	903	727	815
Mean	767	801	814	754	673	895	875	693	784

C.D. for N marginal means =73.7 Kg/ha.

C.D. for N means at the same level of P =104.2 Kg/ha.

C.D. for P means at the same level of N =142.8 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Bhachan.**

**Ref :- Gj. 63(88).**

**Type 'CM'.**

Object :- To find out the optimum requirements of manurial dose and spacing for Cotton.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) *Bajra*. (c) 24.7 C.L/ha. of F.Y.M+22.4 Kg/ha. of N. (ii) Sandy soil. (iii) N.A. (iv) (a) 2 ploughings and 1 harrowing. (b) Dibbling. (c) 7 Kg/ha. (d) As per treatments. (e) 2 to 3 seeds/hill. (v) 12.4 C.L/ha. of F.Y.M. (vi) *Kalyan*. (vii) Irrigated. (viii) 2 interculturings, 3 weedings. (ix) 36 cm. (x) N.A.

2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 spacing between rows : R<sub>1</sub>=46, R<sub>2</sub>=69 and R<sub>3</sub>=91 cm.

(2) 3 spacing between plants : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.

(3) 3 levels of manures : M<sub>0</sub>=0, M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

3. DESIGN :

- (i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) 59.4 m.×24.7 cm. (iii) 2. (iv) (a) 6.4 cm×8.2 cm. (b) 5.5 cm×7.3 cm. (v) 46 cm×46 cm. (vi) Yes.

4. GENERAL :

- (i) Normal. (i') Root rot, light attack of boll worms and red cotton bugs. (ii) *Kapas* yield. (iv) (a) 1961-continued (modified in 1963). (b) No. (c) Nil. (v) to (vii) Nil.

5. RESULTS :

- (i) 1517 Kg/ha. (ii) 352 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1470	1395	1474	1393	1372	1574	1446
S <sub>2</sub>	1696	1698	1287	1526	1260	1896	1560
S <sub>3</sub>	1628	1285	1715	1393	1738	1501	1544
Mean	1598	1461	1492	1437	1457	1657	1517
M <sub>0</sub>	1480	1466	1366				
M <sub>1</sub>	1644	1295	1431				
M <sub>2</sub>	1671	1622	1678				

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(188), 65(135).**

**Site :- Agri. Res. Stn., Bhachau.**

**Type :- 'CM'.**

Object :- To find out the optimum requirements of fertilizer dose and spacing for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+24.71 C.L/ha. of F.Y.M. (ii) Sandy soil. (iii) 12.7.64, 24.7.65. (iv) (a) 2 ploughings and harrowings. (b) Dibbling. (c) 7 Kg/ha. (d) As per treatments. (e) 2-3. (v) 24.71 C.L/ha. of F.Y.M. (vi) *Kalyan*. (vii) Irrigated. (viii) 2 interculturings and 2 weedings. (ix) 20 cm., 35 cm. (x) N.A., December 65 to February 1966.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 spacings between rows : S<sub>1</sub>=46 cm., S<sub>2</sub>=68 cm. and S<sub>3</sub>=91 cm.

(2) 3 spacings between plants : P<sub>1</sub>=15 cm., P<sub>2</sub>=23 cm. and P<sub>3</sub>=30 cm.

(3) 3 levels of fertilizers : M<sub>0</sub>=0, M<sub>1</sub>=11.2 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

**3. DESIGN :**

(i) 3<sup>3</sup> Confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) 59.4 m×24.7 m. (iii) 2. (iv) (a) 8.2 m×6.4 cm. (b) 7.3 cm.×5.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1964-1965. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogenous.

**5. RESULTS :**

(i) 908 Kg/ha. (ii) 389.9 Kg/ha (with 14 d.f. made up of interactions of years with P, S, M, P×S and P×M) (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
P <sub>1</sub>	794	855	833	848	790	844	827
P <sub>2</sub>	841	924	922	756	1058	874	896
P <sub>3</sub>	1054	913	1036	954	945	1103	1001
Mean	896	897	930	853	931	940	908

1964

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	1182	1148	1321	1217
M <sub>1</sub>	1390	1330	1494	1405
M <sub>2</sub>	1378	1335	1480	1398
Mean	1317	1271	1432	1330

1965

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	487	493	487	489
M <sub>1</sub>	464	492	415	457
M <sub>2</sub>	477	587	387	484
Mean	476	524	430	477

**Crop :- Cotton (Kharif).****Ref :- Gj. 61(191), 62(29).****Site :- Agri. Res. Stn., Bhachau.****Type :- 'CM'.**

Object :—To find out the optimum spacing and manurial dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat in 1961 and Bajra in 1962. (c) 22.4 Kg/ha. of N in 1961, 37.0 C.L/ha. of F.Y.M+ 22.4 Kg/ha. of N+28.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy soil. (iii) 30.7.1961, 9.7.62. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) 9 Kg/ha. in 1961, N.A. in 1962. (d) As per treatments. (e) N.A. (v) Nil in 1961, 7.41 C.L/ha. of F.Y.M. (vi) Kalyan (late). (vii) Unirrigated in 1961, irrigated in 1962. (viii) 3 interculturations (ix) 80 cm., 28 cm. (x) 28.4.1962, 8.5.1962, N.A.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 spacings between rows : R<sub>1</sub>=46, R<sub>2</sub>=69 and R<sub>3</sub>=91 cm.(2) 3 spacings between plants : S<sub>1</sub>=15, S<sub>2</sub>=23 and S<sub>3</sub>=30 cm.(3) 3 levels of manures : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.N as A/S and P<sub>2</sub>O<sub>5</sub> as Super was applied.**3. DESIGN :**(i) 3<sup>3</sup> Confd. (ii) (a) 3 block/replication, 9 plots/block. (b) N.A. (iii) 2. (iv) (a) 9.1 m.×8.2 m. (b) 7.3m.×5.5 m. (v) 91 cm.×137 cm. (vi) Yes.**4. GENERAL :**

(i) Good. (ii) Attack of wooly mites, red cotton bugs. (iii) Yield of kapas. (iv) (a) 1961-contd. (modified in 1963 and 1964). (b) No. (c) Results of combined analysis given under 5. (v) Nil. (vi) Rainfall below normal in 1962. (vii) Error variances for 1961, 1962 homogeneous. Treatments modified in 1963.

**5. RESULTS :**

(i) 1328 Kg/ha. (ii) 322.4 Kg/ha. based on 18 d.f. composed of two and three factor interactions with the years. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1296	1354	1311	1282	1318	1360	1320
S <sub>2</sub>	1365	1330	1122	1158	1139	1520	1272
S <sub>3</sub>	1542	1229	1401	1266	1556	1350	1391
Mean	1401	1304	1278	1235	1338	1410	1328
M <sub>0</sub>	1228	1287	1190				
M <sub>1</sub>	1529	1262	1222				
M <sub>2</sub>	1444	1364	1421				

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(193), 65(96).**

**Site :- Cotton Breeding Stn., Broach.**

**Type :- 'CM'.**

Object :—To find out optimum spacing with suitable manurial and fertiliser dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) *Jowar-Cotton*. (b) *Jowar*. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black cotton soil. (iii) 23.6.64, 19.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 7 Kg/ha. (d) As per treatments. (e) 1. (v) Nil. (vi) Digvijay (medium). (vii) Unirrigated. (viii) 2 weedings, 5 to 6 interculturings. (ix) 115 cm., 52 cm. (x) 3 pickings from 30.1.65 to 11.3.65, 4 pickings from 13.1.66 to 15.3.66.

**2. TREATMENTS :**

**Main-plot treatments :**

3 spacings : S<sub>1</sub>=122 cm. × 61 cm., S<sub>2</sub>=152 cm. × 61 cm. and S<sub>3</sub>=183 cm. × 61 cm.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of fertilisers : M<sub>0</sub>=0, M<sub>1</sub>=22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.3 C.L/ha.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super applied by drilling.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 10.0 m. × 7.3 m. for S<sub>1</sub>, 10.7 m. × 7.3 m. for S<sub>2</sub> and 11.2 m. × 7.3 m. for S<sub>3</sub>. (b) 7.6 m. × 6.1 m. (v) Varies from S<sub>1</sub> to S<sub>3</sub>. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1964—Contd. (b) No. (c) Nil. (v) N.A. (vi) No adequate rainfall in 1965. (vii) Error (b) heterogeneous.

**5. RESULTS :**

**1964 (193)**

(i) 672 Kg/ha. (ii) (a) 59.8 Kg/ha. (b) 138.0 Kg/ha. (iii) M effect is highly significant. F effect is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
M <sub>0</sub>	504	623	509	477	614	545
M <sub>1</sub>	702	767	670	678	748	713
M <sub>2</sub>	763	789	718	689	824	757
Mean	656	726	633	615	729	672
F <sub>0</sub>	650	615	580			
F <sub>1</sub>	663	838	685			

C.D. for M marginal means=120.0 Kg/ha.

C.D. for F marginal means= 98.0 Kg/ha.

1965 (96)

(i) 497 Kg/ha. (ii) (a) 91.3 Kg/ha. (b) 74.6 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
M <sub>0</sub>	572	411	478	515	459	487
M <sub>1</sub>	489	497	450	466	487	489
M <sub>2</sub>	576	512	491	528	524	526
Mean	545	473	473	503	490	497
S <sub>0</sub>	550	464	495			
S <sub>1</sub>	541	482	451			

**Crop :- Cotton (Kharif).****Ref :- Gj. 61(198), 62(44), 63(36), 64(175).****Site :- Dry Farming Res. Stn., Dhandhuka.****Type :- 'CM'.**

Object :-To find out the effect of different cultural practices on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Cotton. (b) Cotton. (c) N.A. ; 12.4 C.L./ha. of F.Y.M. in 1962, 1963 and 1964. (ii) Medium black to sandy loam. (iii) 27.7.1961 ; 29.7.1962 ; 9.8.1963 ; 19.7.1964. (iv) (a) As per treatments. (b) Drilling. (c) 11 Kg/ha. ; 9 Kg/ha. ; 6 Kg/ha. ; 7 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Kalyan. (vii) Unirrigated. (viii) 2 interculturings in 1961, 1962 ; 3 interculturings in 1963, weeding as and when necessary in 1964. (ix) 54 cm. ; 46 cm. ; 66 cm. ; 66 cm. (x) 27 to 29.2.1962 ; N.A. ; 11.4.1964 ; 20.2.1965.

**2. TREATMENTS :****Main-plot treatments**

7 cultural treatments : C<sub>1</sub>=Continuous shallow ploughing in March every year, C<sub>2</sub>=Shallow ploughing in every alternative year starting from 1962, C<sub>3</sub>=Shallow ploughing in every third year starting from 1963, C<sub>4</sub>=Shallow ploughing in furrows in March followed by 1 harrowing in May (local practices), C<sub>5</sub>=1 harrowing in March, C<sub>6</sub>=2 harrowings first in March and 2nd in May and C<sub>7</sub>=3 harrowings, 1st in March, 2nd in April and 3rd in May.

**Sub-plot treatments**

2 methods of application of 12.4 C.L./ha. of F.Y.M. : M<sub>1</sub>=In furrows and M<sub>2</sub>=By broadcast.

**2. DESIGN :**

(i) Split-plot. (ii) (a) 7 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (ii) 4. (iv) (a) 13.7 m. × 7.3 m. in 1961, 1962 and 1964; 13.5 m. × 7.2 m. in 1963. (b) 12.2 m. × 5.5 m. in 1961, 1962 and 1964 ; 12.0 m. × 5.4 m. in 1963. (v) 76 cm. × 91 cm. in 1961, 62 and 1964 ; 75 cm. × 90 cm. in 1963. (vi) Yes.

**4. GENERAL :**

(i) Normal in 1961 ; Not satisfactory in 1962 ; Good in 1963 and 1964. (ii) Nil in 1961, Attack of aphids, bollworms and jassids in 1962 ; Moderate attack of aphids, bollworm and jassids in 1963 and light attack of aphids and bollworms. (iii) Seed Cotton yield. (iv) (a) 1961 to 1964. (b) Yes. (c) Nil. (v) Vallabhipur in 1961 to 1963 and Jamkhamlia in 1964. (iv) Nil. (vii) Both the errors are heterogeneous.

**5. RESULTS :****1961 (198)**

(i) 877 Kg/ha. (ii) (a) 125.1 Kg/ha. (b) 184.0 Kg/ha. (iii) Main effects of C and M alone are significant. (iv) Av. yield of *Kapas* in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub> +C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	916	936	923	803	914	1004	919
M <sub>2</sub>	927	787	1035	729	770	803	834
Mean	922	862	979	766	842	902	877

C.D. for C marginal means except C<sub>1</sub> and C<sub>2</sub> = 130.9 Kg/ha.

C.D. for M marginal means = 82.3 Kg/ha.

**1962 (44)**

(i) 477 Kg/ha. (ii) (a) 275.2 Kg/ha. (b) 248.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	427	477	302	421	820	840	598	498
M <sub>2</sub>	718	488	310	432	404	436	410	457
Mean	572	482	306	426	412	638	504	477

**1963 (36)**

(i) 1193 Kg/ha. (ii) (a) 138.3 Kg/ha. (b) 121.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	1173	1151	1338	1155	1226	1125	1192	1194
M <sub>2</sub>	1259	1181	1259	1244	1099	1069	1237	1193
Mean	1216	1166	1298	1200	1162	1097	1214	1193

**1964 (175)**

(i) 806 Kg/ha. (ii) (a) 112.1 Kg/ha. (b) 68.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	858	803	734	805	824	790	839	808
M <sub>2</sub>	806	789	766	893	783	796	794	804
Mean	882	796	750	849	804	793	817	806

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Halvad.**

**Ref :- Gj. 64(160), 65(63).**

**Type :- 'CM'.**

**Object :-** To study the comparative effect of green manuring by sannhamp with different rows of sannhemp in between two Cotton rows.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 29.6.64 and 1.7.64 ; 6.7.65. (iv) (a) 1 harrowing and ploughing. (b) Hand sowing. (c) 10 Kg/ha. (d) As per treatments. (e) 1. (v) Nil ; 22.4 Kg/ha. of N as A/S. (iv) Deviraj. (vii) Unirrigated. (viii) 2 weedings, 3 interculturings. (ix) 46 cm. (x) 28.1.65 and 17.2.65 ; 22.2.66 and 21.3.66.

## 2. TREATMENTS :

6 cultural treatments :  $T_1$ =Cotton alone at 91 cm. apart ;  $T_2$ =Cotton alone at 137 cm. apart,  $T_3$ =Cotton at 91 cm. apart with 2 rows of *Sann* in between ;  $T_4$ =Cotton at 137 cm. apart with 2 rows of *Sann* in between ;  $T_5$ =Cotton at 91 cm. apart with one row of *sann* in between and  $T_6$ =Cotton at 137 cm. apart with one row of *sann* in between.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  5.5 m. (b) 10.4 m.  $\times$  2.7 m. (v) 30 cm.  $\times$  137 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of *Kapas*. (iv) (a) 1964-1965. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil and (vii) Error variances are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 457 Kg/ha. (ii) 104.6 Kg/ha. (based on 35 d.f. made up of pooled error + (Treatment  $\times$  year) interaction. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment :	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	429	484	505	427	449	452

Corp :- Cotton (*Kharif*).

Ref :- Gj. 64(159), 65(62).

Site :- Agri. Res. Stn., Halvad.

Type :- 'CM'.

Object :- To study the effect of cultural treatments on prevention of hardening of soil after sowing of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil (b) *Jowar*, *Bajra* and wheat. (c) Nil. (ii) Medium black. (iii) 15.7.64 ; 6.8.65. (iv) (a) 3 ploughings, 1 2 harrowings. (b) Drilling. (c) 25 Kg/ha. ; 17 Kg/ha. (d) 46 cm. row to row. (e) Nil. (v) Nil. (vi) *Kalyan*. (vii) Unirrigated. (viii) Interculturing, hoeing and weeding. (ix) 46 cm. ; 67 cm. (x) 9.3.65 ; 28.3.66.

## 2. TREATMENTS :

3 cultural manuring treatments :  $T_1$ =Shallow sowing with higher seed rate ;  $T_2$ =Sowing in previously composted furrows at 12.4 C.L./ha. of F.Y.M. and  $T_3$ =Local method of sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) and (b) 20.1 m.  $\times$  10.0 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1964-1965. (b) No. (c) Nil. (v) N.A. (vi) Nil and (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

1964

(i) 115 Kg/ha. (ii) 7.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	119	123	104

C.D. = 10.0 Kg/ha.

65(62)

(i) 269 Kg/ha. (ii) 940 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Av. yield	240	292	274

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Halvad.**

**Ref :- Gj. 60(46), 61(49), 62(196).**  
**Type :- 'CM'.**

Object :- To study the effect of Sann and Guwar as green manuring crop sown in between Cotton rows on the yield of Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Legume, Cereal, Cotton ; Cotton-Groundnut-Cotton ; Nil. (b) Groundnut ; Cotton and Cotton. (c) Nil. (ii) Medium black. (iii) 7, 8.7.1960 ; 29.6.1961 ; 24.7.1962. (iv) (a) 1 or 2 plougings+2 or 3 harrowings. (b) Dibbling ; Drilling : Drilling. (c) 11 Kg/ha. for Cotton and 67 Kg/ha. for G.M. ; 67 Kg/ha. for G.M.-Cotton N.A. and 9 Kg/ha. for Cotton. (d) As per treatments. (e) N.A. (v) Nil. (vi) Co<sub>2</sub>-170. (vii) Irrigated. (viii) 3 interculturings ; 1 weeding ; 2 weedings and 1 interculturing. (ix) 21 cm. ; 52 cm. ; 35 cm. (x) 3.2.1961 ; N.A. ; 16.2.1963 and 28.2.1963.

#### 2. TREATMENTS :

6 cultural-cum-manurial treatments : T<sub>1</sub>=Cotton alone at 91 cm. ; T<sub>2</sub>=Cotton alone at 137 cm. ; T<sub>3</sub>=Cotton at 91 cm. with 2 rows of *Sann* in between ; T<sub>4</sub>=Cotton at 91 cm. with 2 rows of *Guar* in between, T<sub>5</sub>=Cotton at 137 cm. with 3 rows of *Sann* in between and T<sub>6</sub>=Cotton at 137 cm. with 3 rows of *Guar* in between.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 5.5 m. (b) 10.4 m. × 3.7 m. ; 10.4 m. × 2.7 m. ; 10.4 m. × 2.7 m. (v) 91 cm. × 91 cm. ; 91 cm. × 137 cm. ; 91 cm. × 137 cm. (vi) Yes.

#### 4. GENERAL :

(i) Not satisfactory ; Good ; Normal. (ii) Light attack of black arm, one spraying of endrex ; Attack of jassides, endrin was sprayed. (iii) Seed cotton yield. (iv) (a) 1959 to 1962. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Result of experiment conducted during 1959 (17) also pooled. Error variances are heterogeneous, and interaction is present

#### 5. RESULTS :

(i) 668 Kg/ha. (ii) 135.4 Kg/ha. (based on 15 d.f. composed of Treatments × years interaction. (iii) Treatment differences are not significant. (vi) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	683	653	678	688	630	674

**Crop :- Cotton (Kharif).**  
**Site :- Central Exptl. Stn., Junagadh.**

**Ref :- Gj. 60(70), 61(134).**  
**Type :- 'CM'.**

Object :- To study the effect of manures and spacing on Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat ; *Jowar*. (c) Nil, 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 6.7.1960 ; 26.6.1961. (iv) (a) 1 ploughing and 2 harrowings ; 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 3 to 4 ; 3 to 4 and thinned to one plant after one month. (v) Nil. (vi) CO<sub>2</sub>-170. (vii) Irrigated. (viii) 3 interculturings ; 4 interculturings. (ix) 79 cm. ; 141 cm. (x) 16.1.1961 to 24.3.1961 ; 22.2.1962 to 15.3.1962.



## 2. TREATMENTS :

## Main-plot treatments :

2 spacings :  $S_1=91 \text{ cm.} \times 61 \text{ cm.}$  and  $S_2=122 \text{ cm.} \times 61 \text{ cm.}$ 

## Sub-plot treatments :

3 manurial treatments :  $M_0$ =Control (no manure),  $M_1=11208 \text{ Kg/ha.}$  of F.Y.M. and  $M_2$ =Sann G.M. (amount N.A.).

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 3 sub-plots/main-plot. (b)  $27.4 \text{ m.} \times 11.0 \text{ m.}$  (iii) 4. (iv) (a)  $12.2 \text{ m.} \times 3.7 \text{ m.}$  (b)  $11.0 \text{ m.} \times 3.7 \text{ m.}$  (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory in 1960, Normal in 1961. (ii) Attack of aphids, jassides, black arm, which affected the yield very much. Endrex sprayed during 1960. 20 C.C. of endrex was sprayed on 18.10.1961. (iii) Yield of *kapas*. (iv) (a) 1958 to 1961. (b) No. (c) Nil. (v) No. (vi) Heavy rains and strong wind had adverse effect on crop during 1961. (vii) Error (a) and Error. (b) For experiment conducted during 1958 to 1961 are heterogeneous.

## 5. RESULTS :

60(70)

(i) 150 Kg/ha. (ii) (a) 31.3 Kg/ha. (b) 24.9 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	$M_0$	$M_1$	$M_2$	Mean
$S_1$	129	204	164	166
$S_2$	126	151	124	133
Mean	127	178	144	150

C.D. for M marginal means= $12.4 \text{ Kg/ha.}$ 

61(134)

(i) 895 Kg/ha. (ii) (a) 193.1 Kg/ha. (b) 135.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$M_0$	$M_1$	$M_2$	Mean
$S_1$	927	907	767	867
$S_2$	884	1028	854	922
Mean	906	967	811	895

Crop :- Cotton (*Kharif*).

Ref :- Gj. 60(139), 61(169), 62(163).

Site :- Trial-cum-Demons. Farm, Kholwad.

Type :- 'CM'.

Object :-To study the response of Cotton to graded doses of manures and spacings under irrigated conditions.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat ; Cotton and Paddy ; Cotton and Groundnut. (c) Nil ;  $44.8 \text{ Kg/ha.}$  of N+ $22.4 \text{ Kg/ha.}$  of  $P_2O_5$  to both crops ;  $12.4 \text{ C.L./ha.}$  of F.Y.M.+ $44.8 \text{ Kg/ha.}$  of N+ $22.4 \text{ Kg/ha.}$  of  $P_2O_5$ . (ii) Medium black. (iii) 21.6.1960 ; 2, 3.6.1961 ; 21.6.1962. (iv) (a) 4 harrowings ; 4 harrowings ; 2 ploughings and 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 2 to 3 ; 2 to 3 ; 1. (v) Nil. (vi) 2087. (vii) Irrigated. (viii) 2 to 3 weedings and 6 interculturings ; 4 interculturings ; 5 interculturings. (ix) 96 cm. ; 145 cm. ; 84 cm. (x) 16.1.1961 to 16.3.1961 ; 22.2.1962 to 19.3.1962 ; 28.1.1963 to 12.3.1963.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1), (2), (3) and (4)

(1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=67.2$  Kg/ha.(2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=134.5$  Kg/ha.(3) 2 spacings :  $S_1=91$  cm.  $\times$  61 cm. and  $S_2=122$  cm.  $\times$  61 cm.(4) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=112.1$  Q/ha.

## Sub-plot treatments :

4 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 8 main-plots/block ; 2 blocks/replication ; 4 sub-plots/main-plot. (b) N.A.  
(iii) 2. (iv) (a) 7.3 m.  $\times$  11.0 m. (b) 3.7 m.  $\times$  8.5 m. (v) 183 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Slight attack pink with boll worm ; cupravit was sprayed. (iii) Seed cotton yield.  
(iv) (a) 1958 to 1962 (modified in 1959). (b) No. (c) Nil. (v) Kim and Surat. (vi) Nil. (vii) Error  
(a) and Error (b) are heterogeneous.

## 5. RESULTS :

## 60(139)

(i) 1139 Kg/ha. (ii) (a) 175.2 Kg/ha. (b) 176.5 Kg/ha. (iii) Main effect of N is highly significant and interactions  $P \times S$ ,  $K \times N$  and  $P \times S \times F$  are significant. (iv) Mean and differential response table and yield *kapas* in Kg/ha.

Differential response

Mean response	P		K		S		F	
	—	+	—	+	—	+	—	+
P	45	—	79	11	-27	117	70	20
K	-1	33	—	—	-52	50	-33	31
S	-61	-134	11	-112	—	—	-37	-86
F	61	86	36	29	93	86	36	—

C. D. for  $P \times S$  differential response = 103.6 Kg/ha.

	$P_0$	$P_1$	$K_0$	$K_1$	$S_1$	$S_2$	$F_0$	$F_1$	Mean
$N_0$	865	908	918	855	904	868	846	927	886
$N_1$	1005	1083	1002	1086	1095	993	1012	1076	1044
$N_2$	1288	1235	1325	1198	1271	1252	1223	1300	1262
$N_3$	1307	1420	1312	1414	1408	1309	1352	1375	1363
Mean	1116	1161	1139	1139	1169	1108	1108	1169	1139

C.D. for N marginal means

= 90.8 Kg/ha.

C.D. for N means at the same level of K

= 128.8 Kg/ha.

C.D. for K means at the same level of N

= 132.8 Kg/ha.

## 61(169)

(i) 679 Kg/ha. (ii) (a) 393.7 Kg/ha. (b) 151.5 Kg/ha. (iii) Main effect of N is highly significant. Main effect of S and interaction  $K \times F$  are significant. (iv) Table of mean and differential response and yield of *kapas* in Kg/ha.

## Differential response

Mean response		P		K		S		F	
		-	+	-	+	-	+	-	+
P	105	-	-	144	66	155	55	110	100
K	-48	-9	-87	-	-	-104	8	-218	122
S	159	209	109	103	215	-	-	135	183
F	112	117	107	-58	282	88	136	-	-

C.D. for K × F differential response = 232.7 Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	461	496	465	492	426	532	394	564	479
N <sub>1</sub>	495	642	589	549	496	641	536	601	568
N <sub>2</sub>	694	789	782	700	657	826	672	810	741
N <sub>3</sub>	857	999	976	880	819	1037	890	965	928
Mean	627	731	703	655	600	759	623	735	679

C.D. for S marginal means = 164.6 Kg/ha.

C.D. for N marginal means = 78.2 Kg/ha.

62(163)

(i) 597 Kg/ha. (ii) (a) 636.0 Kg/ha. (b) 238.5 Kg/ha. (iii) None of the effects is significant. (iv) Mean and differential response table and yield of *kapas* in Kg/ha.

## Differential response

Mean response		P		K		S		F	
		-	+	-	+	-	+	-	+
P	143	-	-	36	250	304	-18	122	164
K	123	16	230	-	-	191	55	104	142
S	18	179	-143	86	-50	-	-	-41	77
F	84	63	105	65	103	25	143	-	-

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	427	667	482	611	528	566	473	620	546
N <sub>1</sub>	612	638	535	714	565	685	573	677	625
N <sub>2</sub>	549	640	502	686	582	607	563	626	594
N <sub>3</sub>	514	730	621	623	677	567	612	632	622
Mean	525	669	535	659	588	606	555	639	597

**Crop :- Cotton (Kharif).**

**Ref :- 60(32), 61(168) ; 62(162).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'CM'.**

**Object :-**To study the response of Cotton to a graded dose of manure and spacings under irrigated conditions.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar ; Nil ; Nil. (b) Jowar ; Jowar ; Nil. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  ; 22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super ; 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of  $P_2O_5$ +44.8 Kg/ha. of N. (ii) Medium black. (iii) 25.6.1960 ; 22.6.1961 and 5.7.1962. (iv) (a) 4 harrowings ; 3 harrowings ; 2 ploughings and 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 2 to 3 ; 2 to 3 and 1. (v) Nil. (vi)  $Co_2$ 170. (vii) Irrigated. (viii) 6 interculturings ; 5 interculturings. (ix) 96 cm. ; 145 cm. ; 84 cm. (x) 11.1.1961 to 23.2.1961 ; 19.2.1962 to 17.3.1962 ; 10.1.1963 to 13.3.1963.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2), (3) and (4)

- (1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=67.2$  Kg/ha.
- (2) 2 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$  and  $K_1=134.5$  Kg/ha.
- (3) 2 spacings :  $S_1=91$  cm.  $\times$  61 cm. and  $S_2=122$  cm.  $\times$  61 cm.
- (4) 2 levels of F.Y.M :  $F_0=0$  and  $F_1=112.1$  Q/ha.

**Sub-plot treatments :**

4 levels of N as A/S :  $N_0=0$  and  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=100.9$  Kg/ha.

Time and method of application of manure N.A. in 1960 ;  $P_2O_5$  applied on 30.7.1961, 15.9.1961 and N and  $K_2O$  applied on 30.7.1961 ; Fertilizers applied round the plants by stric on 18.8.1962 and 13.9.1962 ; F.Y.M. applied on 16.6.1962.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 8 main-plots/block ; 2 blocks/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  11.0 m. (b) 3.7 m.  $\times$  8.5 m. (v) 183 cm.  $\times$  122 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Slight attack of aphids, Jassides, and pink boll worms. (iii) Seed cotton yield. (iv) (a) 1958 to 1962 (modified in 1959). (b) No. (c) Nil. (v) Kim and Surat. (vi) Nil. (vii) Error. (b) is heterogeneous.

**5. RESULTS :**

**60(32)**

(i) 1048 Kg/ha. (ii) (a) 155.4 Kg/ha. (b) 216.2 Kg/ha. (iii) Main effect of S, F and N are highly significant. Interaction  $N \times S$  is significant. (iv) Mean and differential response and yield of kapas in Kg/ha.

Differential response

Main response		P		K		S		F	
		-	+	-	+	-	+	-	+
P	41	-	-	18	65	46	37	79	4
K	5	-18	28	-	-	57	-41	-8	18
S	-89	-84	-93	-43	-135	-	-	-36	-141
F	115	152	78	102	128	168	62	-	-

C.D. for S or F mean response=65.0 kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	629	685	621	693	626	688	587	727	657
N <sub>1</sub>	939	936	960	915	936	938	875	999	937
N <sub>2</sub>	1269	1204	1198	1275	1338	1135	1176	1296	1236
N <sub>3</sub>	1276	1453	1407	1322	1472	1257	1327	1403	1364
Mean	1028	1070	1046	1051	1093	1004	991	1106	1048

C.D. for N marginal means =128.0 Kg/ha.

C.D. for N means at the same level of S =157.7 Kg/ha.

C.D. for S means at the same level of N =152.8 Kg/ha.

61(68)

(i) 718 Kg/ha. (ii) (a) 266.5 Kg/ha. (b) 148.8 Kg/ha. (iii) Main effect of N is highly significant and interaction N×P is significant. (iv) Table of means and differential response in and yield of *kapas* in Kg/ha.

Differential response

Mean response		P		K		S		F	
		-	+	-	+	-	+	-	+
P	13	-	-	11	15	81	-55	-10	36
K	-46	48	-44	-	-	-65	-27	-45	-47
S	55	123	-13	36	74	-	-	109	1
F	41	18	64	42	40	-13	95	-	-

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	453	425	426	452	413	465	390	488	439
N <sub>1</sub>	609	593	612	591	566	637	568	634	601
N <sub>2</sub>	733	897	831	799	753	877	788	842	815
N <sub>3</sub>	1051	983	1096	939	1030	1004	1044	990	1017
Mean	711	725	741	695	690	746	697	739	718

C.D. for N marginal means =76.8 Kg/ha.

C.D. for N means at the same level of P=108.6 Kg/ha.

C.D. for P means at the same level of N=139.6 Kg/ha.

62(162)

(i) 1534 Kg/ha. (ii) (a) 274.9 Kg/ha. (b) 226.6 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Mean and differential response and yield of *kapas* in Kg/ha.

## Differential response

Mean response		P		K		S		F	
		-	+	-	+	-	+	-	+
P	-19	-	-	-60	22	-86	48	-22	-16
K	-72	-113	-31	-	-	-82	-62	-124	-20
S	-47	-114	20	-57	-37	-	-	-17	-77
F	79	76	82	27	131	109	49	-	-

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	962	847	944	864	900	909	888	921	904
N <sub>1</sub>	1304	1306	1341	1269	1340	1271	1240	1370	1305
N <sub>2</sub>	1826	1817	1856	1787	1894	1749	1739	1904	1821
N <sub>3</sub>	2085	2130	2141	2073	2099	2116	2114	2101	2107
Mean	1544	1525	1570	1498	1558	1511	1495	1574	1534

C.D. for N marginal means=117.0 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(121), 61(158), 62(168).**

**Site :- Agri. Res. Stn., Kim.**

**Type :- 'CM'.**

Object :-To study the response of Cotton to a graded dose of manure and spacings under irrigated conditions.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 33 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 13, 15.7.1960 ; 20.6.1961 ; 5.7.1962. (iv) (a) Nil ; 4 harrowings, 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (d) 3 to 4 ; 3 to 4 ; 1 to 2. (v) 12.4 C.L./ha. of F.Y.M. for 60(121) and Nil for other years. (vi) 2087. (vii) Irrigated. (viii) 2 to 3 interculturings. (ix) 103 cm. ; 108 cm. ; N.A. (x) 13.2.1961 to 18.2.1961 ; 7.3.1962 to 4.5.1962 ; 2 to 5.3.1963.

2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2), (3) and (4)

- (1) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=67.2 Kg/ha.
- (2) 2 levels of K<sub>2</sub>O as Mur. Pot. : K<sub>0</sub>=0 and K<sub>1</sub>=134.5 Kg/ha.
- (3) 2 spacings : S<sub>1</sub>=91 cm.×61 cm. and S<sub>2</sub>=122 cm.×61 cm.
- (4) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=112.1 Q/ha.

**Sub-plot treatments :**

4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.  
Time and method of application of manure N.A.

3. DESIGN :

(i) Split-plot confd. (ii) (a) 8 main-plots/block ; 2 blocks/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 2. (iii) (a) 7.3 m.×11.0 m. ; 7.3 m.×13.4 m. ; 7.3 m.×13.4 m. (b) 3.7 m.×8.5 m. ; 3.7 m.×11.0 m. ; 3.7 m.×11.0 m. (v) 183 cm.×122 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. ; Satisfactory ; Good. (ii) Attack of aphids and wooly mite ; Nil ; Nil. (iii) *Kapas* yield. (iv) (a) 1960—1962. (b) No. (c) Nil. (v) Kholwad and Surat. (vi) Nil. (vii) Error (b) is heterogeneous.

## 5. RESULTS :

60(121)

(i) 405 Kg/ha. (ii) (a) 122.0 Kg/ha. (b) 86.2 Kg/ha. (iii) Main effect of S alone is significant, and N effect is highly significant. (iv) Mean and differential response table and yield of *kapas* in Kg/ha.

Differential response

Mean response	P		K		S		F	
	-	+	-	+	-	+	-	+
P	4	—	29	-21	-4	12	28	-20
K	-31	-6	—	—	-7	-54	13	-74
S	-52	-60	-28	-76	—	—	-49	-54
F	-14	10	30	-57	-11	-16	—	—

C.D. for S mean response = 51.1 Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	295	282	299	278	311	266	307	270	288
N <sub>1</sub>	354	366	390	330	376	345	372	348	360
N <sub>2</sub>	448	432	448	432	479	401	449	432	440
N <sub>3</sub>	515	548	544	519	558	505	520	543	532
Mean	403	407	420	390	431	379	412	398	405

C.D. for N marginal means = 44.6 Kg/ha.

61(158)

(i) 461 Kg/ha. (ii) (a) 150.0 Kg/ha. (b) 115.4 Kg/ha. (iii) None of the effects is significant. (iv) Table of means and differential response and yield of *kapas* in Kg/ha.

Differential response

Mean response	P		K		S		F	
	-	+	-	+	-	+	-	+
P	-18	—	34	-70	-9	-27	-35	-1
K	-6	46	—	—	15	-27	11	-23
S	-29	-20	-8	-50	—	—	-74	16
F	35	18	52	18	-10	80	—	—

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	428	478	445	461	481	425	431	475	453
N <sub>1</sub>	501	448	455	495	484	465	450	500	475
N <sub>2</sub>	472	458	486	444	467	462	469	461	465
N <sub>3</sub>	479	423	470	433	470	433	423	479	451
	470	452	464	458	475	446	443	479	461

62(168)

- (i) 997 Kg/ha. (ii) (a) 334.9 Kg/ha. (b) 190.4 Kg/ha. (iii) Main effects of N and S are highly significant.  
 (iv) Mean and differential response table and yield of *kapas* in Kg/ha.

Mean response	P		K		S		F		
	-	+	-	+	-	+	-	+	
P	5	-	-	-50	60	65	-55	16	-6
K	46	-	9	-	-	144	-52	91	1
S	-183	-123	-243	-85	-181	-	-	-115	-251
F	22	33	11	67	-23	90	-46	-	-

C.D. for S mean response = 140.0 Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	F <sub>1</sub>	F <sub>2</sub>	Mean
N <sub>0</sub>	875	895	903	867	958	813	915	855	885
N <sub>1</sub>	1012	909	961	961	1040	881	997	925	961
N <sub>2</sub>	989	1023	965	1046	1118	894	972	1040	1040
N <sub>3</sub>	1104	1172	1068	1208	1239	1037	1062	1214	1138
	995	1000	974	1020	1089	906	986	1009	997

C.D. for N marginal means = 98.2 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref. :- Gj. 60(88), 61(157), 62(170).

Site :- Trial-cum-Demons. Farm, Kim. Type :- 'CM'.

Object :- To find out the optimum time of sowing and distance and to determine the N and P requirements of Cotton under irrigated conditions.



## 1. BASAL CONDITIONS :

(i) (a) Nil (all years). (b) N.A. ; *Jowar* ; Sugarcane. (c) N.A. in 1960 ; 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  in 1961 and 134.5 Kg/ha. of N+24.7 C.L./ha. of F.Y.M. in 1962. (ii) Medium black. (iii) As per treatments. (iv) (a) 3 harrowings in 1960 ; 5 ploughings and 5 harrowings in 1961 ; 2 harrowings in 1962. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 3 to 4 in 1960 and 1961 ; 1 to 2 in 1962. (v) 12.4 C.L./ha. of F.Y.M. (vi) 2087. (vii) Irrigated in 1960, 1961 and unirrigated in 1962. (viii) 2 inter-culturings ; 10 inter-culturings ; 5 inter-culturings. (ix) 103 cm. ; 108 cm. ; 80 cm. (x) 2.2.1961 to 12.3.1961 ; 3.3.1962 to 30.4.1962 ; 6 to 19.3.1963.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2).

(1) 3 spacings :  $S_1=91$  cm.  $\times$  61 cm. ;  $S_2=152$  cm.  $\times$  61 cm. and  $S_3=183$  cm.  $\times$  61 cm.

(2) 3 dates of sowing :  $D_1=15$  days before normal ;  $D_2=Normal$  and  $D_3=15$  days after normal.

Exact dates given below.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=56.0$  and  $N_2=112.0$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=56.0$  and  $P_2=112.0$  Kg/ha.

Dates of sowing during 1961 :  $D_1=11.6.1960$  ;  $D_2=25.6.1960$  and  $D_3=12.7.1960$ .

Dates of sowing during 1962 :  $D_1=16.6.1961$  ;  $D_2=30.6.1961$  and  $D_3=15.7.1961$  and during 1963  $D_1=17.6.1962$  ;  $D_2=2.7.1962$  and  $D_3=16.7.1962$ .

Fertilizers applied by line placement in 1960 and during 1962 N applied by ring placement in 24.8.1962 and 30.9.1962. P applied by line placement before sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication ; 9 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 1/197.7 ha. (b) 1/247.1 ha. (v) N.A. (vi) Yes.

## 4. GENERAL :

(i) Normal in 1960 and 1962, satisfactory in 1961 (ii) Attack of aphids and woolly mite in 1960 and Nil in 1961 and 1962. (iii) *Kapas* yield. (iv) (a) 1960 to 1962. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Both the variances for the 3 years are heterogeneous.

## 5. RESULTS :

(i) 710 Kg/ha. (ii) (a) 237.8 Kg/ha. (b) 158.9 Kg/ha. (iii) Main effect of N is highly significant. Interaction  $N \times P$  is significant. Other effects are not significant. (iv) Av. yield of *kapas* in Kg/ha.

	$S_1$	$S_2$	$S_3$	$D_1$	$D_2$	$D_3$	$P_0$	$P_1$	$P_2$	Mean
$N_0$	635	516	569	537	662	521	585	568	568	574
$N_1$	735	650	714	713	740	647	730	713	656	700
$N_2$	872	818	881	815	888	869	795	885	892	857
Mean	747	661	721	688	764	679	703	722	705	710
$P_0$	758	624	727	690	740	679				
$P_1$	752	716	697	702	792	672				
$P_2$	732	643	739	672	759	685				
$S_1$	764	731	568							
$S_2$	845	613	832							
$S_3$	633	640	763							

C.D. for N marginal means = 61.0 Kg/ha.

C.D. for body of  $N \times P$  table means = 105.7 Kg/ha.

## 61(157)

(i) 271 Kg/ha. (ii) (a) 52.4 Kg/ha. (b) 48.4 Kg/ha. (iii) Main effect of S, N and interaction  $N \times P$  are highly significant. Main effect of P and interaction  $D \times N$  is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	262	224	189	207	248	219	224	222	228	225
N <sub>1</sub>	294	251	257	287	263	251	265	274	262	267
N <sub>2</sub>	329	321	309	336	322	301	296	302	361	320
Mean	295	265	252	277	278	257	262	266	284	271
P <sub>0</sub>	298	258	230	275	268	243				
P <sub>1</sub>	292	254	252	263	273	262				
P <sub>2</sub>	295	284	273	292	294	265				
D <sub>1</sub>	306	286	258							
D <sub>2</sub>	318	286	250							
D <sub>3</sub>	261	263	247							

C.D. for S marginal means=23.3 Kg/ha.

C.D. for N or P marginal means=18.6 Kg/ha.

C.D. for N×P table means=32.2 Kg/ha.

C.D. for N means at the same level of D=32.1 Kg/ha.

C.D. for D means at the same level of N=33.8 Kg/ha.

62(170)

- (i) 306 Kg/ha. (ii) (a) 292.8 Kg/ha. (b) 125.8 Kg/ha. (iii) Main effect of S alone is highly significant.  
 (iv) Av. yield of kapas in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	476	244	188	354	301	254	273	323	313	303
N <sub>1</sub>	508	239	207	347	329	277	301	305	349	318
N <sub>2</sub>	460	225	211	355	318	222	258	350	287	298
Mean	481	236	202	352	316	251	277	326	316	306
P <sub>0</sub>	405	225	202	347	295	189				
P <sub>1</sub>	538	231	210	353	323	303				
P <sub>2</sub>	501	252	195	357	331	261				
D <sub>1</sub>	528	263	265							
D <sub>2</sub>	563	211	174							
D <sub>3</sub>	353	233	167							

C.D. for S marginal means=129.9 Kg/ha.

Crop :- Cotton (Kharif).

Ref :- Gj. 61(163), 62(60), 64(205).

Site :- Agri. Res. Stn., Kothara.

Type :- 'CM'.

Object:—To find out the optimum spacing and fertilizer dose for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar-Cotton-Groundnut*. (b) *Jowar*. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Sandy. (iii) 2.7.1961 ; 22.7.1962 ; 9.7. 1964. (iv) (a) 2 ploughings+2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 3. (v) 12.4 C.L./ha. of F.Y.M. (vi) Kalyan (medium). (vii) Unirrigated. (viii) 3 intercroppings+2 weedings. (ix) 87 cm. ; 28 cm. and 37 cm. (x) 15.3.1962 to 16.4.1962 ; 24.3.1963 ; 31.3.1965.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 3 row spacings :  $R_1=46$ ,  $R_2=69$  and  $R_3=91$  cm.

(2) 3 plant spacings :  $S_1=15$ ,  $S_2=23$  and  $S_3=30$  cm.

(3) 3 manurial treatments :  $M_0$ =Control (No manure),  $M_1=11.2$  Kg/ha. of N as A/S+11.2 Kg/ha. of  $P_2O_5$  as Super and  $M_2=22.4$  Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.

## 3. DESIGN :

(i)  $3^3$  confd. (ii) (a) 9 plots/block, 3 blocks/replication. (b) 24.7 m.  $\times$  82.3 m. (iii) 2 (iv) 8.2 m.  $\times$  9.1 m. (b) 5.5 m.  $\times$  7.3 m. (v) 137 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of *kapas*. (iv) (a) 1961-1965 (Not conducted in 1963). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the allocation of treatment combination to different blocks is not properly done, the expt. is analysed as a fact. in R.B.D.

## 5. RESULTS :

## 61(163)

(i) 259 Kg/ha. (ii) 70.9 Kg/ha. (iii) Main effects of M alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	$R_1$	$R_2$	$R_3$	$M_0$	$M_1$	$M_2$	Mean
$S_1$	261	232	227	164	230	326	240
$S_2$	239	315	276	158	251	421	277
$S_3$	229	267	285	179	281	321	260
Mean	243	271	263	167	254	356	259
$M_0$	157	191	152				
$M_1$	239	269	254				
$M_2$	333	353	382				

C.D. for M marginal means=48.5 Kg/ha.

## 62(60)

(i) 176 Kg/ha. (ii) 55.8 Kg/ha. (iii) Main effects of R and M are significant and interaction  $R \times M$  is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$R_1$	$R_2$	$R_3$	$M_0$	$M_1$	$M_2$	Mean
$S_1$	128	187	188	183	163	158	168
$S_2$	148	134	222	190	192	123	168
$S_3$	175	211	191	162	247	167	192
Mean	150	177	200	179	201	149	176
$M_0$	130	204	202				
$M_1$	169	235	198				
$M_2$	152	93	202				

C.D. for R or M marginal means=38.3 Kg/ha.

C.D. for  $R \times M$  table means =66.4 Kg/ha.

64(205)

(i) 226 Kg/ha. (ii) 61.8 Kg/ha. (iii) Main effects of R and S are highly significant (iv) Av. yield of *kapas* in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	83	191	266	189	193	157	180
S <sub>2</sub>	148	249	342	257	269	213	246
S <sub>3</sub>	149	289	318	272	242	242	252
Mean	126	243	309	239	235	204	226
M <sub>0</sub>	145	215	357				
M <sub>1</sub>	121	261	323				
M <sub>2</sub>	113	253	246				

C.D. for R or S marginal means=42.4 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 61(95).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Type :- 'CM'.**

**Object :-** To study the optimum dose of manure along with spacing for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra*. (c) N.A. (ii) Sandy loam. (iii) 28.6.1961. (iv) (a) 4 ploughings and 2 harrowings. (b) Dibbling. (c) 1 Kg/ha. (d) As per treatments. (e) N.A. (v) 24.7 C.L./ha. of F.Y.M. (vi) Hybrid (vii) Irrigated. (viii) 8 Intercultings. (ix) 65 cm. (x) 6.1.62 ; to 12.2.62 ; 26.2.62 to 2.3.62 ; 16.3.62 to 19.3.62 ; 7.4.62.

**2. TREATMENTS :**

All combinations of (1), (2) and (3)

(1) 3 spacings : S<sub>1</sub>=183 cm. × 61 cm., S<sub>2</sub>=183 cm. × 122 cm. and S<sub>3</sub>=183 cm. × 183 cm.

(2) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(3) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 and P<sub>3</sub>=67.2 Kg/ha.

N applied to plants in rings on 20.7.1961 ; 27.6.1961 and 16.9.1961.

P applied to plants in rings on 17.7.1961.

**3. DESIGN :**

(i) 3<sup>3</sup> confd. (ii) (a) 9 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 14.6 m. × 7.3 m. (b) 14.6 m. × 5.5 m. (v) 91 cm. along length on either side of breadth. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Attack of Jassides, Aphids, Red cotton bug and Boll worms. Insecticides were applied. (iii) seed Cotton. (iv) (a) 1961-1962 (Modified in 1962). (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 1513 Kg/ha. (ii) 398.7 Kg/ha. (iii) Only the main effect of S is highly significant. (iv) Av. yield of seed cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	1641	1664	1305	1606	1506	1498	1537
N <sub>2</sub>	1747	1492	1104	1378	1427	1538	1448
N <sub>3</sub>	1725	1686	1258	1239	1589	1841	1556
Mean	1704	1614	1222	1407	1507	1626	1513
P <sub>1</sub>	1614	1557	1051				
P <sub>2</sub>	1634	1585	1303				
P <sub>3</sub>	1865	1699	1313				

C.D. for S marginal means=275.6 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Ref. :- Gj. 62(219).**

**Type :- 'CM'.**

Object :- To find out proper spacing and fertilizer dose to Cotton.

1. BASAL CONDITION :

(i) (a) Cotton-Bajra-wheat. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 2.7.62. (iv) (a) 4 ploughings and 1 harrowing- (b) Dibbling. (c) 2 Kg/ha. (d) As per treatments (e) 1-2. (v) 24.7 C.L./ha. of F.Y.M. (vi) Hybrid cotton (B.C. 68×S.I.V. 135). (vii) Irrigated. (viii) 4 weedings and 4 interculturings. (ix) 60 cm. (x) 21.1.1963 ; 6.2.1963 ; 27.2.1963 ; 3.3.1963 ; 13.4.1963.

2. TREATMENTS :

**Main-plot treatments**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 and P<sub>3</sub>=67.2 Kg/ha.

**Sub-plot treatments**

3 spacings : S<sub>1</sub>=183 cm.×61 cm., S<sub>2</sub>=183 cm.×122 cm. and S<sub>3</sub>=183 cm.×183 cm.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication, 3 sub-plots/main-plots. (b) N.A. (iii) 2. (iv) (a) 14.6 m.×7.3 m. (b) 14.6 m.×5.5 m. (v) 91 cm. on either side. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Attack of Aphids, Jassides and Pink boll worm. Endrex and Mycop were sprayed. (iii) Seed cotton yield. (iv) (a) 1961-1962 (Modified in 1962). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 965 Kg/ha. (ii) (a) 241.7 Kg/ha. (b) 241.7 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of kapas in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
P <sub>1</sub>	1102	1049	760	1582	675	654	970
P <sub>2</sub>	837	1055	1107	1340	953	706	1000
P <sub>3</sub>	854	922	995	1564	634	573	924
Mean	931	1009	954	1495	754	644	965
S <sub>1</sub>	1518	1522	1446				
S <sub>2</sub>	656	800	806				
S <sub>3</sub>	619	704	610				

C.D. for S marginal means=169.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(250), 64(265), 65(30).**

**Site :- Cotton Breeding Sub-Stn., Porbander.**

**Type :- 'CM'.**

Object :—To determine the optimum requirements of spacings and fertilizers for Cotton.

1. BASAL CONDITIONS :

(i) (a) Groundnut-Cotton. (b) Groundnut. (c) 12.4 C.L/ha. of F.Y.M. (ii) Medium light shallow soil. (iii) 5.7.63 ; 20.8.64 ; 5, 6.8.65. (iv) (a) 1 ploughing and harrowing. (b) Drilling. (c) 12 Kg/ha. (d) As 8 per treatments. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. (vi) Kalyan. (vii) Unirrigated. (viii) 3 interculturings. (ix) 35 cm. (x) 7.1.64 ; 9.3.65 ; 24.2.66.

2. TREATMENTS :

**Main-plot treatments**

3 spacings between rows : S<sub>1</sub>=61, S<sub>2</sub>=76 and S<sub>3</sub>=91 cm.

**Sub-plot treatments**

All combinations of (1) and (2)

(1) 4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2, N<sub>2</sub>=22.4 (in two equal doses) and N<sub>3</sub>=22.4 Kg/ha.

(2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=22.4 Kg/ha.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 8 sub-plots/main-plot. (b) Nil. (iii) 4. (iv) (a) 10.4 m × 7.3 m for S<sub>1</sub>, 10.7 m × 7.3 m. for S<sub>2</sub> and 11.0 m. × 7.3 m. for S<sub>3</sub>. (b) 9.1 m × 6.1 m. (v) Yes.

4. GENERAL :

(i) Normal. (ii) Insecticides applied as precautionary measure. (iii) Yield of *kapas*. (iv) (a) 1963-1965. (b) No. (c) Results of combined analysis are given under 5. (v) Viramgam. (vi) Nil. (vii) Both the error variance are homogenous and both the Treatments × years interactions are present.

5. RESULTS :

(i) 250 Kg/ha. (ii) (a) 300.1 Kg/ha. with 4 d.f. made up of interaction of years with (N, P, N × S and P × S) (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	262	226	226	230	246	238
N <sub>1</sub>	272	259	236	260	251	256
N <sub>2</sub>	253	236	240	246	240	243
N <sub>3</sub>	275	267	251	274	255	264
Mean	266	247	238	252	248	250
P <sub>0</sub>	275	236	247			
P <sub>1</sub>	256	259	230			

**Crop : Cotton (Kharif).****Ref :- Gj. 60(49), 61(139).****Site :- Agri. Res. Stn., Surat.****Type :- 'CM'.**

Object :—To find out the optimum yield of Cotton by different treatments of N, P, K and F.Y.M. with different spacings and number of plants/hill.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Deep black. (iii) 7.7.1960, 29.6.1961. (iv) (a) N.A., 1 harrowing. (b) Dibbling. (c) 6 Kg/ha. (d) and (e) As per treatments. (v) Nil. (vi) 2087 Vijalpa. (vii) Unirrigated. (viii) 4 interculturings, 4 weedings and 2 harrowings ; 4 interculturings. (ix) 87 cm. ; 122 cm. (x) 26.3.1961, 26, 27.4.1962.

**2. TREATMENTS :****Main-plot treatments**

All combinations of (1), (2), (3), (4) and (5)

- (1) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=33.6$  Kg/ha.  
 (2) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=67.2$  Kg/ha.  
 (3) 2 spacings :  $S_1=152$  cm  $\times$  61 cm. and  $S_2=152$  cm.  $\times$  91 cm.  
 (4) 2 levels of number of plants/hill :  $D_1=1$  and  $D_2=2$ .  
 (5) 2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5604$  Kg/ha.

**Sub-plot treatments**

3 levels of N as A/S :  $N_0=0$ ,  $N_1=33.6$  and  $N_2=67.2$  Kg/ha.  
 N, P, and K applied on 25.8 1961 and F.Y.M. on 29.6.1961.

**3. DESIGN :**

(i) Split-plot confounding. (ii) (a) 8 main-plots/block, 4 blocks/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 7.6 m  $\times$  9.1 m. (b) 4.6 m  $\times$  7.3 m. (v) 152 cm  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. Not satisfactory. (ii) Slight attack of boll worms. (iii) Yield of seed Cotton. (iv) (a) 1957 to 1961. (b) No. (c) Nil. (v) No. (vi) N.A., Due to continuous rains July and August, the crop growth was hampered in 1961. (vii) Sub-plot errors are heterogenous for experiments conducted during 1957 to 1961.

**5. RESULTS :****1960 (49)**

(i) 460 Kg/ha. (ii) (a) 177.9 Kg/ha. (b) 92.4 Kg/ha. (iii) Main effects of N alone is highly significant. (iv) Average yield of seed cotton and mean and differential response table in Kg/ha.

Differential response

Mean response	P		K		S		D		F	
	—	+	—	+	—	+	—	+	—	+
P	32	—	62	3	26	38	72	—7	26	39
K	9	37	—20	—	—4	21	37	—	—17	34
S	—35	—42	—29	—48	—22	—	—51	—19	6	—77
D	—59	—19	—99	—30	—88	—75	—43	—	—68	—50
F	22	+15	28	—4	48	63	—20	13	31	—

	$P_0$	$P_1$	$K_0$	$K_1$	$S_1$	$S_2$	$D_1$	$D_2$	$F_0$	$F_1$	Mean
$N_0$	397	435	422	409	436	397	421	411	413	419	416
$N_1$	465	491	470	486	505	451	526	431	461	495	479
$N_2$	468	501	474	495	491	479	521	448	472	497	484
Mean	444	475	455	464	477	442	490	430	448	471	460

C.D. for N marginal means=47.7 Kg/ha.

1961

(i) 494 Kg/ha. (ii) (a) 145.2 Kg/ha. (b) 88.8 Kg/ha. (iii) Main effect of N is highly significant. Interactions K×S and S×N are significant. (iv) Mean and differential response table and yield of seed Cotton in Kg/ha.

Differential response

Mean response	P		K		S		D		F	
	-	+	-	+	-	+	-	+	-	+
P 24	—	—	-20	68	19	29	55	-7	6	42
K 29	-15	73	—	—	10	-42	59	-1	79	-21
S 8	3	13	79	-63	—	—	44	-28	19	-3
D -49	-18	-80	-19	-79	-13	-85	—	—	-11	-87
F 21	3	39	71	-29	32	10	59	-17	—	—

C.D. for K×S differential response= 99.1 Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	403	448	407	445	447	405	457	395	425	426	426
N <sub>1</sub>	472	486	461	496	483	475	486	472	456	501	479
N <sub>2</sub>	570	584	569	584	540	613	612	541	568	586	577
Mean	482	506	479	508	490	498	518	469	483	504	494

S.E. of the difference of two

C.D. for N marginal means=45.8 Kg/ha.

C.D. for N means at the same level of S=64.8 Kg/ha.

C.D. for S means at the same level of N=80.7 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- 61(186), 62(142).**

**Site :- Trial-cum-Demons Farm, Thasra.**

**Type :- 'CM'.**

Object :- To find out suitable spacing and optimum dose of N and P for Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A., Wheat. (c) N.A., 44.8 Kg/ha. of N+22.4Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 4.7.1961, 8.7.1962. (iv) (a) 3 ploughings and 1 harrowing in 1961 and 1 ploughing and 2 harrowings in 1962. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1 ; 1 to 2. (v) 19.8 C.L/ha. of F.Y.M. in 1961 and Nil in 1962. (vi) Hybrid. (vii) Irrigated. (viii) 8 interculturations and 8 weedings in 1961 and 3 interculturations and 4 weedings in 1962. (ix) 73cm., 66 cm. (x) 18.5.1962, 8.2.63 to 8.4.63.

2. TREATMENTS :

**Main-plot treatments**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>1</sub>=33.6, N<sub>2</sub>=67.2 and N<sub>3</sub>=100.9 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>1</sub>=22.4, P<sub>2</sub>=44.8 and P<sub>3</sub>=67.2 Kg/ha.

**Sub-plot treatments**

3 spacings : S<sub>1</sub>=183 cm×61 cm., S<sub>2</sub>=183 cm.×122 cm. and S<sub>3</sub>=183 cm×183 cm.

N applied in three split doses on 17.8.1961, 17.9.1961 and 11.10.1961. P<sub>2</sub>O<sub>5</sub> drilled at sowing.



## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 14.6 m × 7.3 m. (b) 14.6 m × 5.5 m. (v) 91 cm. on either side. (vi) Yes.

## 4. GENERAL :

(i) Below normal in 1961 and normal in 1962. (ii) Heavy attack of cater pillers in initial stages. black arm diseases. Endrin E.C. 20 was sprayed in 1961 Nil in 1962. (iii) Seed cotton yield. (iv) (a) 1961-contd. (design modified in 1963 and 1964). (b) No. (c) Nil. (v) N.A. (vi) Heavy damage due to frost in 1961. (vii) Sub-plot errors are heterogenous.

## 5. RESULTS :

## 1961

(i) 528 Kg/ha. (ii) (a) 127.6 Kg/ha. (b) 84.4 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Average yield of seed cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	533	454	412	449	498	452	466
N <sub>2</sub>	705	486	521	620	594	497	570
N <sub>3</sub>	636	535	471	470	657	515	547
Mean	625	492	468	573	583	488	528
P <sub>1</sub>	648	462	429				
P <sub>2</sub>	651	600	498				
P <sub>3</sub>	575	413	476				

C.D. for S marginal means=59.1 Kg/ha.

## 1962

(i) 1040 Kg/ha. (ii) (a) 173.9 Kg/ha. (b) 134.2 Kg/ha. (iii) Main effect of S and interaction S×N×P are highly significant. (iv) Average yield of seed Cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>1</sub>	1245	902	787	922	900	1111	978
N <sub>2</sub>	1301	1027	875	1044	1123	1036	1068
N <sub>3</sub>	1366	1035	819	1028	997	1196	1074
Mean	1304	988	827	998	1007	1114	1040
P <sub>1</sub>	1147	990	857				
P <sub>2</sub>	1339	905	777				
P <sub>3</sub>	1426	1069	848				

C.D. for S marginal means=93.9 Kg/ha.

Crop :- Cotton (*Kharif*).

Site :- Trial-cum-Demons Farm, Thasra.

Ref :- GJ. 63(172).

Type :- 'CM'.

Object :- To find out the optimum spacing and fertilizer dose for Hybrid Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 13.7.63. (iv) (a) 2 ploughings and 1 harrowing. (b) Dibbling. (c) 2 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) Hybrid. (vii) Irrigated. (viii) 4 weedings and 5 interculturings. (ix) 102 cm. (x) 4 pickings, starting from 10.3.64.

## 2. TREATMENTS :

## Main-plot treatments

3 spacings :  $S_1=183\text{ cm} \times 61\text{ cm.}$ ,  $S_2=183\text{ cm} \times 122\text{ cm.}$  and  $S_3=183\text{ cm} \times 183\text{ cm.}$

## Sub-plot treatments

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=99.9$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_1=22.4$ ,  $P_2=44.8$  and  $P_3=67.2$  Kg/ha.

N applied in 3 doses and  $P_2O_5$  applied at sowing. Time of application of N is N.A.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 9 sub-plots/main plot. (b) N.A. (iii) 2. (iv) (a) 7.3 m.  $\times$  14.6 m. (b) 5.5 m.  $\times$  11 m. (v) 91 cm.  $\times$  183 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed Cotton yield. (iv) (a) 1961-1965, (modified in 1963, 64 and 65). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Yield was slightly attacked by frost.

## 5. RESULTS :

(i) 858 Kg/ha. (ii) (a) 162.3 Kg/ha. (b) 116.3 Kg/ha. (iii) Main effects of N and S are highly significant. Interaction N  $\times$  P is significant. (iv) Average yield of seed Cotton in Kg/ha.

	$S_1$	$S_2$	$S_3$	$P_1$	$P_2$	$P_3$	Mean
$N_1$	1229	938	548	980	855	880	905
$N_2$	1069	794	437	745	772	783	767
$N_3$	1229	938	540	847	1019	842	903
Mean	1176	890	508	857	882	835	858
$P_1$	1210	847	515				
$P_2$	1201	927	518				
$P_3$	1116	897	493				

C.D. for S marginal means =232.8 Kg/ha.

C.D. for N marginal means =80.1 Kg/ha.

C.D. for body of N  $\times$  P table means=138.6 Kg/ha.

Crop :- (Kharif).

Site :- Trial-cum-Demons. Farm, Thasra.

Ref :- GJ. 64(109).

Type :- 'CMP'.

Object :—To find out the optimum spacing and dose of fertilizer for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super. (ii) Sandy loam. (iii) 10.7.64. (iv) (a) 3 ploughings and 3 harrowings. (b) Dibbling. (c) 2 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) Hybrid. (vii) Irrigated. (viii) 3 weedings and 7 interculturings. (ix) 77 cm. (x) 5 pickings from 20.2.65 to 18.4.65.

## 2. TREATMENTS :

## Main-plot treatments

2 spacings :  $S_1=183 \text{ cm.} \times 61 \text{ cm.}$  and  $S_2=183 \text{ cm.} \times 122 \text{ cm.}$

## Sub-plot treatments :

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_1=33.6$ ,  $N_2=67.2$  and  $N_3=99.9 \text{ Kg/ha.}$

(2) 3 levels of  $P_2O_5$  as Super :  $P_1=22.4$ ,  $P_2=44.8$  and  $P_3=67.2 \text{ Kg/ha.}$

(3) 3 levels of  $K_2O$  as Pot. Sul :  $K_0=0$ ,  $K_1=22.4$  and  $K_2=44.8 \text{ Kg/ha.}$

N applied in three doeses on 27.8.1964, 11.9.1964 and 25.9.1964,  $P_2O_5$  and  $K_2O$  applied before sowing.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 2 main-plots/replication 3 blocks/main-plots and 9 sub-plots/block.

(b) N.A. (iii) 1. (iv) 7.3 m.  $\times$  14.6 m. (b) 3.7 m.  $\times$  12.2 m. (v) 183  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. Insecticides were applied thrice. (iii) seed cotton yield. (iv) (a) 1961—1965 (modified in 1963—1964 and 65). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1527 Kg/ha. (ii) (a) 458.4 Kg/ha. (b) 464.0 Kg/ha. (iii) Main effects of N alone is highly significant. (iv) Av. yield of seed cotton in Kg/ha.

	$N_1$	$N_2$	$N_3$	$K_0$	$K_1$	$K_2$	$S_1$	$S_2$	Mean
$P_1$	990	1312	1796	1344	1330	1424	1309	1423	1366
$P_2$	1239	1495	1730	1545	1362	1557	1619	1357	1488
$P_3$	1493	1615	2074	1439	1753	1990	1951	1504	1727
Mean	1241	1474	1867	1443	1482	1657	1626	1428	1527
$S_0$	1274	1529	2077	1531	1558	1790			
$S_1$	1207	1419	1657	1354	1405	1524			
$K_0$	1342	1357	1629						
$K_1$	1136	1420	1889						
$K_2$	1244	1644	2082						

C.D. for N marginal means = 321.8 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(266).**

**Site :- Trial-cum-Demons. Farm Thasra.**

**Type :- 'CM'.**

**Object :-** To find out suitable spacings and optimum dose of fertilizers for cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) cotton. (c) 74.1 Kg/ha. of N + 37.0 Kg/ha. of  $P_2O_5$ . (ii) Goradu soils. (iii) 20.7.65. (iv) (a) 2 ploughings, 1 harrowing. (b) Dibbling. (c) —. (d) As per treatments. (e) One plant/hill (v) Nil. (vi) Hybrid cotton. (vii) Irrigateds. (viii) 3 weeding. (ix) 41.9 cm. (x) 25.1.66 ; 2, 14.2.66 ; 18.3.1966.

## 2. TREATMENTS :

**Main-plot treatments**2 spacings :  $S_1=183 \text{ cm.} \times 61 \text{ cm.}$  and  $S_2=183 \text{ cm.} \times 122 \text{ cm.}$ **Sub-plot treatments**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_1=37.0$ ,  $N_2=74.1$  and  $N_3=111.1 \text{ Kg/ha.}$ (2) 3 levels of  $P_2O_5$  as Super :  $P_1=24.7$ ,  $P_2=49.9$  and  $P_3=74.1 \text{ Kg/ha.}$ (3) 3 levels of  $K_2O$  as Pot. Sul :  $K_0=0$ ,  $K_1=24.7$  and  $K_2=49.4 \text{ Kg/ha.}$ N applied in two doses, 1st dose at sowing, 2nd dose on 21.8.65.  $P_2O_5$  and  $K_2O$  applied at sowing.

## 3. DESIGN :

(i) Split-plots. (ii) (a) 2 main-plots/replication, 27 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a)  $7.3 \text{ m.} \times 14.6 \text{ m.}$  (b)  $3.7 \times 12.2 \text{ m.}$  (v)  $183 \times 122 \text{ cm.}$ 

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1964—1965 (1964 N.A.). (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 1482 Kg/ha. (ii) (a) 3139.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	Mean
$S_0$	1574	1694	1697	1651	1660	1654	1686	1654	1625	1655
$S_1$	1280	1307	1338	1264	1285	1375	1357	1299	1268	1308
Mean	1427	1501	1518	1458	1473	1515	1522	1477	1447	1482
$K_0$	1497	1558	1510	1485	1501	1579				
$K_1$	1430	1444	1556	1418	1432	1581				
$K_2$	1354	1500	1486	1471	1485	1383				
$P_0$	1450	1447	1475							
$P_1$	1372	1530	1516							
$P_2$	1458	1525	1560							

**Crop :- Cotton (Kharif).****Site :- Agri. Res. Stn., Umrela.****Ref :- Gj. 60(108), 61(80).****Type :- 'CM'.**

Object :—To find out the optimum dose of fertilizers and suitable spacings for cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 61(80), Paddy for 61(180). (c) Nil for 60(108). 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 61(80). (ii) Medium black. (iii) 25.6.1960 ; 30.6.1961. (iv) (a) 1 ploughing and 1 harrowing for 60(108) and 1 ploughing and 2 harrowings for 61(80). (b) Drilling. (c) N.A. ; 17 Kg/ha. (d) As per treatments. (e) N.A. (v) N.A. for for 60(108) and 22.4 C.L./ha. of F.Y.M. for 61(80). (vi) C.J. 73. (vii) Un-irrigated. (viii) N.A. ; 2 in interculturings. (ix) 27.10.1960, 2.11.1960, 22.11.1960 ; 24.10.1961.

## 2. TREATMENTS :

**Main-plot treatments**3 row spacings :  $R_1=46$ ,  $R_2=69$  and  $R_3=91 \text{ cm.}$ **Sub-plot treatments**2 plants spacings :  $S_1=15$  and  $S_2=23 \text{ cm.}$ **Sub-plot treatments**3 levels of fertilizers :— $M_0$ =Control (no fertilizers),  $M_1=22.4 \text{ Kg/ha.}$  of N+11.2 Kg/ha. of  $P_2O_5$  and  $M_2=2 M_1$ .N as A/S and  $P_2O_5$  as Super applied at sowing.

## 3. DESIGN :

(i) Split-split-plot. (ii) (a) 3 main-plots/replication ; 2 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 7.3m. × 9.14 m. for R<sub>1</sub> and R<sub>2</sub>; 6.9 × 9.1 m. for R<sub>2</sub> for 60(108). and 7.3 × 9.1 m. for 61(80). (b) 5.5m. × 7.3 m. (v) N.A. for 60(108) ; 91 cm. allround for 61(80). (vi) Yes.

## 4. GENERAL :

(i) Good ; not satisfactory. (ii) Nil. (iii) Seed cotton. (iv) (a) 1958—1961. (b) No. (c) Nil (v) Vallabhipur. (vi) Nil ; unadequate rainfall in 1961. (vii) Sub-plot and sub-sub-plot errors are heterogeneous.

## 5. RESULTS :

## 1960

(i) 1031 Kg/ha. (ii) (a) 135.1 Kg/ha. (b) 185.4 Kg/ha. (c) 166.1 Kg/ha. (iii) Main effect of R alone is highly significant, interaction S × M is significant. (iv) Av. yield of seed cotton in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1219	1004	873	1040	934	1123	1032
S <sub>2</sub>	1207	917	965	950	1104	1035	1030
Mean	1213	961	919	995	1019	1079	1031
M <sub>0</sub>	1170	950	866				
M <sub>1</sub>	1204	888	966				
M <sub>2</sub>	1265	1045	926				

C.D. for R marginal means = 127.2 Kg/ha.

C.D. for S means at the same level of M = 161.6 Kg/ha.

C.D. for M means at the same level of S = 180.0 Kg/ha.

## 1961

(i) 162 Kg/ha. (ii) (a) 61.1 Kg/ha. (b) 45.4 Kg/ha. (c) 74.8 Kg/ha. (ii) Interaction R × S is highly significant. (iv) Av. yield of seed cotton in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	227	132	124	186	129	167	161
S <sub>2</sub>	153	143	196	146	163	180	164
Mean	190	137	160	167	146	174	162
M <sub>0</sub>	214	137	151				
M <sub>1</sub>	159	128	151				
M <sub>2</sub>	197	147	177				

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(157) 61(99).**

**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Type :- 'CM'.**

**Object :-** To find out the optimum dose of N required along with spacings for cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. for 60(157) and Groundnut for 61(99). (c) N.A. (ii) Medium black. (iii) N.A. 8.7.1961. (iv) (a) N.A. ; 2 harrowings. (b) Drilling. (c) 11 Kg/ha. ; 13 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil ; 12.4 C.L./ha. of F.Y.M. for 61 (99). (vi) C.J.—73. (vii) Un-irrigated. (viii) 2 inter-culturings ; 3 inter-culturings. (ix) 75 cm. ; 60 cm. (x) N.A. ; 29.10.1961, 20.11.1961 and 11.12.1961.

## 2. TREATMENTS :

**Main-plot treatments**3 row spacings :  $R_1=46$ ,  $R_2=69$  and  $R_3=91$  cm.**Sub-plot treatments**2 plants spacings :  $S_1=15$  and  $S_2=23$  cm.**Sub-plot treatments**3 levels of fertilizers :  $M_0$ =Control (no fertilizers),  $M_1=22.4$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_2=2 M_1$ .N as A/S applied by hand after sowing and  $P_2O_5$  as Super drilled at sowing.

## 3. DESIGN :

(i) Split-Split-plot. (ii) (a) 3 main-plots/replication ; 2 sub-plots/main-plot and 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 11.6 m.  $\times$  7.2 m. (b) 8.2 m.  $\times$  5.5 m. (v) 168 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) N.A. crop was effected due to shortage of rains in 1961. (ii) N.A. Slight attack of boll worms in 1961. (iii) Seed cotton yield. (iv) (a) 1960—1961. (b) No. (c) Results of combined analysis given under 5. (v) Umrela. (vi) Nil. (vii) All the error variances are homogeneous.

## 5. RESULTS :

(i) 424 Kg/ha. (ii) (a) 135.2 Kg/ha. (based on 10 d.f. composed of pooled error and interaction  $R \times$  years), (b) 76.1 Kg/ha. (based on 21 d.f. composed of pooled error and two and three factors interaction with years) (c) 149.4 Kg/ha. (based on 56 d.f. composed of pooled error and two and three factors interaction with years). (iii) Only M effect is highly significant. (iv) Av. yield of seed cotton in Kg/ha.

	$R_1$	$R_2$	$R_3$	$M_0$	$M_1$	$M_2$	Mean
$S_1$	446	404	428	328	437	514	426
$S_2$	436	421	406	310	462	490	421
Mean	441	413	417	319	450	502	424
$M_0$	297	322	338				
$M_1$	490	424	435				
$M_2$	536	493	477				

C.D. for M marginal means=70.6 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- GJ. 62(50), 63(47).****Site :- Dry Farming Res. Stn., Vallabhipur.****Type :- 'CM'.**

Object :- To study the effect of N and P with different spacings on cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Wal. (c) 9.0 Kg/ha. of N ; 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 13.7.1962, 7.7.1963. (iv) (a) 4 harrowings. (b) Drilling. (c) 28 Kg/ha. ; 22 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) C.J.—73. (vii) Un-irrigated. (viii) 3 inter-culturings ; 4 inter-culturings, 4 weedings. (ix) 9.11.1962, 23.11.1962, 13.11.1963 and 29.12.1963.

## 2. TREATMENTS :

**Main-plot treatments**3 spacings between rows :  $R_1=46$ ,  $R_2=69$  and  $R_3=91$  cm.**Sub-plot treatments**2 spacings between plants :  $S_1=15$  and  $S_2=23$  cm.**Sub-plot treatments**3 levels of fertilizers :  $M_0$ =Control (no manure),  $M_1=22.4$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_2$ =Twice  $M_1$ . $P_2O_5$  as Super drilled on 13.7.1262.

## 3. DESIGN :

(i) Split-Split plot design. (ii) (a) 3 main-plots/replication ; 2 sub-plots/main-plot and 3 sub-sub plots/main plot. (iii) 3. (iv) (a) 11.6 m.  $\times$  7.2 m. (b) 8.2 m.  $\times$  5.5 m. (v) 168 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal : Below normal. (ii) Nil ; attack of spotted boll worms. Endrine 20% was sprayed twice during 1963. (iii) Seed cotton yield. (iv) (a) 1960 to 1963. (b) No. (c) Nil. (v) Umrela. (vi) Nil. (vii) Errors (a) and errors. (b) heterogeneous.

## 5. RESULTS :

## 1962

(i) 300 Kg/ha. (ii) (a) 219.8 Kg/ha. (b) 200.2 Kg/ha. (c) 59.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed cotton in Kg/ha.

	$R_1$	$R_2$	$R_3$	$M_0$	$M_1$	$M_2$	Mean
$S_1$	297	280	339	286	334	295	305
$S_2$	216	300	302	327	281	279	296
Mean	291	290	320	306	308	287	300
$M_0$	281	313	325				
$M_1$	298	271	354				
$M_2$	294	286	281				

## 1963

(i) 187 Kg/ha. (ii) (a) 57.8 Kg/ha. (b) 40.1 Kg/ha. (c) 52.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed cotton in Kg/ha.

	$R_1$	$R_2$	$R_3$	$M_0$	$M_1$	$M_2$	Mean
$S_1$	199	200	169	168	201	199	189
$S_2$	199	211	142	191	189	172	184
Mean	199	206	155	180	195	186	187
$M_0$	186	205	147				
$M_1$	189	224	172				
$M_2$	222	188	147				

**Crop :- Cotton (Kharif).****Ref :- Gj. 62(241), 63(272), 64(296).****Site :- S.C.R.D. and T Centoe, Vased.****Type :- 'CM'.****Object :-**To study the effect of various G.M. coner crops on yied of Cotton and its residul effect on Bajra.

## 1. BASAL CONDITIONS :

(i) (a) Cotton—*Bajra*. (b) *Bajra*. (c) Nil. (ii) Sandy to clay loam soil. (iii) 29.6.1962 ; 3.7.1963 ; 8.7.1964. (iv) (a) 2 ploughings and 1 harrowing in 1962, 2 ploughings and 2 harrowings in 1963, 2 ploughings and 3 harrowings in 1964. (b) Dibbling. (c) Nil. (d) 30 cm.×90 cm. (e) 1-2. (v) Nil. (vi) CO<sub>2</sub>-170. (vii) Unirrigated. (viii) 4 weedings and 2 interculturings in 1962, 1963 and 4 weedings and 1 interculturing in 1964. (ix) N.A. (x) 24.11.1962 to 16.1.1963 ; 26.12.1963 to 6.4.1964 ; 23.12.1964 to 27.3.1965.

## 2. TREATMENTS :

T<sub>1</sub>=Cotton alone (No G.M.)+12.5 C.L./ha. of F.Y.M. ; T<sub>2</sub>=Cotton with 20 Kg/ha. of N+Lolice (G.M.) (cowpeas)., T<sub>3</sub>=Cotton with 20 Kg/ha. of N+Sannhemp G.M. and T<sub>4</sub>=Cotton with 20 Kg/ha. of N+Guar (G.M.).

G.M. crops were given 20 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, N as A/S in all years. G.M. from the plots to be uprooted and applied in the respective treatments at the rate of equal quantities of 30, 45.5 and 12 Kg. of Lolice, Sannhemp and Guar were applied in the plots after one and half month after sowing in 1962.

G.M. buried in soil on 28.8.1963 as below : 72, 101 and 23 Kg/ha. an average per-plot of cowpeas, Sannhemp and Guar respectively in 1963 and G.M. applied in plots on 15.8.1964. Further details N.A. for 1964.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) Nil. (iii) 6. (iv) (a) 8.1 m.×9.9 m. in 1962 ; 8.0 m.×5.4 m. in 1963 and 1964. (b) 7.8 m.×9.0 m. in 1962 ; 8.0 m.×5.4 m. in 1963 and 1964. (v) 15 cm.×45 cm. in 1962 and Nil in 1963. 1964. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil but endrex was sprayed as precautionary measures in 1962 ; Attack of aphids, jassides and endrex was sprayed in 1963 and 1964 ; B.H.C. also was sprayed in 1964. (iii) Seed cotton yield. (iv) (a) 1962 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is present.

## 5. RESULTS :

(i) 554 Kg/ha. (ii) 169.6 Kg/ha. (based on 6 d.f. made up of Treatments×years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of seed cotton in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Av. yield	522	593	556	545

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(169), 61(197).**

**Site :- Soil Cons. Res. Demons. & Training Centre, Vasad. Type :- 'CM'.**

**Object :-**To study the response of Cotton to different forms of Nitrogenous fertilizers in combination with groundnut as cover crop.

## 1. BASAL CONDITIONS :

(i) (a) Cotton+Groundnut—*Jowar*+Cowpea. (b) *Jowar*+Cowpea. (c) Nil. (ii) Sandy loam to loam. (iii) 26.6.1960 ; 28.6. 1961. (iv) (a) 1 ploughing and harrowing. (b) Dibbling. (c) 9 Kg/ha. (d) 91 cm.×30 cm. (e) 1. (v) 125.5 C.L./ha. of F.Y.M. applied on 18.5.1960 ; 26.5.1961. (vi) CO<sub>2</sub>—170. (vii) Unirrigated. (viii) 4 interculturings ; 6 interculturings. (ix) 42 cm. ; 83 cm. (x) 11.11.1960 to 1.2.1961 (Groundnut 26.10.1960) ; 19.12.1961 to 2.3.1962.

## 2. TREATMENTS :

**Main-plot treatments :**

2 cover crops treatments : T<sub>1</sub>=Cotton with groundnut as cover crop (one row of groundnut in between 2 rows of cotton) and T<sub>2</sub>=Cotton alone (no cover crop).

**Sub-plot treatments :**

3 sources of 44.8 Kg/ha. of N : S<sub>1</sub>=A/S, S<sub>2</sub>=A/C and S<sub>3</sub>=A/S/N.

N applied on 26.7.1960 and 10.8.1961 in bands 15 cm. on either side of cotton rows.



## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12.6 m. × 7.2 m. (b) 10.6 m. × 5.2 m. (v) 100 cm. around. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1957 to 1961 (Treatments modified in 1959). (b) No. (c) Nil. (v) and (vi) Nil. (vii) Both the error variances are heterogeneous.

## 5. RESULTS :

60(169)

(i) 704 Kg/ha. (ii) (a) 194.3 Kg/ha. (b) 87.4 Kg/ha. (iii) Main effect of T alone is significant. (iv) Av. yield of seed cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
T <sub>1</sub>	611	554	565	577
T <sub>2</sub>	771	851	874	832
Mean	691	702	720	704

C.D. for T marginal means = 252.4 Kg/ha.

61(197)

(i) 627 Kg/ha. (ii) (a) 251.8 Kg/ha. (b) 87.1 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of seed cotton in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
T <sub>1</sub>	605	637	547	596
T <sub>2</sub>	650	748	580	659
Mean	628	692	564	628

C.D. for S marginal means = 94.9 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(201), 64(167), 65(56).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'CM'.**

**Object :-** To study the effect of different spacings and fertilizer doses on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 1.8.63 ; 9.7.64 ; 24.7.65. (iv) (a) 2 to 4 harrowings. (b) Drilling. (c) 14 Kg/ha. (d) As per treatments. (e) 1-2. (v) 7.4 C.L./ha. of F.Y.M. (vi) Kalyan. (vii) Unirrigated. (viii) 2 interculturings. (ix) 56. cm. ; 47. cm. ; 39. cm. (x) 26.3.64 and 7.4.64 ; 20.1.65 and 12.2.65 ; 8.2.66 and 28.2.66.

## 2. TREATMENTS :

**Main-plot treatments :**

3 spacings : S<sub>1</sub> = 61 cm. × 23 cm., S<sub>2</sub> = 76 cm. × 23 cm. and S<sub>3</sub> = 91 cm. × 23 cm.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub> = 0 and P<sub>1</sub> = 22.4 Kg/ha.

(2) 4 levels of N as A/S : N<sub>0</sub> = 0, N<sub>1</sub> = 11.2, N<sub>2</sub> = 22.4 (in two doses) and N<sub>3</sub> = 22.4 Kg/ha.

P<sub>2</sub>O<sub>5</sub> drilled on 5.7.1963. N applied by broadcast on 17.9.63 and N<sub>3</sub> on 17.9.1963 and 23.10.63.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 8 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 10.4 m. × 7.3 m. for S<sub>1</sub> ; 10.7 m. × 7.3 m. for S<sub>2</sub> and 11.0 m. × 7.3 m. for S<sub>3</sub>. (b) 9.1 m. × 6.1 m. (v) Varies from S<sub>1</sub> to S<sub>3</sub>. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1963-1965. (b) No. (c) Nil. (v) Porbander. (vi) Nil. (vii) Both the error variances are heterogeneous.

## 5. RESULTS :

63(201)

(i) 731 Kg/ha. (ii) (a) 166.3 Kg/ha. (b) 157.6 Kg/ha. (iii) Interaction P×S is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	718	636	761	787	623	705
N <sub>1</sub>	737	593	741	698	722	690
N <sub>2</sub>	789	764	658	733	740	737
N <sub>3</sub>	934	741	708	766	823	794
Mean	794	683	717	736	727	731
P <sub>0</sub>	753	666	789			
P <sub>1</sub>	835	701	645			

C.D. for P means at the same level of S=178.6 Kg/ha.  
C.D. for S means at the same level of P=160.1 Kg/ha.

64(167)

(i) 928 Kg/ha. (ii) (a) 374.0 Kg/ha. (b) 306.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	817	891	814	710	972	841
N <sub>1</sub>	849	1017	849	905	904	905
N <sub>2</sub>	774	880	1102	786	1051	919
N <sub>3</sub>	1004	1082	1058	1107	989	1048
Mean	861	967	956	877	970	928
P <sub>0</sub>	853	905	873			
P <sub>1</sub>	869	1029	1039			

65(56)

(i) 717 Kg/ha. (ii) (a) 74.4 Kg/ha. (b) 98.3 Kg/ha. (iii) Interaction S×P is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	670	688	723	748	639	694
N <sub>1</sub>	620	767	674	695	680	687
N <sub>2</sub>	752	783	683	726	753	739
N <sub>3</sub>	722	788	737	746	752	749
Mean	691	757	704	729	706	717
P <sub>0</sub>	668	756	762			
P <sub>1</sub>	715	757	647			

C.D. for P means at the same level of S=111.4 Kg/ha.  
C.D. for S means at the same level of P=115.7 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- 60(117), 61(175).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'CM'.**

**Object :-**To determine the optimum spacing and manurial requirements for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 28.7.1960 ; 27.7.1961. (iv) (a) 4. harrowings ; 5 harrowings. (b) Drilling. (c) 13 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) *Kalyan* (late), (vii) Unirrigated. (viii) 7 interculturings and 3 weedings ; 7 interculturings and 5 weedings. (ix) 69 cm. ; 21 cm. (x) 1, 2,3.1961 ; 26 to 28.2.1962.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$ ,  $N_2=22.4$  applied in two doses and  $N_3=22.4$  Kg/ha. applied in single dose.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=22.4$  Kg/ha.

(3) 2 levels of F.Y.M. :  $F_0=0$ , and  $F_1=12.4$  C.L./ha. of F.Y.M.

**Sub-plot treatments**

3 spacings between rows :  $S_1=46$  cm.,  $S_2=61$  cm. and  $S_3=76$  cm.

Time and method of application of manures is N.A.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 16 main-plots/replication ; 3 sub-plots/main-plot. (b) 56.1 m.  $\times$  48.8 m. (iii) 3. (iv) (a) 12.2 m.  $\times$  4.6 m. for  $S_1$  and  $S_3$  ; 12.2 m.  $\times$  4.9 m. for  $S_2$ . (b) 9.1 m.  $\times$  3.7 m. for  $S_1$  and  $S_2$  ; 11.0 m.  $\times$  3.1 m. for  $S_3$ . (v) 152 cm.  $\times$  46 cm. for  $S_1$  ; 152 cm.  $\times$  61 cm. for  $S_2$  and 61 cm.  $\times$  76 cm. for  $S_3$ . (vi) Yes.

**4. GENERAL :**

(i) Normal in 1960 ; lodging and yellowing of plants due to continuous heavy rains in last week of August. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1954 to 1961. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error (a) and Error (b) are both heterogeneous.

**5. RESULTS :**

**60(117)**

(i) 514 Kg/ha. (ii) (a) 218.0 Kg/ha. (b) 87.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of seed cotton in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	$P_0$	$P_1$	$F_0$	$F_1$	Mean
$S_1$	538	474	523	483	507	503	491	519	505
$S_2$	566	509	544	489	516	538	511	542	527
$S_3$	562	482	516	486	520	502	510	512	511
Mean	555	488	528	486	514	514	504	524	514
$F_0$	551	482	524	458	496	511			
$F_1$	558	495	531	514	531	518			
$P_0$	530	473	579	473					
$P_1$	579	504	476	499					

**61(175)**

(i) 924 Kg/ha. (ii) (a) 194.0 Kg/ha. (b) 107.0 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
S <sub>1</sub>	902	867	906	1004	901	938	880	960	920
S <sub>2</sub>	955	851	882	1025	931	926	900	957	928
S <sub>3</sub>	967	829	932	973	904	947	920	930	925
Mean	941	849	907	1001	912	937	900	947	924
F <sub>0</sub>	924	823	872	981	897	903			
F <sub>1</sub>	959	875	941	1021	927	971			
P <sub>0</sub>	962	799	882	1004					
P <sub>1</sub>	921	899	931	997					

C.D. for N marginal means=93.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- GJ. 62(201).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'CM'.**

Object :- To determine the optimum requirements of manuring and spacing for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 1.8.62. (iv) (a) 3 harrowings. (b) Dibbling. (c) 15 Kg/ha. (d) As per treatments. (e) 1 to 2 plants/dibble. (v) Nil. (vi) Kalyan. (vii) Unirrigated. (viii) 2 weedings and 3 interculturings. (ix) 77 cm. (x) 23.3.63.

**2. TREATMENTS :**

**Main-plot treatments :**

3 spacings : S<sub>1</sub>=61 cm. × 61 cm., S<sub>2</sub>=61 cm. × 91 cm. and S<sub>3</sub>=61 cm. × 122 cm.

**Sub-plot treatments :**

3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.

N applied by broadcast at sowing.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 8.5 m. × 12.2 m. for S<sub>1</sub>; 9.1 m. × 12.2 m. for S<sub>2</sub> and 9.8 m. × 12.2 m. for S<sub>3</sub> (b) 7.3 m. × 11 m. (v) N.A. (vi) Yes.

**4. GENERAL :**

(i) The growth was retarded due to continuous rains after sowing. Water lodging. (ii) Nil. (iii) Seed cotton yield. (iv) (a) to (c) No. (v) to (vii) Nil.

**5. RESULTS :**

(i) 396 Kg/ha. (ii) (a) 223.2 Kg/ha. (b) 164.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	410	601	394	468
S <sub>2</sub>	550	325	516	464
S <sub>3</sub>	257	290	225	257
Mean	406	405	378	396

**Crop :- Cotton (Kharif).****Ref :- Gj. 65(136).****Site :- Agri. Res. Stn., Bhachau.****Type :- 'CMV'.**

Object :—To assess the differential response of three varieties of Cotton to spacing and fertilizer.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 67.2 Kg/ha. of N+44.8 Kg/ha. of  $P_2O_5$ . (ii) Sandy soil. (iii) 23.7.65. (iv) (a) 2 ploughing, 1 harrowing. (b) Dibbling. (c) Nil. (d) As per treatments. (e) 2-3 seeds/hill. (v) 24.7 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings. (ix) 35 cm. (x) Dec. 1965 to Feb. 1966.

**3. TREATMENTS :****Main-plot treatments :**2 spacings :  $S_1=46$  cm.  $\times$  23 cm. and  $S_2=69$  cm.  $\times$  23 cm.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 varieties :  $V_1=597-B$  ;  $V_2=797$  and  $V_3=Kalyan$ .(2) 2 level of N as A/S :  $N_0=0$  and  $N_1=22.4$  Kg/ha. of N.**3. DESIGN :**

(i) Split-plot. (ii) 2 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 6.9 m.  $\times$  4.6 m. (b) 5.5 m.  $\times$  3.7 m. (v) 68 cm.  $\times$  46 cm. (vi) Yes.

**4. GENERAL :**

(i) Poor. (ii) Attack of root rot. (iii) Seed cotton yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 179 Kg/ha. (ii) (a) 326.5 Kg/ha. (b) 56.1 Kg/ha. (iii) Interaction  $N \times V$  is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$N_0$	$N_1$	$V_1$	$V_2$	$V_3$	Mean
$S_1$	136	152	107	186	140	144
$S_2$	218	211	201	228	215	215
Mean	177	181	154	207	177	179
$V_1$	138	170				
$V_2$	180	233				
$V_3$	213	141				

C.D. for body of  $N \times V$  table = 67.6 Kg/ha.**Crop :- Cotton (Kharif).****Ref :- Gj. 63(248), 65(28).****Site :- Cotton Breeding Sub-Stn., Porbander.****Type :- 'CMV'.**

Object :—To see the response of different varieties to spacing and fertilizers.

**1. BASAL CONDITIONS :**

(i) (a) Groundnut-Cotton. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. (ii) Medium light shallow soil. (iii) 22.7.63, 20.8.64, 6.8.65. (iv) (a) 1 ploughing, 1-2 harrowings. (b) Dibbling. (c) 10-12 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Unirrigated. (viii) 2-3 interculturings. (ix) 35 cm., 80 cm., 36 cm. (x) 10.2.64, 9.3.65, 22.2.66.

## 2. TREATMENTS :

## Main-plot treatments :

2 spacings :  $S_1=61 \text{ cm.} \times 61 \text{ cm.}$  and  $S_2=91 \text{ cm.} \times 61 \text{ cm.}$

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=22.4 \text{ Kg/ha.}$

(2) 3 varieties :  $V_1=597\text{-B}$ ,  $V_2=797$  and  $V_3=Kalyan$ .

## 3. DESIGN :

(i) Split-plot. (ii) (a) 2 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a)  $8.5 \text{ m.} \times 7.3 \text{ m.}$  (b)  $7.3 \text{ m.} \times 5.5 \text{ m.}$  (v)  $60 \text{ cm.} \times 91 \text{ cm.}$

## 4. GENERAL :

(i) Normal. (ii) Insecticides applied once as precautionary measure. (iii) *Kapas* yield. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Experiment failed in 1964. Sub-plot variances are heterogeneous.

## 5. RESULTS :

63(248)

(i) 248 Kg/ha. (ii) (a) 30.5 Kg/ha. (b) 46.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$S_1$	$S_2$	$N_0$	$N_1$	Mean
$V_1$	232	278	259	251	255
$V_2$	229	232	212	248	230
$V_3$	260	260	284	236	260
Mean	240	257	251	245	248
$N_0$	241	262			
$N_1$	239	251			

65(28)

(i) 488 Kg/ha. (ii) (a) 144.3 Kg/ha. (b) 101.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$S_1$	$S_2$	$N_0$	$N_1$	Mean
$V_1$	463	421	439	446	442
$V_2$	470	483	434	519	476
$V_3$	576	514	534	557	545
Mean	503	473	469	507	488
$N_0$	477	461			
$N_1$	530	485			

Crop :- Cotton (*Kharif*).

Site :- Agri. Res. Stn., Viramgam.

Ref :- Gj. 60(176).

Type :- 'CMV'.

Object :- To study the effect of different spacings and N on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 1.8.60. (iv) (a) 4 harrowings. (b) Dibbling. (c) 15 Kg/ha. (d) As per treatments. (e) 1-2 plants. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 2 interculturings and 2 weedings. (ix) 22 cm. (x) 14.3.61.

## 2. TREATMENTS :

## Main-plot treatments :

3 spacings :  $S_1=61 \text{ cm.} \times 61 \text{ cm.}$  ;  $S_2=61 \text{ cm.} \times 46 \text{ cm.}$  and  $S_3=61 \text{ cm.} \times 23 \text{ cm.}$

## Sub-plot treatments :

2 levels of N as A/S :  $N_0=0$  and  $N_1=22.4 \text{ Kg/ha.}$

## Sub-sub-plot treatments

4 varieties :  $V_1=394-3$  ;  $V_2=597-B$  ;  $V_3=797$  and  $V_4=Kalyan$ .

N applied by broadcast on 23.9.60 and 28.10.60.

## 3. DESIGN :

(i) Split-split-plot. (ii) (a) 3 Main-plots/replication, 2 sub-plots/main-plot, 4 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a)  $3.7 \text{ m.} \times 14.6 \text{ m.}$  (b)  $2.4 \text{ m.} \times 12.8 \text{ m.}$  (v)  $61 \text{ cm.} \times 91 \text{ cm.}$  (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1963-63. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Plot-wise yield data N.A.

## 5. RESULTS :

(i) 446Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of kapas in Kg/ha.

	$S_1$	$S_2$	$S_3$	$N_0$	$N_1$	Mean
$V_1$	367	457	453	424	428	426
$V_2$	390	414	439	436	393	414
$V_3$	423	583	422	447	504	476
$V_4$	386	526	488	487	446	467
Mean	392	495	450	449	443	446
$N_0$	410	482	454			
$N_1$	373	508	447			

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Viramgam.**

**Ref :- GJ. 61(206).**

**Type :- 'CMV'.**

Object :- To study the effect of different spacings and N on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 10.7.61. (iv) (a) 4 harrowings. (b) Dibbling. (c) 15 Kg/ha. (d) As per treatments. (e) 1-2 plants/dibble. (v) Nil. (vi) As per treatments. (vii) Unirrigated. (viii) 5 interculturings and 2 weedings (ix) 18 cm. (x) 28.2.62.

## 2. TREATMENTS and 3. DESIGN :

Same as in expt. no. 60 (176) on page 463.

N applied by broadcast on 27.9.1961.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1960-1963. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Expt. not conducted in 1962.

## 5. RESULTS :

(i) 746 Kg/ha. (ii) (a) 340.2 Kg/ha. (b) 91.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	Mean
V <sub>1</sub>	717	658	782	705	733	719
V <sub>2</sub>	770	765	804	726	834	780
V <sub>3</sub>	772	636	807	728	748	738
V <sub>4</sub>	777	672	793	764	731	747
Mean	759	683	796	731	761	746
N <sub>0</sub>	730	685	777			
N <sub>1</sub>	788	681	815			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(205).**

**Site :- Agri. Res. Stn., Viramgam.**

**Type :- 'CMV'.**

Object :- To study the effect of different spacings and N on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 30.7.63. (iv) (a) 3 harrowings. (b) Dibbling. (c) 14 Kg/ha. (d) As per treatments. (e) 1-2 plants/dibble. (v) 7.4 C.L./ha. of F.Y.M. (vi) As per treatments. (vii) Unirrigated. (viii) 2 interculturings. (ix) 56 cm. (x) 3.3.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 spacings : S<sub>1</sub>=61 cm. × 61 cm. ; S<sub>2</sub>=61 cm. × 46 cm. and S<sub>3</sub>=61 cm. × 23 cm.

**Sub-plot treatments**

2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=22.4 Kg/ha.

**Sub-sub-plot treatments :**

3 varieties : V<sub>1</sub>=597-B, V<sub>2</sub>=797 and V<sub>3</sub>=Kalyan.

N applied by broadcast on 18.9.1963.

## 3. DESIGN :

(i) Split-split-plot. (ii) (a) 3 main-plots/replication, 2 sub-plots/main-plot, 3 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 3.7 m. × 14.6 m. (b) 2.4 m. × 12.9 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. Water lodging in September. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1960-1963 (modified in 1964). (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 297 Kg/ha. (ii) (a) 70.0 Kg/ha. (b) 34.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
N <sub>0</sub>	276	277	337	287	288	316	297
N <sub>1</sub>	256	292	345	292	302	302	298
Mean	266	284	341	289	294	309	297
V <sub>1</sub>	248	290	332				
V <sub>2</sub>	263	281	337				
V <sub>3</sub>	288	282	355				



**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(117), 64(48), 65(125).**

**Site :- Trial-cum-Demons. Farm, Bardoli. Type :- 'P'.**

Object :—To find out the best method of giving irrigations to Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* ; Wheat ; Paddy. (c) 44.8 Kg/ha. of N ; 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  ; 61.8 Kg/ha. of N+37.0 Kg/ha. of  $P_2O_5$ . (ii) Black soil. (iii) 28.6.63 ; 17.7.64 ; 25.6.65. (iv) (a) 1-2 ploughings and harrowings. (b) Dibbling. (c) 7 Kg/ha. (d) 122 cm.×61 cm. (e) 1. (v) Nil. ; 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and 12.4 C.L./ha. of F.Y.M. respectively. (vi) 2087 for 63 and 64 and Digvijay for 65. (vii) As per treatments. (viii) 2-3 weedings ; 2-4 interculturings. (ix) 139 cm. ; 224 cm. ; 106 cm. (x) 11.4.64 ; 16.3.65 ; 12.2.66 and 22.2.66.

2. TREATMENTS :

3 methods of irrigation :  $M_1$ =Ridges and furrows method,  $M_2$ =Flat beds method and  $M_3$ =Flood irrigation (One plot only for the entire expt.)

2 irrigations were given of 2.5 acre inches intensity.

3. DESIGN :

(i) Paired-plot. (ii) (a) 2. (b) N.A. (iii) 6 for  $M_1$  and  $M_2$  and 1 for  $M_3$ . (iv) (a) and (b) 3.7 m.×9.1 m. for  $M_1$  and  $M_2$  and 21.9 m.×18.3 m. for  $M_3$  (v) Nil. (vi) Yes.

4. GENERAL :

(i) Good. (ii) Endrex was sprayed. (iii) *Kapas* yield. (iv) (a) 1963-1965. (b) Nil. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Treatment  $M_3$  is not included in the analysis as there is only one plot for the entire experiment. Error variances are homogeneous, interaction Treatments×years is present.

5. RESULTS :

(i) 1256 Kg/ha. (ii) 379.6 Kg/ha. (with 2 d.f. based on Treatments×years interaction). (iii) Treatment difference is not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$M_1$	$M_2$
Av. yield	1170	1332

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(27), 61(115), 62(111).**

**Site :- Trial-cum-Demons. Farm, Bardoli. Type :- 'P'.**

Object :—To find out the optimum time and number of irrigations for Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* ; Wheat ; Wheat. (c) Nil ; 44.8 Kg/ha. for others. (ii) Black clay loam. (iii) 7.7.1960 ; 17.6.1961 redibbled on 13.8.1961 ; 3.7. 1962. (iv) (a) 2 ploughings and 2 harrowings ; 1 ploughing and 5 harrowings ; 2 ploughings and 2 harrowings. (b) Dibbling. (c) 9 Kg/ha. (d) 183 cm.×61 cm. (e) N.A. ; N.A. ; 1. (v) 24.7 C.L./ha. of F.Y.M. on 6.7.1960 and 44.8 Kg/ha. of N as A/S on 3.8.1960 ; 12.4 C.L./ha of F.Y.M. ; 24.7 C.L./ha. of F.Y.M. (vi) Cotton-2087. (vii) As per treatments. (viii) 5 interculturings and 5 weedings ; 3 interculturings ; 3 weedings. (ix) 117 cm. ; 176 cm. ; 135 cm. (x) 12.2.1961 to 3.4.1961 ; 16.3.1962 to 25.4.1962 ; 28.2.1963 to 28.3.1963.

2. TREATMENTS :

4 intervals of irrigations :  $I_0$ =Control (no irrigation) ;  $I_1$ =2 ;  $I_2$ =3 and  $I_3$ =4 weeks.

Intensity of each irrigation being 2.5 acre inches. Number of irrigations given for  $I_1$ ,  $I_2$  and  $I_3$  were respectively 5, 4 and 3.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4; 5; 4. (iv) (a) 16.5 m. × 12.2 m. (b) 12.8 m. × 9.1 m. ; 12.8 m. × 7.9 m. ; 12.8 m. × 7.9 m. (v) 183 cm. × 152 cm. ; 183 cm. × 213 cm. ; 183 cm. × 213 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Slight attack of aphids, jassides and pink bollworm. (iii) *Kapas* yield. (iv) (a) 1959 to 1962. (b) No. (c) Results of combined analysis are given under 5. (v) Nil. (vi) Heavy rains in July 1961. Re-dibbling had to be carried out in August. (vii) Result of 1959 (55) experiment pooled in this group. Error variances are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 832 Kg/ha. (ii) 175.0 Kg/ha. (based on 51 d.f. composed of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	767	840	846	877

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(124).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'P'.**

Object :—To find out the irrigation requirements for Cotton.

## 1. BASAL CONDITIONS :

(i) Paddy-Cotton. (b) Paddy. (c) 61.8 Kg/ha. of N+37.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black soil. (iii) 20.7.65. (iv) (a) 2 ploughings and 2 harrowings. (b) Dibbling. (c) N.A. (d) 122 cm. × 61 cm. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. (vi) Digvijay (late). (vii) As per treatments. (viii) 2 weedings and 2 intercultrings. (ix) 106 cm. (x) 12.2.66 ; 22.3.66.

## 2. TREATMENTS :

7 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=One irrigation at square formation stage, I<sub>2</sub>=One irrigation at square flowering stage, I<sub>3</sub>=One irrigation at perfect flowering stage, I<sub>4</sub>=2 irrigations (as per I<sub>1</sub> and I<sub>2</sub>), I<sub>5</sub>=2 irrigations (as per I<sub>1</sub> and I<sub>3</sub>) and I<sub>6</sub>=3 irrigations (as per I<sub>1</sub>, I<sub>2</sub> and I<sub>3</sub>).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3. (iv) (a) 15.2 m. × 12.2 m. (b) 12.8 m. × 9.8 m. (v) 122 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) Kholwad. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1311 Kg/ha. (ii) 162.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>
Av. yield	1084	1174	1362	1656	1190	1350	1363

C.D.=300.6 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref. :- Gj. 60(20), 62(195).**

**Site :- Agri. Res. Farm, Halvad.**

**Type :- 'P'.**

Object :—To assess the best interval and number of irrigations for successful cultivation of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Legume-Cereal-Cotton ; Nil. (b) Groundnut, *jowar*. (c) Nil. (ii) Medium black. (iii) 28.6.1960 ; 24.7.1962. (iv) (a) 1 ploughing and 2 harrowings ; 2 ploughings and 4 harrowings. (b) Drilling. (c) 11 Kg/ha. (d) 91 cm. × 23 cm., 91 cm. × 30 cm. (e) N.A., 1. (v) Nil. (vi) 170-CO<sub>2</sub>; Deviraj. (vii) As per treatments. (viii) 3 interculturings ; 2 interculturings and 1 weeding. (ix) 20 cm. ; 35 cm. (x) 6.2.1261 ; 7 to 28.2.1963.

## 2. TREATMENTS :

4 irrigational treatments : I<sub>0</sub>=Control (No irrigation) ; I<sub>1</sub>=7 irrigations at 13 days interval, I<sub>2</sub>=5 irrigations at 18 days interval, and I<sub>3</sub>=3 irrigations at 30 days interval.

Intensity of each irrigation being 2 acre inches.

During 1962, first irrigation given at 3.10.1962 ; intensity of irrigations N.A.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 15.2 m. × 5.5 m. (b) 13.4 m. × 3.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of black arms ; slight attack of Jassids. (iii) *Kapas* yield. (iv) (a) 1958 to 1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Experiment not conducted during 1961-62. Experiments conducted during 1958 and 1959 N.A. Error variances are homogenous and interaction is absent.

## 5. RESULTS :

(i) 675 Kg/ha. (ii) 127.4 Kg/ha based on 33 d.f. composed of pooled error and Treatments × years interaction. (iii) Treatment differences are highly significant. (iv) Av. yield o. *kapas* in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	493	764	725	718

C.D.=106.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(80).**

**Site :- Irrigations Demons. Farm. Jamnagar.**

**Type :- 'P'.**

Object :—To find out the water requirements of Cotton in Saurashtra Region.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium back (iii) 22.7.65. (iv) (a) 2 ploughings, 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) 91 cm. × 30 cm. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. + 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) *Kalyan*. (vii) As per treatments. (viii) 4 interculturings. (ix) 34 cm. (x) N.A.

## 2. TREATMENTS :

4 irrigational treatments : I<sub>1</sub>=No irrigation, I<sub>1</sub>=66% moisture available in soil (4 irrigations on 7.10. ; 8.11. to 22.12.65.), I<sub>2</sub>=33% moisture available in soil (2 irrigations on 8.11 ; 22.12.65) and I<sub>3</sub>=33% moisture available in soil i.e. at wilting point (1 irrigation on 23.12.65).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 15.2 m. × 12.2 m. (b) 12.8 m. × 9.8 m. (v) 122 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Nil, Basudin, Hexatin and 1 Folidol applied as precaution. (iii) Seed Cotton yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 169 Kg/ha. (ii) 60.4 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	95	347	154	80

C.D.=83.2 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(234).**

**Site :- Trial-cum-Demons, Farm, Kholwad.**

**Type :- 'I'.**

Object :- To find out the irrigation requirements of Digvijay Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-jowar. (b) Jowar. (c) Nil. (ii) Black soil. (iii) 6.7.65. (iv) (a) 3 ploughings. (b) Dibblings. (c) 10 Kg/ha. (d) 152 cm. × 61 cm. (e) 2. (v) 12.6 C.L/ha. of F.Y.M.+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) As per treatments. (viii) 3 interculturings. (ix) 99 cm. (x) 3 pickings 11.1.66 to 16.2.66.

## 2. TREATMENTS :

7 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=One irrigation at bud formation stage, I<sub>2</sub>=One irrigation at flowering stage, I<sub>3</sub>=One irrigation at peak flowering stage, I<sub>4</sub>=Two irrigations : One at bud formation stage and 2nd at flowering stage, I<sub>5</sub>=Two irrigation : 1st at bud formation stage and 2nd at peak flowering stage and I<sub>6</sub>=Three irrigations : 1st at bud formation stage, 2nd at flowerings stage and 3rd at peak flowerings stage.

## 3. RESULTS :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 3. (iv) (a) 15.2 m. × 12.2 m. (b) 12.8 m. × 9.8 m. (v) 122 cm. × 122 cm.

## 4. GENERAL :

(i) Satisfactory. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1965—68. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1015 Kg/ha. (ii) 318.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>	I <sub>6</sub>
Av. yield	1006	1172	894	1049	809	1225	953

**Crop :- Cotton (Kharif).**

**Ref :- 60(34), 61(137), 62(164).**

**Site : Trial-cum-Demons Farm, Kholawad. Type :- 'I'.**

Object :- To find out the optimum time and number of irrigations to Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut+Wheat and Wheat ; Cotton (with other inter-cropping) Wheat. (c) 14.8 C.L/ha. of F.Y.M. for Groundnut+Wheat and 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for Wheat ; 12.4 C.L/ha. of F.Y.M.+44 Kg/ha. of N ; N.A. (ii) Medium black. (iii) 20.6.1960, 23.6.1961, 26.6.1962. (iv) (a) 3 harrowings, 3 harrowings, 2 ploughings and 2 harrowings. (b) Dibbling. (c) N.A., 6 Kg/ha., N.A. (d) 183 cm × 61 cm. (e) 2 to 3, N.A., 1. (v) 12.4 C.L/ha. of F.Y.M. broadcasted. 44.8 Kg/ha. of N as A/S applied on 3.8.60 and 14.9.60, 44.8 Kg/ha. of N, 12.4 C.L/ha. of F.Y.M.+44.3 Kg/ha. of N. (vi) Cotton 2087. (vii) As per treatments. (viii) 8 interculturings, 5 interculturings, 6 interculturings. (ix) 96 cm., 145 cm., 84 cm. (x) 12.1.1961 to 22.2.1961, 26.2.1962 to 16.4.1962, 20.1.1963 to 4.3.1963.

## 2. TREATMENTS :

4 irrigational treatments :  $I_0$  = Control (no irrigation),  $I_1$  = 5 irrigations at 2 weeks interval,  $I_2$  = 4 irrigations at 3 weeks interval and  $I_3$  = 3 irrigations at 4 weeks interval.  
Intensity of each irrigation being 2.5 acre inches.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 15.2 m × 11.0 m. (b) 10.4 × 7.3 m. (v) 244 cm × 183 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal, Satisfactory, Good. (ii) Slight attack of woolly mites, 10 to 15% damage caused by pink boll worms, slight attack of woolly mites, Cupravit was applied on 27.11.1961, slight attack of leaf gale fly and Jassids. (iii) *Kapas* yield. (iv) (a) 1959 to 1962. (b) No. (c) Results of combined are analysis are given under 5. (v) N.A. (vi) Nil. (vii) Results of experiment 59(34) pooled in this group. Error variances are heterogeneous and Treatments × Interaction years is present.

## 5. RESULTS :

(i) 1085 Kg/ha. (ii) 228.2 Kg/ha. based on 9 d.f. composed of Treatments × interaction years. (iii) Treatments are highly significantly different. (iv) Average yield of *kapas* in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$	$I_3$
Av. yield	857	1223	1144	1117

C.D. = 280.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(181), 64(115), 65(183).**

**Site :- Trial-cum-Demons Farm, Kim. Type :- 'P'.**

**Object :-** To find out the best suitable method of irrigation for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* in 63(181) and 64(115), *Wheat* in 65(183). (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  + 12.4 C.L/ha. of F.Y.M. for *Jowar*, N.A. (ii) Medium black. (iii) 17.7.63, 16.7.64, 23.6.65. (iv) (a) 1-2 harrowings. (b) Dibbling. (c) N.A. (d) 122 cm × 61 cm ; for 63(181) and 64(115), 122 cm × 30 cm. for 65(183). (e) 1-2. (v) 12.4 C.L/ha. of F.Y.M + 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  for 63(181) and 64(115), 12.4 C.L/ha. of F.Y.M. for 65(183). (vi) 2087. (vii) As per treatments. (viii) 3-4 interculturings. (ix) N.A., N.A., 73 cm. (x) 2.5.64, 4 pickings 11.3.65 to 30.4.65, 23.2.66 and 24.3.66.

## 2. TREATMENTS :

3 methods of irrigation :  $M_1$  = Ridges and furrows,  $M_2$  = Flat beds and  $M_3$  = Flood irrigation (one plot only).  
Irrigations of 2 acre inches intensity were given by each method.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6 for  $M_1$  and  $M_2$ , 1 for  $M_3$ . (iv) (a) and (b) 9.1 m × 3.7 m. for  $M_1$  and  $M_2$  and 18.3 m × 22 m. for  $M_3$ . (v) Nil.

## 4. GENERAL :

(i) Normal. (ii) Endrex sprayed. (iii) Yield of *kapas*. (iv) (a) 1963-continued. (b) No. (c) The results of combined analysis are presented under 5 Results. (v) N.A. (vi) Nil. (vii) Treatment  $M_3$  is not included in the analysis as only one  $M_3$  plot is thereforth entire experiment. Error variances are homogeneous, interaction is absent.

## 5. RESULTS :

(i) 452 Kg/ha. (ii) 65.1 Kg/ha. [based on 17 d.f. made up of pooled error + (Treatment × year) interaction]. (iii) Treatment difference is not significant. (iv) Average yield of *kapas* in Kg/ha.

Treatment :	$M_1$	$M_2$
Av. yield	443	462

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(114).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'P'.**

Object :- To find out the effect of irrigations on Cotton on moisture deficit basis.

1. **BASAL CONDITIONS:**

(i) (a) Nil. (b) *Jowar*. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L/ha. of N. (ii) Medium black. (iii) 16.7.64. (iv) (a) 3 harrowings. (b) Dibbling. (c) N.A. (d) 122 cm×30 cm. (e) 1. (v) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) Digvijay. (vii) As per treatments. (viii) 4 interculturings. (ix) N.A. (x) 6 pickings 8.2.65 to 30.4.65.

2. **TREATMENTS:**

4 depths of soil for moisture deficit :  $D_0$ =Control (no irrigation),  $D_1$ =38 cm. depth, one irrigation (30.12.1964),  $D_2$ =30 cm. depth, two irrigations (8, 30.12.1964) and  $D_3$ =23 cm. depth, two irrigations (8, 30.12.1964).

At kim Field capacity=31.5, wilting point=17.0.

Therefore  $31.5-17.0=14.5$  is taken as 100% moisture available. When the moisture percentage of soil goes down to 50% at different depths, the irrigations are to be given as above. Intensity of each irrigation being 2 acre inches.

3. **DESIGN:**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.4 m×1.3 m. (b) 7.3 m×6.1 m. (v) 152 cm×61 cm. (vi) Yes.

4. **GENERAL:**

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1964 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. **RESULTS:**

(i) 492 Kg/ha. (ii) 101.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of *kapas* in Kg/ha.

Treatment	$D_0$	$D_1$	$D_2$	$D_3$
Av. yield	403	505	543	516

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 60(145), 61(155), 62(166).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'P'.**

Object :- To find out the number of irrigations required for economic growing of Cotton.

1. **BASAL CONDITIONS:**

(i) (a) Nil. (b) Nil, Wheat, Wheat. (c) Nil, 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ , 22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L/ha. of F.Y.M+0, 33.6 and 67.2 Kg/ha. of N. (ii) Medium black. (iii) 11.7.1960, 20.6.1961, 4.7.1962. (iv) (a) 3 harrowings, 8 harrowings, 2 harrowings., (b) Dibbling. (c) N.A. (d) 152 cm×61 cm. (e) 3 to 4, 3 to 4, 1 to 2. (v) 12.4 C.L/ha. of F.Y.M+44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) Cotton 2087. (vii) As per treatments. (viii) N.A., 4 interculturings ; 4 interculturings. (ix) 103 cm., 108 cm., N.A. (x) 9.2.1961 to 15.3.1961, 27.3.1962 to 5.5.1962, 1.3.1963.

2. **TREATMENTS:**

4 levels of irrigations :  $I_0$ =Control (no irrigation),  $I_1$ =5,  $I_2$ =4 and  $I_3$ =3 irrigation.

Intensity of irrigation being 2 acre inches. Intervals of irrigations for  $I_1$ ,  $I_2$  and  $I_3$  were respectively 2, 3 and 4 weeks.

3. **DESIGN:**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 21.3 m×6.1 m., 12.2 m×9.1 m., 11 m×9.1 m. (b) 20.1 m.×3.1 m., 9.1 m×6.1 m., 9.1 m×7.3 m. (v) 61 cm×152 cm., 153 cm×152 cm., 91 cm×91 cm. (vi) Yes.

4. **GENERAL:**

(i) N.A., Good. Normal. (ii) Attack of aphids and wooly mites, Nil, Nil. (iii) *Kapas* yield. (iv) (a) 1960 to 1962. (b) No. (c) Results of combined analysis given under 5. (v) (a) No. (vi) Nil. (vii) Error variances are homogeneous, interaction is absent.

## 5. RESULTS :

(i) 838 Kg/ha. (ii) 166.7 Kg/ha., based on 57 d.f. composed of pooled errors and Treatments  $\times$  interaction years. (iii) Treatment differences are not significant. (iv) Average yield of Cotton in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>
Av. yield	805	846	854	848

**Crop :- Cotton.**

**Ref :- Gj. 64(235), 65(21).**

**Site :- Irrigation Demons. Farm, Kukda.**

**Type :- 'P'.**

Object :- To find out suitable times for irrigation for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajri* ; Groundnut. (c) Nil in 64(235) ; 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(21). (ii) Medium black soil. (iii) 25.7.64 ; 20.7.65, (iv) (a) 1-2 ploughings ; 1-2 harrowings. (b) Dibbling. (c) 6 Kg/ha. ; 7 Kg/ha. (d) 61 cm.  $\times$  46 cm. (e) 2. (v) Nil. (vi) *Kalyan*. (vii) Irrigated. (viii) Nil. (ix) 36 cm., 37 cm. (x) 6.3.65 ; 5.3.66 and 30.3.66.

## 2. TREATMENTS :

One irrigation given when required by testing the soil moisture at below mentioned depths in the soil. 4 depths of soil : D<sub>1</sub>=Local method, D<sub>2</sub>=38 cm., D<sub>3</sub>=30 cm. and D<sub>4</sub>=23 cm.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.4 m.  $\times$  4.6 m. (b) 9.1 m.  $\times$  3.7 m. (v) 61 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1964-1965. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Crop affected by frost in 64(235). (vii) Error variances are homogeneous, interaction is absent.

## 5. RESULTS :

(i) 1002 Kg/ha. (ii) 226.1 Kg/ha. with 33 d.f. made up of pooled error and Treatments  $\times$  years interaction. (iii) Treatment differences are not significant. (iv) Av. yield of *kaps* in Kg/ha.

Treatment	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>
Av. yield	932	1046	1024	1004

**Crop :- Cotton (*Kharif*).**

**Ref :- Gj. 65(267).**

**Site :- Trial-cum-Demons. Farm., Tharsa.**

**Type :- 'P'.**

Object :- To find out the water requirements of Cotton (last irrigation for cotton).

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sugar best. (c) 118.6 Kg/ha. of N+84.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Goradu soil. (iii) 20.7.65. (iv) (a) 2 ploughings and 1 harrowing. (b) Dibbling. (c) Nil. (d) 122 cm.  $\times$  61 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M., +98.8 Kg/ha. of N+49.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+49.4 Kg/ha. of K<sub>2</sub>O. (vi) Gujarat-67. (late). (vii) As per treatments. (viii) 4 weedings. (ix) 42 cm. (x) 3 pickings 10.2.66 to 8.3.66.

## 2. TREATMENTS :

4 irrigational treatments : I<sub>1</sub>=Irrigations given up to 1st week of December (65) at 60% available moisture, I<sub>2</sub>=Irrigations given upto 1st week of Jan, 66 at 60% available moisture, I<sub>3</sub>=Irrigations given upto 3rd week of Jan, 66 at 60% available moisture, I<sub>4</sub>=Irrigations given upto 2nd week of Feb. 66, at 60% available moisture.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 15.2 m. × 12.2 m. (b) 12.8 m. × 9.1 m. (v) 122 cm. × 152 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1965; contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 683 Kg/ha. (ii) 223.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>
Av. yield	625	765	712	630

**Crop :- Cotton (Kharif).**

**Ref :- 60(77), 61(133).**

**Site :- Central Exptl. Stn., Junagadh.**

**Site :- 'IV'.**

Object :—To study the effect of frequency of irrigation on different varieties of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat during 1960, and *Jowar* during 1961. (c) N.A., 12.4 C.L./ha. of F.Y.M. (iii) Medium black. (iii) 24.6.1960; 24.6.1961. (iv) (a) 1 ploughing and 1 harrowing; 2 harrowings. (b) Dibbling; hand sowing. (c) N.A. (d) 61 cm. × 91 cm. (e) 3 to 4. (v) 12.4 C.L./ha. of F.Y.M. (vi) and (vii) As per treatments. (viii) 3 interculturings; 4 interculturings. (ix) 82 cm.; 141 cm. (x) 16.1.1961, 20.2.1961, 24.3.1961; 9.2.62, 22.2.1962 and 28.3.1962.

## 2. TREATMENTS :

**Main-plot treatments :**

4 levels of irrigation : I<sub>0</sub>=0, I<sub>1</sub>=2, I<sub>2</sub>=4 and I<sub>3</sub>=6 irrigations.

**Sub-plot treatments :**

3 varieties : V<sub>1</sub>=CO<sub>2</sub>-170, V<sub>2</sub>=*Kalyan* and V<sub>3</sub>=C.J. 73.

Intensity and interval of irrigation N.A.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication; 3 sub-plots/main-plot. (b) N.A.; 22.0 m. × 16.5 m. (iii) 4. (iv) (a) 5.5 m. × 5.5 m. (b) 4.3 m. × 3.7 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal; Normal. (ii) Attack of aphids, jassids and black arm, Endrex was sprayed during 1960 and Endrex 20 C.C. sprayed on 8.10.1961. (iii) *Kapas* yield. (iv) (a) 1958—1961. (b) No. (c) Nil. (v) N.A. (vi) Due to heavy rains and strong winds all the plots were affected unevenly during 1961. (vii) Both the error variances are heterogeneous.

## 5. RESULTS :

60(77)

(i) 362 Kg/ha. (ii) (a) 71.8 Kg/ha. (b) 91.0 Kg/ha. (iii) Main effect of V alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
V <sub>1</sub>	205	254	302	325	271
V <sub>2</sub>	384	417	350	381	383
V <sub>3</sub>	360	411	490	462	431
Mean	316	361	381	389	362

C.D. for V marginal means = 67.7 Kg/ha.



61 (133)

(i) 653 Kg/ha. (ii) (a) 300.5 Kg/ha. (b) 238.0 Kg/ha. (iii) Main effect of V is highly significant and that of I is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
V <sub>1</sub>	780	705	860	957	825
V <sub>2</sub>	133	629	750	724	559
V <sub>3</sub>	291	567	691	746	574
Mean	401	634	767	809	653

C.D. for I marginal means=277.5 Kg/ha.

C.D. for V marginal means=176.7 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(41), 63(33).**

**Site :- Trial cum-Demons. Farm, Chanasura.**

**Type :- 'IM'.**

Object :-To find out the optimum dose of fertilizer and economic number of irrigations for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Linseed ; Castor. (c) Nil. (ii) Light Goradu (Sandy loam). (iii) 21.7.1962 ; 30.6.1963.  
(iv) (a) 2 ploughings and 1 harrowing ; 3 ploughings and 2 harrowings. (b) Dibbling. (c) N.A.  
(d) 91 cm. × 91 cm. ; 91 cm. × 30 cm. (e) N.A. (v) Nil. (vi) *Kalyan*. (vii) As per treatments. (viii) 2 interculturings ; 3 interculturings. (ix) 33 cm. ; 59 cm. (x) 10.2.1963 to 7.4.1963 ; 8.3.1964 to 9.5.1964.

**2. TREATMENTS :**

**Main-plot treatments :**

4 levels of irrigation : I<sub>0</sub>=Control (no irrigation), I<sub>1</sub>=One irrigation in 1st week of October, I<sub>2</sub>=2 irrigations in 1st and 3rd weeks of Oct. and I<sub>3</sub>=3 irrigations in 1st, 3rd week of October and 1st week of Nov.

**Sub-plot treatments :**

3 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=22.4 Kg/ha. of N as A/S+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=Twice M<sub>1</sub>.

Intensity of each irrigation being 3 acre inches.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 15.3 m. × 4.6 m. (b) 13.7 m. × 2.7 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1962 to 1963. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Both the errors are homogeneous.

**5. RESULTS :**

(i) 1038 Kg/ha. (ii) (a) 359.5 Kg/ha. based on 21 d.f. composed of pooled error and years × I interaction. (b) 284.2 Kg/ha. based on 56 d.f. composed of pooled error and two and three factor interactions with years. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
M <sub>0</sub>	908	938	1138	1112	1024
M <sub>1</sub>	1086	844	1228	1052	1052
M <sub>2</sub>	1076	1090	1138	850	1038
Mean	1023	957	1168	1005	1038

**Crop :- Cotton (Kharif).**

**Ref :- GJ. 64(158), 65(61).**

**Site :- Irrigation-cum-Demons. Farm, Halvad**

**Type :- 'IM'.**

Object :—To study the effect of flood vs. furrow irrigation with different doses of N on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 64, Cotton-Jowar for 65. (b) Bajra for 64, jowar for 65. (c) Nil. (ii) Medium black soil. (iii) 5.7.64 ; 7.7.65. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 12 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) Nil. (vi) Deviraj. (vii) As per treatments. (viii) 2 interculturings for 64, 3 weedings and 3 hoeings for 65. (ix) 46 cm. for 64, 67 cm. for 65. (x) 25.1.65 to 17.2.65, 21.2.66 to 21.3.66.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 methods of irrigation :  $M_1$ =Flood irrigation and  $M_2$ =Furrow irrigation.

(2) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$ ,  $N_2=44.8$  and  $N_3=67.2$  Kg/ha.

2 irrigations were given by each method. N applied on 28.7.1964 and 21.8.1964.

2 irrigations were given by each method on 12.10.65 and 29.10.65. N applied on 30.8.65.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 4.6 m. (b) 9.1 m. × 2.7 m. (v) 61 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous, interaction is absent.

**5. RESULTS :**

(i) 614 Kg/ha. (ii) 164.7 Kg/ha. (based on 49 d.f. made of pooled error + Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$N_0$	$N_1$	$N_2$	$N_3$	Mean
$M_1$	486	642	677	633	616
$M_2$	622	623	588	641	618
Mean	554	632	633	637	614

**Crop :- Cotton (Kharif).**

**Ref :- GJ. 64(95), 65(235).**

**Site :- Trial-cum. Demons. Farm, Kholwad,**

**Type :- 'IM'.**

Object :—To find out the best method of irrigation with fertilizer doses on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-jowar. (b) Jowar. (c) Nil. (ii) Medium black soil. (iii) 14.7.64 ; 5.7.65. (iv) (a) 1 ploughing and 2 harrowings. (b) Dibbling. (c) N.A. for 64, 9.8 Kg/ha. for 65. (d) 122 cm. × 61 cm. for 64, 152.5 cm. × 61.0 cm. for 65. (e) 1 to 2 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. for 64, 12.4 C.L./ha. of F.Y.M. and 22.4 Kg/ha. of  $P_2O_5$  for 65. (vi) Digvijay. (vii) As per treatments. (viii) 3 to 4 interculturings. (ix) 191 cm. for 64 and 91.2 cm. for 65. (x) 20.2.65 to 22.3.65 ; 24.1.66 to 18.2.66.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 methods of irrigations :  $M_1$ =Flood irrigation and  $M_2$ =Furrow irrigation.

(2) 4 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$ ,  $N_2=44.8$  and  $N_3=67.2$  Kg/ha.

2 irrigations of 2.5 acre inches intensity were given by each method on 15.11.1964 and 11.12.1964.

N drilled on 16.9.1964.

For 65,  $\frac{1}{2}$  dose of N was given on 22.7.65 and the other  $\frac{1}{2}$  dose on 10.9.65.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 7.3 m. for 64 and 9.8 m. × 7.3 m. for 65. (b) 7.3 m. × 6.1 m. (v) 152 cm. × 61 cm. for 64 and 122 cm. × 61 cm. for 65.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1964—1967. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

## 64(95)

(i) 788 Kg/ha. (ii) 114.8 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
M <sub>1</sub>	613	727	829	745	728
M <sub>2</sub>	794	895	781	923	848
Mean	703	811	805	834	788

C.D. for M marginal means = 84.4 Kg/ha.

## 65(235)

(i) 1085 Kg/ha. (ii) 178.7 Kg/ha. (iii) Main effect of N alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
M <sub>1</sub>	791	1284	1110	1155	1085
M <sub>2</sub>	891	1188	1250	1015	1086
Mean	841	1236	1180	1085	1085

C.D. for N marginal means = 185.8 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(118), 65(184).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'IM'.**

Object :—To find out the best method of irrigation with different doses of fertilizers for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* for 64, wheat for 65. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+12.4 C.L./ha. of F.Y.M. for 64 and 11.2 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65. (ii) Medium black for 64 and heavy clay for 65. (iii) 16.7.64 and 26.6.65. (iv) (a) 2 harrowings. (b) Dibblings. (c) N.A. (d) 122 cm. × 30 cm. (e) 1 to 2 plants/hill. (v) Nil. (vi) *Digvijay*. (vii) As per treatments. (viii) 4 interculturings. (ix) N.A. for 64, 73 cm. for 65 (x) 8.2.65 to 1.5.65 and 16.2.66 to 25.3.66.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 methods of irrigation : M<sub>1</sub>=Flood irrigation and M<sub>2</sub>=Furrow irrigation.

(2) 4 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4, N<sub>2</sub>=44.8 and N<sub>3</sub>=67.2 Kg/ha.

2 irrigations of 2 acre inches intensity were given by each method on 1.12.1964 and 31.12.1964.

N drilled on 25.9.64 and 12.10.1964.

For 65 details are N.A.

## 3. DESIGN :

(i) Fact, in R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 7.3 m. (b) 7.3 m. × 6.1 m. (v) 153 cm. × 61 cm. (vi) Yes.

## 3. GENERAL :

(i) Gaps due to heavy rains in August, 1964. Normal for 1965. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1964—1965. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 847 Kg/ha. (ii) 394.4 Kg/ha. based on 7 d.f. made up of (Treatments × years) interaction. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
M <sub>1</sub>	592	847	1028	892	840
M <sub>2</sub>	761	923	786	949	855
Mean	676	885	907	921	847

**Crop :- Cotton (Kharif).**

**Ref. :- Gj. 64(67).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'IM'.**

Object :—To study the effect of soil moisture regions and manuring on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) 16.7.64. (iv) (a) 1 harrowing. (b) Dibbling. (c) 5 Kg/ha. (d) 152 cm. × 61 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) *Digvijay* (late). (vii) As per treatments. (viii) 5 intercultrings and 5 weedings. (ix) 213 cm. (x) 2.3.65 and 12.4.65.

## 2. TREATMENTS :

**Main-plot treatments**

4 irrigational treatments : I<sub>0</sub>=Control (no irrigation), I<sub>1</sub>=4 irrigations (1, 23.10.1964 ; 13.11.1964 and 23.12.1964) when moisture percentage in the soil is reduced from 100 to 60%, I<sub>2</sub>=2 irrigations (23.10.1964 23.12.1964 when moisture percentage in the soil is reduced from 100 to 40% and I<sub>3</sub>=1 irrigation (23.12.1964) when moisture percentage in the soil is reduced from 100 to 20%.

**Sub-plot treatments :**

3 levels of N as A/S : N<sub>1</sub>=44.8, N<sub>2</sub>=89.7 and N<sub>3</sub>=134.5 Kg/ha.

For Surat (deep black soils), 37.5% moisture present in soils in the field capacity and this is taken as 100 where as 22.5% moisture present in soil is culting point and is taken as 0. In main-plot treatments irrigations are to be given according to this phenomenon. N applied by spot method on 24.9.1964.

## 3. DESIGN :

(i) Split plot. (ii) (a) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 8.5 m. × 7.9 m. (b) 6.1 m. × 5.5 m. (v) 122 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of woolly mites and Spraying of *Metasystox* and *Folido+Endrin*. (iii) *Kapas* yield. (iv) (a) 1964. (b) No. (c) Nil. (v) N.A. (vi) Heavy rains. (vii) Nil.

## 5. RESULTS :

(i) 713 Kg/ha. (ii) (a) 205.7 Kg/ha. (b) 72.8 Kg/ha. (iii) All the effects are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
N <sub>1</sub>	726	634	477	374	553
N <sub>2</sub>	1091	895	635	429	780
N <sub>3</sub>	1048	980	708	492	897
Mean	955	836	607	455	713

C.D. for I marginal means = 146.2 Kg/ha.

C.D. for N marginal means = 42.4 Kg/ha.

C.D. N means at the same level of I = 84.9 Kg/ha.

C.D. for I means at the same level of N = 161.8 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(68).**

**Site :- Agri. Res., Stn., Surat.**

**Type :- 'IM'.**

**Object :-** To study the effect of soil moisture regimes and manuring on yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) 15.7.64; Resowing on 28.7.64. (iv) (a) 1 harrowing. (b) Dibbling. (c) 5 Kg/ha. (d) 122 cm. × 61 cm. (e) 1. (v) 12.6 C.L./ha of F.Y.M. + 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) I.S.C.—67 (late). (vii) As per treatments. (viii) 5 intercultrings and 6 weedings. (ix) 213 cm. (x) 8.4.65 and 22.4.64.

## 2. TREATMENTS :

Same as in expt. no 64(67) on page 477.

## 3. DESIGN :

(i) Split plot. (ii) (a) 4 main-plots/replications; 3 sub-plots/main-plots. (b) N.A. (iii) 6. (iv) 9.8 m. × 9.8 m. (v) 7.3 m. × 7.3 m. (vi) 122 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of Bollworms, Aphlids and Jassids. About 30% damage. Endrin and Folidol were sprayed. (iii) *Kapas* yield. (iv) (a) 1964. (b) No. (c) Nil. (v) N.A. (vi) Heavy rains throughout monsoons. (vii) Nil.

## 5. RESULTS :

(i) 769 Kg/ha. (ii) (a) 109.6 Kg/ha. (b) 92.9 Kg/ha. (iii) Main effects of I and N are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
N <sub>1</sub>	823	704	596	404	632
N <sub>2</sub>	951	938	760	536	796
N <sub>3</sub>	1150	1025	781	562	879
Mean	975	889	712	501	769

C.D. for I marginal means = 77.8 Kg/ha.

C.D. for N marginal means = 54.2 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(76)**

**Site :- Irrigation-cum-Demons. Farm.**

**Type -- 'IM'.**

Object :—To study the effect of irrigation and fertilizers on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) N.A. (ii) Medium black. (iii) 19.7.62. (iv) (a) 1 ploughing and 2 harrowings (b) Dibbling. (c) 17 Kg/ha. (d) 46 cm. × 23 cm. (e) 1 to 2. (iv) 12.4 C.L./ha. of F.Y.M. (v) C.J.—73. (vi) As per treatments. (vii) 1 weeding and 2 interculturings. (viii) 35 cm. (ix) 14.11.62, 3.12.62 and 20.12.62.

**2. TREATMENTS :**

**Main-plot treatments**

3 levels of irrigation :  $I_0$ =Control (no irrigation),  $I_1$ =1 and  $I_2$ =2 irrigations.

**Sub-plot treatments**

3 manurial treatments :  $M_0$ =Control (no manure),  $M_1$ =22.4 Kg/ha. of N as A/S+11.2 Kg/ha. of  $P_2O_5$  as Super and  $M_2$ =44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.

Intensity of each irrigation being 2 acre inches. N and  $P_2O_5$  drilled at sowing. Time of irrigation : N.A.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) 10.06 m. × 6.4 m. (b) 9.1 m. × 5.4 m. (v) 46 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Serious attack of boll worms and light-attack of jassides ; 20% endrine was sprayed. (iii) kapas yield. (iv) (a) to (c) No. (v) (a) N.A. (b) Nil. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 567 Kg/ha. (ii) (a) 176.3 Kg/ha. (b) 151.3 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

	$I_0$	$I_1$	$I_2$	Mean
$M_0$	464	515	655	545
$M_1$	407	537	748	564
$M_2$	447	539	794	593
Mean	439	530	732	567

C.D. for I marginal means=131.0 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(MAE), 64(MAE), 65(MAE).**

**Site :- M.A.E. centre Umrela.**

**Type :- 'ICM'.**

Object :—Type I : To study the effect of different levels of N and P and intensities and frequency of irrigations on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) N.A. for 63, Nil for 64 and Jowar—Cottod for 65. (b) N.A. for 63, Gram for 64 and Jowar (fodder) for 65. (c) N.A. for 63, 64 ; Nil for 65. Medium black. (iii) 9.7.1963, 11.7.1964, 16.6.1965. (iv) (a) 1 to 2 harrowings and ploughings. (b) Hand sowing. (c) 20 Kg/ha. (d) N.A. for 63 ; 91 cm between rows for 64 ; 75 cm. × 15 cm. for 65. (e) N.A. (v) N.A. for 63 ; 5600 Kg/ha. of F.Y.M. for others. (vi) CJ—73 (vii) Irrigated. (viii) Fwee weeding and 1 interculturings. (ix) N.A. for 63 ; 94.6 cm. for 64 ; 32 cm. for 65 (x) 25.2.1964, 25.1.1965, 7, 20.11.1965 and 14.12.1965.

## 2. TREATMENTS :

All combinations of (1), (2), (3) and (4)

(1) 3 Intensities of irrigations :  $I_1=5.0$ ,  $I_2=7.0$  and  $I_3=10.0$  cm. per irrigation.

(2) 3 frequencies of irrigation :  $F_1=5$ ,  $F_2=7$  and  $F_3=9$  irrigations.

(3) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=56.0$  and  $N_2=112.0$  Kg/ha.

(4) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=56.0$  and  $P_2=112.0$  Kg/ha.

The frequencies of irrigation applied in 1965 (MAE) are :  $F_1=1$ ,  $F_2=2$  and  $F_3=3$  irrigations.

## 3. DESIGN :

(i)  $3^4$  Fact. confd. (ii) (a) 9 plots/block, 9 blocks/replication. (b) N.A. (iii) 1. (iv) (a) N.A. for 63, 64;  $11.5 \text{ m.} \times 4.5 \text{ m.}$  (b) N.A. for 63, 64;  $10.0 \text{ m.} \times 4.5 \text{ m.}$  (v) N.A. for 63, 64; 76 cm. along length for 65. (vi) Yes.

## 4. GENERAL :

(i) N.A. for 63, crop ledged completely in 64; Good in 65. (ii) N.A. for 63; Attack of aphids and Endrine sprayed in 64; Nil for 65. (iii) *kapas* yield. (iv) (a) 1963–1966. (b) No. (c) Nil. (v) N.A. (vi) to (vii) Nil.

## 5. RESULTS :

## 63(MAE)

(i) 930 Kg/ha. (ii) 197.0 Kg/ha. (iii) Main effects of F and P are significant. (iv) Av. yield of *kapas* in Kg/ha.

	$F_1$	$F_2$	$F_3$	$I_1$	$I_2$	$I_3$	$N_0$	$N_1$	$N_2$	Mean
$P_0$	849	891	837	902	926	749	943	883	751	859
$P_1$	1036	933	800	822	916	1031	875	923	972	923
$P_2$	1024	1101	897	1032	1045	943	1008	1023	990	1007
Mean	970	975	845	919	962	908	942	943	904	930
$N_0$	947	1024	855	923	969	933				
$N_1$	1002	993	834	866	1062	902				
$N_2$	960	907	845	968	856	888				
$I_1$	1026	981	749							
$I_2$	1006	909	972							
$I_3$	877	1034	813							

C.D. for F or P marginal means = 108.3 Kg/ha.

## 64(MAE)

(i) 341 Kg/ha. (ii) 95.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$F_1$	$F_2$	$F_3$	$I_1$	$I_2$	$I_3$	$N_0$	$N_1$	$N_2$	Mean
$P_0$	289	360	337	345	312	330	335	360	293	329
$P_1$	323	393	340	300	364	391	305	384	366	352
$P_2$	333	345	347	339	357	329	333	334	358	342
Mean	315	366	341	328	344	350	324	359	339	341
$N_0$	289	347	336	362	315	296				
$N_1$	333	403	341	305	399	373				
$N_2$	323	348	346	316	319	381				
$I_1$	292	356	336							
$I_2$	364	345	323							
$I_3$	290	396	365							

## 65(MAE)

(i) 1175 Kg/ha, (ii) 268.4 Kg/ha. (iii) Main effect of P alone is significant. (iv) Av. yield of kapas in Kg/ha.

	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
P <sub>0</sub>	1113	926	1156	1082	1134	979	1030	1018	1147	1065
P <sub>1</sub>	1058	1270	1440	1245	1184	1339	1150	1329	1289	1256
P <sub>2</sub>	1174	1224	1217	1174	1057	1384	1189	1103	1323	1205
Mean	1115	1140	1271	1167	1125	1234	1123	1150	1253	1175
N <sub>0</sub>	1107	1138	1124	1069	1107	1193				
N <sub>1</sub>	1001	1159	1290	1226	1059	1165				
N <sub>2</sub>	1237	1123	1399	1206	1209	1344				
I <sub>1</sub>	1168	1158	1175							
I <sub>2</sub>	1109	1047	1219							
I <sub>3</sub>	1068	1215	1419							

C.D. for P marginal means = 147.6 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(207).**

**Site :- Irrigation Demondas Farm, Jamnagar.**

**Type :- 'IC'.**

**Object :-** To study the effect of irrigation and spacing on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar. (c) Manure mixtures (Details N.A.). (ii) Medium black. (iii) 14.7.62. (iv) (a) 3 ploughings and 3 harrowings. (b) Dibbling, (c) N.A. (d) As per treatments, (e) 1. (v) 67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) 17) -CO<sub>2</sub>. (vii) As per treatments. (viii) 8 interculturings and 2 weedings. (ix) 28 cm. (x) 28.1.63 ; 14.2.63 ; 2, 15.3.1963.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

3 spacings : S<sub>1</sub>=91 cm. x 30 cm, S<sub>2</sub>=122 cm. x 30 cm. and S<sub>3</sub>=183 cm. x 30 cm.

Details of irrigations N.A.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11.0 m. x 9.1 m. (b) 7.3 m. x 6.7 m. (v) 183cm. x 122 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Light attack of top shoot borers boll worms, red cotton loags. (iii) kapas yield. (iv) (e) to (c) No. (v) N.A. (vi) Long draught during Monsoon. (vii) Nil.

**5. RESULTS :**

(i) 452 Kg/ha. (ii) (a) 93.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.



	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
S <sub>1</sub>	467	437	336	413
S <sub>2</sub>	448	450	464	454
S <sub>3</sub>	517	485	464	489
Mean	477	457	421	452

**Crop :- Cotton (Kharif).**

**Ref :- Gj 62(78).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'IC'.**

**Object :-** To study the effect of irrigation and spacing on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 8.7.62. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) 7 Kg/ha. (d) Ar per treatments. (e) 3 to 4. (v) 12.4 C.L./ha. of F.Y.M.+67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) CO<sub>2</sub>—170. (vii) As per treatments. (viii) 4 interculturing. (ix) 62 cm. (x) 29.12.62 ; 18.1.63 and 5.2.63.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2 (1st week of Oct., 2nd week of Nov.), I<sub>2</sub>=3 (1st, 4th week of Oct., 2nd week of Nov.) and I<sub>3</sub>=4 irrigations (1st and 3rd weeks of both Oct. and Nov.)

**Sub-plot treatments :**

3 spacings : S<sub>1</sub>=91 cm. × 30 cm. ; S<sub>2</sub>=122 cm. × 30 cm. and S<sub>3</sub>=183 cm. × 30 cm.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 11.0m. × 9.1 m. (b) 7.3 m. × 6.7 m. (v) 180cm. × 122 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. But 20% endrine was sprayed twice. (iii) *Kapas* yield. (iv) (a) 1962-confd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1697 Kg/ha. (ii) (a) 272.6 Kg/ha. (b) 492.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
S <sub>1</sub>	1926	1880	2042	1949
S <sub>2</sub>	1685	1746	1710	1714
S <sub>3</sub>	1266	1351	1665	1427
Mean	1626	1659	1806	1697

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(167).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Type :- 'IC'.**

**Object :-** To find out the best combination of irrigation and spacing for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 12.4 C.L./ha. of F.Y.M. + 22.4 to 44.8 Kg/ha. of N + 22.4 to 44.8 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 2.7.62. (iv) (a) 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1 to 2. (v) 67.2 Kg/ha. of N + 33.6 Kg/ha. of  $P_2O_5$  + 12.4 C.L./ha. of F.Y.M. (vi)  $CO_2$ -170. (vii) As per treatments. (viii) 2 interculturings. (ix) N.A. (x) 26.1.63 and 15.2.63.

## 2. TREATMENTS and 3. DESIGN :

Same as in expt. no. 62 (78) conducted at Junagadh on page 482.

Dates of irrigation for  $I_1$  are 1.11.1962, 30.12.1962, for  $I_2$  are 1.11.1962, 30.11.1962, 30.12.1962 and for  $I_3$  are 1.11.1962, 20.11.1962, 10.12.1962 and 30.12.1962.

## 4. GENERAL :

(i) Good. (ii) Attack of aphids, thrips and Endrex was applied. (iii) *Kapas* yield. (iv) (a) to (c) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1445 Kg/ha. (ii) (a) 353.6 Kg/ha. (b) 356.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$I_1$	1628	1350	1289	1422
$I_2$	1591	1469	1269	1443
$I_3$	1552	1711	1149	1471
Mean	1590	1510	1236	1445

**Crop :-** Crop (*Kharif*).

**Site :-** Trial-cum-Demons. Farm, Pilwai.

**Ref :-** Gj. 62(220).

**Type :-** 'IC'.

Object :—To find out the optimum number of irrigations and spacing for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-*Bajri*-Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 14.7.62. (iv) (a) 3 ploughings and 2 harrowings. (b) Dibbling. (c) 5 Kg/ha. (d) As per treatments. (e) 1. (v) 24.7 C.L./ha. of F.Y.M. (vi) 134  $CO_2$ -M. (vii) Irrigated. (viii) 4 weedings and 5 interculturings. (ix) 60 cm. (x) 6.2.63 ; 1.3.63 ; 4.4.63.

## 2. TREATMENTS :

**Main-plot treatments :**

3 irrigations :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.

**Sub-plot treatments :**

3 spacings :  $S_1=91$  cm.  $\times$  33 cm.,  $S_2=122$  cm.  $\times$  30 cm., and  $S_3=183$  cm.  $\times$  30 cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m.  $\times$  11.0 m. (b) 6.7 m.  $\times$  7.3 m. (v) 122 cm.  $\times$  183 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of aphids, jassides, black arm. Endrex was sprayed twice. (iii) Seed cotton yield. (iv) (a) to (c) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 2105 Kg/ha. (ii) (a) 319.7 Kg/ha. (b) 337.4 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
I <sub>1</sub>	2372	2174	1896	2147
I <sub>2</sub>	2219	2183	1775	2059
I <sub>3</sub>	2436	1967	1927	2110
Mean	2342	2108	1866	2105

C.D. for S marginal means=289.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(143).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'IC'.**

Object :—To find out the optimum spacing and irrigation for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 13.7.62. (iv) (a) 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1 to 2. (v) 67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) CO<sub>2</sub>-170. (vii) As per treatments. (viii) 4 weedings and 4 interculturings. (ix) 67 cm. (x) 3, 8, 29.3.1963 ; 1.4.1963.

**2. TREATMENTS and 3. DESIGN**

Same as in expt. no. 62 (78) conducted at Junagadh on page 482.  
Time of irrigation : N.A.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) *Kapas* yield. (iv) (a) to (c) No. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1083 Kg/ha. (ii) (a) 402.4 Kg/ha. (b) 179.1 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
S <sub>1</sub>	1177	1238	1180	1198
S <sub>2</sub>	1190	1157	1004	1117
S <sub>3</sub>	859	852	1093	935
Mean	1075	1082	1092	1083

C.D. for S marginal means=153.6 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 62(75).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'IC'.**

Object :—To study the effect of irrigation on Cotton under different spacings.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 17.9.62. (iv) (a) 2 ploughings and 2 harrowings. (b) Dibbling. (c) 3 Kg/ha. (d) As per treatments. (e) N.A. (v) 67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) CO<sub>2</sub>-170. (vii) As per treatments. (viii) 2 weedings and 3 interculturings. (ix) 35 cm. (x) 3.3.63 and 22.3.63.

## 2. TREATMENTS :

Same as in expt. no. 62(78) conducted at Junagadh on page 482.  
Time of irrigation N.A.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12.8 m. × 5.8 m. (b) 9.1 m. × 4.6 m. (v) 183 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Attack of jassides and bollworm. 2% endrin was sprayed. (iii) *Kapas* yield. (iv) (a) to (c) No. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 235 Kg/ha. (ii) (a) 77.2 Kg/ha. (b) 85.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Mean
S <sub>1</sub>	247	210	247	235
S <sub>2</sub>	228	298	143	223
S <sub>3</sub>	288	229	225	247
Mean	254	246	205	235

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Amreli.**

**Ref :- Gj. 63(3) & 65(118).**

**Type :- 'ICM'.**

**Object :-** To study the yielding capacity of Cotton under different irrigations, spacings and manures.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut for 63 only. (b) Groundnut, *Jowar* for 65. (c) 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 5.6 Kg/ha. of N for 63 only. (ii) Shallow light black soil for 63 and medium black soil for 65. (iii) 13.7.63, 26.7.65. (iv) (a) 1 ploughing, 2 to 3 harrowings. (b) Dibbling. (c) 5 Kg/ha. for 63, N.A. for 65. (d) As per treatments. (e) 2 to 3 seeds/hill. (v) 12.4 C.L/ha. of F.Y.M. for 63 only. (vi) C.J. 73 (Sanjay). (vii) As per treatments. (viii) 3 interculturings and 2 weedings. (ix) 56 cm. and 60 cm. (x) 3.12.63 to 7.1.64, 11.12.65 to 13.1.66.

## 2. TREATMENTS :

**Main-plot treatments :**

3 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=2 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=61 cm. × 15 cm., S<sub>2</sub>=61 cm. × 23 cm. and S<sub>3</sub>=61 cm. × 30 cm.

(2) 2 manurial treatments : M<sub>0</sub>=Control (no manure) and M<sub>1</sub>=44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

Date of irrigations for I<sub>1</sub> are 5.9.65 and 30.9.65 and for I<sub>2</sub> are 5.9.65, 20.9.65, 12.10.65 and 25.10.65.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super. Half dose was applied at sowing and the other half one month after sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 8.5 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory for 63, poor in 65. (ii) Nil, slight attack of boll worm in 65. (iii) Plant-populations and *kapas* yield. (iv) (a) 1963-1968 (Experiment not conducted in 1964) (b) No. (c) Nil. (v) N.A. (vi) Strong winds and dry weather at sowing. (vii) Irrigational treatments could not be applied due to the oil engine being totally out of order. Hence the analysis modified. As the experiment is continued, individual years results are given.

## 5. RESULTS :

63(3)

(i) 459 Kg/ha. (ii) 91.2 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Average yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	455	398	408	420
M <sub>1</sub>	530	481	482	498
Mean	492	440	445	459

C.D. for M marginal means = 43.1 Kg/ha.

65(118)

(i) 301 Kg/ha. (ii) (a) 67.0 Kg/ha. (b) 57.3 Kg/ha. (iii) Main effect of I and M are highly significant and that of S is significant. (iv) Average yield of *kapas* in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
I <sub>0</sub>	140	314	230	216	235	227
I <sub>1</sub>	213	404	339	321	265	309
I <sub>2</sub>	261	473	393	375	333	367
Mean	205	397	321	304	278	301
S <sub>1</sub>	208	433				
S <sub>2</sub>	220	388				
S <sub>3</sub>	186	370				

C.D. for I marginal means = 35.2 Kg/ha.

C.D. for M marginal means = 21.8 Kg/ha.

C.D. for S marginal means = 26.7 Kg/ha.

**Crop :- Cotton (*Kharif*).**

**Ref :- Gj. 63(116), 64(49).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'ICM'.**

Object :—To study the effect of irrigation, spacings and manuring on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 63, Groundnut for 64. (c) 44.8 Kg/ha. of N for 63 only. (ii) Clay loam. (iii) 3.7.63, 17.7.64. (iv) (a) 1 harrowing. (b) Dibbling. (c) 7 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 24.7 C.L./ha. of press mud for 63 and 12.3 C.L./ha. of F.Y.M. for 64. (vi) ISC-67 (late). (vii) As per treatments. (viii) 3 to 4 interculturings. (ix) 139 cm, for 63, 224 cm, for 64. (x) 19.3.64 to 8.5.64, 18.4.65.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=67.2 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

N and P<sub>2</sub>O<sub>5</sub> applied by ring method on 3.9.63. Intensity of each irrigation being 2.5 acre inches.

N applied by ring method on 1.9.64 and 20.10.64 and P<sub>2</sub>O<sub>5</sub> applied by ring method on 21.9.64.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m × 6.7 m. (b) 7.3 m × 5.5 m. (v) 91 cm × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil, Endrex was applied. (iii) *Kapas* yield. (iv) (a) 1963-64. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the sub-plot error variances are heterogeneous, individual year results are presented below.

## 5. RESULTS :

63(116)

(i) 702 Kg/ha. (ii) (a) 333.9 Kg/ha. (b) 202.3 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>1</sub>	670	731	686	716	701
I <sub>2</sub>	737	676	750	662	706
I <sub>3</sub>	733	668	669	732	700
Mean	713	692	702	703	702
S <sub>1</sub>	707	697			
S <sub>2</sub>	720	686			

64(49)

(i) 599 Kg/ha. (ii) (a) 256.6 Kg/ha. (b) 136.8 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>1</sub>	531	503	579	455	517
I <sub>2</sub>	612	695	694	612	653
I <sub>3</sub>	437	705	608	644	626
Mean	563	643	627	570	599
S <sub>1</sub>	600	654			
S <sub>2</sub>	527	614			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(119). 64(47).**

**Site :- Trial-cum-Demons Form, Bardoli.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum spacing and fertilizer doses under irrigated conditions for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Paddy, Linseed, Safflower. (c) 44.8 Kg/ha. of N, Nil. (ii) Clay loam. (iii) 2.7.1963 to 9.7.1964. (iv) (a) 1 harrowing. (b) Dibbling. (c) 7 Kg/ha. (d) As per treatments. (e) 1. (v) 24.7 C.L/ha. of press mud (sugarcane by product) in 1963, 12.4 C.L/ha. of F.Y.M. (vi) Digvijay. (viii) As per treatments. (viii) 4 interculturations. (ix) 139 cm., 224 cm. (x) 7.3.1963 to 28.4.1964, 11.3.1965 to 10.4.1965.

## 2. TREATMENTS :

## Main-plot treatment :

3 levels of irrigation :  $I_0$ =No irrigation,  $I_1$ =2 and  $I_2$ =3 irrigations.

## Sub-plot treatments :

All combinations of (1) and (2) :

(1) 2 levels of spacings :  $S_1$ =122 cm × 30 cm., and  $S_2$ =122 cm × 61 cm.

(2) 2 levels of manurings :  $M_0$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_1$ =1.5 times  $M_0$ .

N as A/S and  $P_2O_5$  as Super applied by ring method on 21.8.1963 and on 2.9.1964 and 3.10.1964 and  $P_2O_5$  on 2.9.1964.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.8 m × 7.3 m. (b) 7.3 m × 6.1 m. (v) 122 cm × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil, endrex was applied twice in 1963 and 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Both errors (a) and errors (b) homogeneous.

## 5. RESULTS :

(i) 1069 Kg/ha. (ii) (a) 229.9 Kg/ha. based on 14 d.f. composed of pooled error (a) +years × Interaction. (b) 179.2 based on 61 d.f. composed of pooled error +years × one and two factors interaction. (iii) None of the effects is significant.

	$I_1$	$I_2$	$I_3$	$M_0$	$M_1$	Mean
$S_1$	985	1111	1144	1035	1125	1080
$S_2$	998	1151	1022	963	1151	1057
Mean	992	1131	1083	999	1138	1069
$M_0$	942	1052	1004			
$M_1$	1042	1210	1162			

**Crop :- Cotton (*Kharif*).**

**Ref :- Gj. 63(118), 64(46).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'ICM'.**

Object : To study the effect of irrigation, spacing and manurial doses on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton, *Jowar*. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  during both years. (ii) Clay loam. (iii) 27.6.1963, 10.7.1964. (iv) (a) 3 harrowings, 1 harrowing. (b) Dibbling. (c) 7 Kg/ha. (d) As per treatments. (e) 1. (v) 24.7 C.L/ha. of press mud (sugarcane by product) in 1963 and 12.4 C.L/ha. of F.Y.M. in 1964. (vi) 2087 (late). (vii) Irrigated. (viii) 3 interculturings, 4 interculturings. (ix) 139 cm., 224 cm. (x) 15.4.64 and 2.5.1964, 16.3.1965 and 11.4.1965.

## 2. TREATMENTS :

## Main-plot treatments :

3 levels of irrigation :  $I_0$ =No irrigations,  $I_1$ =2 and  $I_2$ =3 irrigations.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 spacings :  $S_1$ =122 cm × 30 cm. and  $S_2$ =122 cm × 61 cm.

(2) 2 manurial treatments :  $M_1$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_2$ =67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

N and  $P_2O_5$  applied by ring method, N on 3.9.1963, 2.9.1964 and 3.10.1964 and  $P_2O_5$  applied on 3.9.1963 and 2.9.1964.

Intensity of irrigation being 2.5 acre inches.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 12.2 m×7.3 m. (b) 8.5 m.×4.9 m. (v) 183 cm.×122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. Endrex applied twice in 1963 and once in 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) N.A. (vi) N.A. (vii) Both the errors are heterogeneous.

## 5. RESULTS :

63(118)

(i) 370 Kg/ha. (ii) (a) 116.0 Kg/ha. (b) 93.7 Kg/ha. (iii) Main effect of I is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>0</sub>	199	247	192	254	223
I <sub>1</sub>	435	427	425	438	431
I <sub>2</sub>	411	503	421	492	456
Mean	348	392	346	395	370
S <sub>1</sub>	322	370			
S <sub>2</sub>	375	415			

C.D. for I marginal means=74.6 Kg/ha.

64(46)

(i) 973 Kg/ha. (ii) (a) 283.5 Kg/ha. (b) 176.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	M <sub>1</sub>	M <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
I <sub>0</sub>	878	964	958	884	921
I <sub>1</sub>	934	1026	982	978	980
I <sub>2</sub>	1034	1002	933	1103	1018
Mean	949	997	958	988	973
S <sub>1</sub>	934	981			
S <sub>2</sub>	964	1013			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(123).**

**Site :- Trial-cum-Demons. Farm, Bardoli.**

**Type :- 'ICM'**

Object :- To find out suitable irrigation spacing and fertilizer for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Paddy-Cotton. (b) Paddy. (c) 61.7 Kg/ha. of N+37.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black soil. (iii) 1.7.65. (iv) (a) 2 ploughings and 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) ISC-67. (vii) As per treatments. (viii) 3 weedings, 2 interculturings. (ix) 106 cm. (x) 17.2.66 and 18.3.66.



## 2. TREATMENTS :

## Main-plot treatments :

All combination of (1) and (2)

(1) 4 levels of irrigation :  $I_0$ =No irrigation,  $I_1$ =2 irrigations at 30% available moisture,  $I_2$ =3 irrigations at 50% available moisture and  $I_3$ =5 irrigations at 70% available moisture.

(2) 3 levels of N as A/S :  $N_1$ =49.4,  $N_2$ =98.8 and  $N_3$ =148.2 Kg/ha.

## Sub-plot treatments :

3 spacings :  $S_1$ =122 cm. × 31 cm.,  $S_2$ =122 cm. × 61 cm. and  $S_3$ =122 cm. × 92 cm.

N applied in two doses at sowing and one month after sowing.

## 3. DESIGN :

(i) Split-plot. (ii) 12 main-plots/replication, 3 sub-plots/main-plot. (iii) 3. (iv) (a) 9.8 m. × 5.5 m. (b) 7.3 m. × 3.7 m. (v) 122 cm × 9.2 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of jassides of bollworm. Insecticides applied. (iii) *Kapas* yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) *Kholwad*. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 857 Kg/ha. (ii) (a) 215.0 Kg/ha. (b) 238.4 Kg/ha. (iii) Main effect of I and S are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$N_1$	$N_2$	$N_3$	$S_1$	$S_2$	$S_3$	Mean
$I_0$	714	749	649	625	755	732	704
$I_1$	975	956	907	1008	1027	731	946
$I_2$	794	993	997	850	1084	851	928
$I_3$	809	974	772	875	941	738	852
Mean	823	918	831	857	952	763	857
$S_1$	818	890	864				
$S_2$	934	1026	895				
$S_3$	717	839	734				

C.D. for I marginal means=121.1 Kg/ha.

C.D. for S marginal means=113.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Bhachau.**

**Ref :- Gj. 64(189).**

**Type :- 'ICM'.**

Object :- To determine the optimum requirements of irrigation, spacing and manures of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra*. (c) Nil. (ii) Sandy soil. (iii) 11.7.64. (iv) (a) 3 ploughing and 1 harrowing. (b) Dibbling. (c) 12 Kg/ha. (d) As per treatments. (e) 2-3. (v) 24.7 C.L./ha. of F.Y.M. (vi) I.S.C.-67. (vii) As per treatments. (viii) 2 interculturations. (ix) 20 cm. (x) As per maturity of bolls (dates N.A.).

## 2. TREATMENTS :

## Main-plot treatments :

3 no. of irrigations :  $I_1$ =2,  $I_2$ =3 and  $I_3$ =4 irrigations.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 doses of fertilizers :  $F_1$ =44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $F_2$ =67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

(2) 2 spacings :  $S_1$ =91 cm. × 30 cm. and  $S_2$ =91 cm. × 61 cm.

N applied as A/S and  $P_2O_5$  as Super other details N.A.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) 27.4 m. × 26.8 m. (iii) 4.  
(iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of jassides, foliolol was sprayed. (iii) Seed cotton yield. (iv) (a) 1964-only.  
(b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 872 Kg/ha. (ii) (a) 220.3 Kg/ha. (b) 211.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	875	877	912	971	805	888
F <sub>2</sub>	810	881	878	880	832	856
Mean	843	878	895	926	818	872
S <sub>1</sub>	880	956	942			
S <sub>2</sub>	806	801	848			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(34).**

**Site Trial-cum-Demons. Farm, Chanasura.**

**Type :- 'ICM'**

Object :- To find out the effect of spacing, fertilizers and number of irrigations on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Castor. (c) Nil. (ii) Light goradu (sandy loam). (iii) 2.7.63. (iv) (a) 3 ploughings and 2 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) *Kalyan*. (vii) As per treatments. (viii) 2 interculturings. (ix) 59 cm. (x) 10.3.64, 27.3.64 and 11.5.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigation : I<sub>0</sub>=No irrigation, I<sub>1</sub>=3 and I<sub>2</sub>=5 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=61 cm. × 30 cm., S<sub>2</sub>=61 cm. × 46 cm. and S<sub>3</sub>=61 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>0</sub>=Control (no manure) and M<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

Details of irrigation : N.A.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 4.3 m. for S<sub>1</sub> and 10.4 m. × 4.9 m. for S<sub>2</sub> and S<sub>3</sub>. (b) 9.1 m. × 3.7 m. (v) 61 cm. × 30 cm. for S<sub>1</sub> and 61 cm. × 61 cm. for S<sub>2</sub> and S<sub>3</sub>. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Plants were affected by white ants. (iii) *Kapas* yield. (iv) (a) 1963—only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1111 Kg/ha. (ii) (a) 145.0 Kg/ha. (b) 234.4 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	978	1193	1061	1035	1063	1134	1077
M <sub>1</sub>	1047	1228	1161	1092	1113	1231	1145
Mean	1012	1210	1111	1064	1088	1182	1111
S <sub>1</sub>	996	1124	1072				
S <sub>2</sub>	943	1196	1125				
S <sub>3</sub>	1098	1310	1137				

C.D. for I marginal means=76.2 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(137).**

**Site :- Trial-cum-Demons. Farm, Chanasura.**

**Type :- 'ICM'.**

**Object :-** To find out the economic spacings, number of irrigations and fertilizer dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Rape seed. (c) 22.4 Kg/ha. of N. (ii) Sandy soil. (iii) 4.6.65. (iv) (a) 3 ploughings, 2 harrowings. (b) Hand sowing (dibbling). (c) Nil. (d) As per treatments. (e) 2 to 3 seeds/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) ISC-67. (vii) As per treatments. (viii) 2 weedings and 2 interculturings. (ix) 35 cm. (x) 1, 16.1.1966 ; 6, 23.2.66 ; 2.3.1966.

**2. TREATMENTS :**

**Main-plot treatments :**

No. of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of fertilizers : F<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=57.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 2 spacings : S<sub>1</sub>=91.5 cm. × 33.5 cm. and S<sub>2</sub>=91.5 cm. × 61.0 cm.

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Light attack of aphids, endrin was sprayed. (iii) Seed cotton yield. (iv) (a) 1963—1965. (1963, 64 failed completely). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Experiments conducted during the years 1963 and 1964 failed completely.

**5. RESULTS :**

(i) 1713 Kg/ha. (ii) (a) 366.1 Kg/ha. (b) 217.0 Kg/ha. (iii) Main effects of I and F are highly significant. Main effect of S is significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	1304	1656	1926	1568	1690	1629
F <sub>2</sub>	1571	1846	1978	1725	1872	1798
Mean	1437	1751	1952	1646	1781	1713
S <sub>1</sub>	1400	1716	1822			
S <sub>2</sub>	1474	1786	2082			

C.D. for I marginal means=235.4 Kg/ha.  
 C.D. for F marginal means=103.1 Kg/ha.  
 C.D. for S marginal means=103.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(138).**

**Site :- Trial-cum-Demons. Farm, Chanasura.**

**Type :- 'ICM'.**

Object :- To find out the economic spacing, number of irrigations and fertilizer doses for Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Rape seed. (c) 22.4 Kg/ha. of N. (iii) Sandy soil. (iii) 20.6.66. (iv) (a) 3 ploughings, 2 harrowings. (b) Hand sowing. (c) Nil. (d) As per treatments. (e) 1 to 2 seeds/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) 134 Co<sub>2</sub>M. (vii) As per treatments. (viii) 2 interculturings. (ix) 34 cm. (x) 2.1.66 to 2.3.66.

2. TREATMENTS :

**Main-plot treatments :**

No. of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 fertilizers doses : F<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 2 spacings : S<sub>1</sub>=91 cm.×30 cm. and S<sub>2</sub>=91 cm.×61 cm.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super applied at sowing.

3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 9.1 m.×6.7 m. (b) 7.3 m.×5.5 m. (v) 91 cm.×61 cm. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Heavy attack of aphids, endrin was sprayed. (iii) Seed cotton yield. (iv) (a) 1963—1965. (1963, 64 failed). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 662 Kg/ha. (ii) (a) 401.7 Kg/ha. (b) 222.0 Kg/ha. (iii) Interaction I×F alone is significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	545	793	570	687	585	636
F <sub>2</sub>	742	617	701	670	704	687
Mean	644	705	636	678	645	662
S <sub>1</sub>	646	738	653			
S <sub>2</sub>	642	673	619			

C.D. for F means at the same level of I=182.7 Kg/ha.  
 C.D. for I means at the same level of F=288.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(99), 64(162).**

**Site :- Irrigation-cum-Demons. Farm, Halvad.**

**Type :- 'ICM'.**

Object :- To find out the optimum number of irrigations, spacings and fertilizer dose for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) *Bajra*-cotton. (b) *Bajra*. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63 only, Nil for 64. (ii) Medium black soil. (iii) 4, 5.8.63, 4.7.64. (iv) (a) 1 ploughing and 2 harrowings. (b) Hand sowing (dibbling). (c) 20 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) *Kalyan*. (vii) As per treatments. (viii) 3 to 5 interculturings. (ix) 26 cm. for 63 and 46 cm. for 64. (x) 3 to 6.4.64 ; 25.2.65.

## 2. TREATMENTS :

## Main-plot treatments :

3 levels of irrigation :  $I_0=0$ ,  $I_1=3$  and  $I_2=5$  irrigations.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 3 spacings :  $S_1=61$  cm.  $\times$  30 cm.,  $S_2=61$  cm.  $\times$  46 cm. and  $S_3=61$  cm.  $\times$  61 cm.

(2) 2 manurial treatments :  $M_0$ =Control (no manure) and  $M_1=44.8$  Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.

Manures applied in two doses : 1st dose broadcasted at sowing and 2nd dose applied in furrows after one month of sowing. Intensity of each irrigation being 3 acre inches. Time of irrigation : N.A.

Manures applied on 28.7.1964.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 6 sub-plots/main-plot. (b) 31.1 m.  $\times$  29.3 m. for 63 ; N.A. for 64. (iii) 6. (iv) (a) 10.4 m.  $\times$  4.3 for  $S_1$  ; 10.4 m.  $\times$  4.6 m. for  $S_2$  and 10.4 m.  $\times$  4.9 for  $S_3$  in 63 and 10.4 m.  $\times$  4.9 m. in 64. (b) 9.1 m.  $\times$  3.7 m. (v) As per treatments for 63 and 61 cm.  $\times$  61 cm. in 64. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1963-1964. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the main-plot error variances are heterogeneous and interaction is absent, therefore individual results are presented below:

## 5. RESULTS :

63(99)

(i) 896 Kg/ha. (ii) (a) 203.4 Kg/ha. (b) 181.8 Kg/ha. (iii) Main effect of M is highly significant. Main effect of S and interaction  $I \times M$  are significant. (iv) Av. yield of *kapas* in Kg/ha.

	$I_0$	$I_1$	$I_2$	$M_0$	$M_1$	Mean
$S_1$	871	809	858	734	958	846
$S_2$	893	909	862	766	1010	888
$S_3$	870	979	1013	903	1005	954
Mean	878	899	911	801	991	896
$M_0$	844	791	768			
$M_1$	912	1007	1054			

C.D. for S marginal means = 112.0 Kg/ha.  
 C.D. for M marginal means = 69.3 Kg/ha.  
 C.D. for I means at the same level of M = 138.2 Kg/ha.  
 C.D. for M means at the same level of I = 120.0 Kg/ha.

64(162)

(i) 831 Kg/ha. (ii) (a) 512.8 Kg/ha. (b) 145.9 Kg/ha. (iii) Main effect of M is highly significant and interaction  $I \times M$  is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	717	843	954	806	870	838
S <sub>2</sub>	736	795	908	738	888	813
S <sub>3</sub>	701	783	1042	766	918	842
Mean	718	807	968	770	892	831
M <sub>0</sub>	680	777	853			
M <sub>1</sub>	756	837	1083			

C.D. for M marginal means = 55.6 Kg/ha.  
 C.D. for I means at the same level of M = 277.7 Kg/ha.  
 C.D. for M means at the same level of I = 96.2 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(98), 64(156), 65(60).**

**Site :- Irrigation-cum-Demons. Farm, Halvad.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum number of irrigation spacing and fertilizer dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) *Bajra-Cotton* ; Nil ; *Cotton-jowar*. (b) *Bajra* ; *Jowar* in 1964—1965. (c) Nil. (ii) Medium black soil. (iii) 11, 12.7.1963 ; 29.6.1964 ; 5.7.1965. (iv) (a) 2 ploughings and 4 harrowings ; 1 ploughing and 1 harrowing ; 1 harrowing. (b) Hand sowing in 63 and dibbling in 1964, 1965. (c) 12 Kg/ha. (d) As per (e) 1. (v) 12.4 C.L./ha. of F.Y.M. in 1963, 1965 and 7.4 C.L./ha. of F.Y.M. in 1964. (vi) I.S.C. 67. (vii) treatments. Irrigated. (viii) 5 interculturings in 1963, 1964 and 2 weedings and 3 hoeings in 1965. (ix) 26 cm., 46 cm., 67 cm. (x) 9, 10.3.1964 ; 18 to 25.2.1965 ; 2 and 21.3.1966.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3, and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=1.5 times M<sub>1</sub>.

Manures applied in two doses : 1st dose broadcasted at sowing and 2nd dose applied in furrows after one month of sowing as top dressing in 1963 ; Fertilizers applied on 13 and 27.7.1964 ; N applied on 30.8.1965 ; 28.10.1965 and P applied on 30.6.1965.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) Nil. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 92 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Satisfactory ; Normal ; Not satisfactory. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Late sowing by about 45 days to normal sowing due to insufficient rains at the normal time in 1963 only. (vii) Both the errors are homogeneous.

**5. RESULTS :**

(i) 508 Kg/ha. (ii) (a) 116.3 Kg/ha. (based on 22. d.f. made up of pooled error (a)+Years×I interaction). (b) 99.5 Kg/ha. (based on 95 d.f. made up of pooled error (b)+years×other one and two factors interaction). (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	484	496	536	483	527	505
S <sub>2</sub>	456	520	557	503	519	511
Mean	470	508	546	493	523	508
M <sub>1</sub>	453	527	499			
M <sub>2</sub>	486	489	594			

**Crop :- Cotton (Kharif).**

**Ref. :- Gj. 63(97), 64(157), 67(59).**

**Site :- Irrigation-cum-Demons. Farm, Halvad.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum number of irrigation spacing and fertilizers dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Bajra-Cotton : Nil ; Cotton-Jowar. (b) Bajra ; Jowar in 1964, 1965. (c) 12.4 C.L./ha. of F.Y.M. ; Nil. (ii) Medium black soil. (iii) 10, 11.7.1963 ; 27.7.1964 ; 4.7.1965. (iv) (a) 2 ploughings and 4 harrowings, 1 ploughing and harrowing, 1 harrowing. (b) Hand sowing, for 1963, dibbling in 1964 and 1965. (c) 12 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. in 1963 and 1965 ; Nil in 1964. (vi) 170—CO<sub>2</sub>. (vii) Irrigated. (viii) 5 interculturings, 6 interculturings ; 2 weedings and 3 hoeing. (ix) 26 cm., 46 cm., 67 cm. (x) 5.2.1964 to 7.3.1964 ; 22.1.1965 to 18.2.1965 ; 15.2.1966 to 8.3.1966.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings 91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=1.5 times M<sub>1</sub>.

Manures applied in two doses 1st dose broadcasted at sowing and 2nd dose applied in furrows after one month of sowing as top dressing. Intensity of each irrigation being 3 acre inches. Time of irrigation N.A. in 1963, manures applied on 15.7.1964, while in 1965 N applied on 30.8.1965 and 27.10.1965 and P<sub>2</sub>O<sub>5</sub> applied on 30.6.1965.

**3. DESIGN :**

(i) Split-plot. (ii) 3 main-plots/block, 4 sub-plots/main-plot. (b) 26.8 m. × 27.4 m. in 1963, N.A. in 1964 and 1965. (iii) 4. (iv) (a) 9.1m. × 6.7 m. (b) 7.3m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Satisfactory in 1963, Normal in 1964, 1965. (ii) Attack of jassides, endrine was sprayed in 1963 and Nil in 1964, 1965. (iii) Kapas yield. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Late sowing by about 45 days to normal sowing due to insufficient rains at normal time in 1963 only. (vii) Both the errors are homogeneous.

**5. RESULTS :**

(i) 920 Kg/ha. (ii) (a) 170.0 Kg/ha. (based on 22 d.f. of pooled error (a)+Treatments × Years interaction). (b) 114.2 Kg/ha. (based on 95 d.f. made up of pooled error (b)+years × one and two factors interaction). (iii) Both the main effects of S and M are highly significant. (iv) Av. yield of Kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	914	958	1041	898	1044	971
S <sub>2</sub>	802	895	912	818	921	870
Mean	858	926	977	858	982	920
M <sub>1</sub>	790	879	906			
M <sub>2</sub>	926	974	1047			

C.D. for S or M marginal means=37.8 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(215), 64(183), 65(79).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'ICM'.**

**Object :-**To study the effect of irrigations, fertilizers and spacings on the yield of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat for 63 ; Cotton for 64 and Groundnut for 65. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63 and 64 and 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65. (ii) Medium black soil. (iii) 15.7.63; 10.7.64 ; 22.7.65. (iv) (a) 1 to 2 ploughings, 2 harrowings. (b) Dibblings. (c) 10 Kg/ha. for 63, 12 Kg/ha. for 64 and 65. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) I.S.C.—67. (vii) As per treatments. (viii) 2 to 5 weedings ; 3 to 6 interculturings. (ix) 29 cm. for 63 ; 57 cm. for 64 and 34 cm. for 65. (x) 9.4.64 ; 8.1.65 to 20.3.65 and N.A. for 65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of fertilizers : F<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=67.3 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 2 spacings : S<sub>1</sub>=91 cm.×31 cm. and S<sub>2</sub>=91 cm.×61 cm.

N applied as A/S by broadcast on 15.7.1963 and P<sub>2</sub>O<sub>5</sub> as Super drilled on 19.6.1963. Dates of irrigations N.A.

Dates of irrigations for I<sub>1</sub> are 5.10.64 and 13.11.64 ; for I<sub>2</sub> are 5.10.64 ; 25.10.64 and 13.11.64 ; for I<sub>3</sub> are 5.10.64 ; 25.10.64 ; 12.11.65 ; 25.11.64.

N applied as A/S by broadcast on 10.7.64 and P<sub>2</sub>O<sub>5</sub> as Super drilled on 7.7.64.

Dates of irrigations for I<sub>1</sub> are 19.10.65 and 18.11.65 for I<sub>2</sub> are 8.10.65, 28.10.65 and 18.11.65 and for I<sub>3</sub> are 8.10.65 ; 23.10.65 ; 8.11.65 and 18.11.65..

N applied as A/S by broadcast on 23.8.65 and 8.10.65 and P<sub>2</sub>O<sub>5</sub> as Super drilled on 20.7.65.

**3. DESIGN :**

(i) Split-plot. (ii) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4 for 63 and 65 ; 3 for 64. (iv) (a) 9.1 m.×6.7 m. (b) 7.3 m.×5.5 m. (v) 91 cm.×61 cm. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory in 63, Normal in 64 and 65. (ii) Attack of top shoot borers, aphids and jassides and bollworms. Endrex was applied twice in 63 ; Basudin, folidol and Hexatin sprayed in 64 and 65. (iii) Kapas yield. (iv) (a) 1963-65. (b) No. (c) Nil. (v) N.A. (vi) The crop was sown with soaking dose of canal water due to late receipt of Monsoon. Only one picking was done as the hills shaded due to severe cold and attack of pest and diseases. (vii) Since sub-plot error variances are heterogeneous, individual results are presented below.

**5. RESULTS :**

63(215)

(i) 194 Kg/ha. (ii) (a) 75.4 Kg/ha. (b) 51.6 Kg/ha. (iii) Interaction I×S alone is significant. (iv) Av. yield of kapas in Kg/ha.



	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	202	150	193	177	186	182
F <sub>2</sub>	201	192	227	203	210	207
Mean	201	171	210	190	198	194
S <sub>1</sub>	225	150	196			
S <sub>2</sub>	177	192	224			

C.D. for I means at the same level of S=74.7 Kg/ha.

C.D. for S means at the same level of I=52.9 Kg/ha.

64(183)

- (i) 583 Kg/ha. (ii) (a) 146.3 Kg/ha. (b) 135.5 Kg/ha. (iii) Main effect of S alone is highly significant.  
(iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	589	594	583	663	514	589
F <sub>2</sub>	570	651	547	695	484	589
Mean	579	622	565	679	499	589
S <sub>1</sub>	669	720	647			
S <sub>2</sub>	490	525	483			

C.D. for S marginal means=94.8 Kg/ha.

65(79)

- (i) 312 Kg/ha. (ii) (a) 65.0 Kg/ha. (b) 78.5 Kg/ha. (iii) Main effects of I and S are highly significant and interaction I×F is significant. (iv) Av. yield of Kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>0</sub>	251	290	366	340	265	302
F <sub>1</sub>	200	390	373	360	282	321
Mean	225	340	369	350	273	312
S <sub>1</sub>	246	389	414			
S <sub>2</sub>	205	291	325			

C.D. for I marginal means =56.3 Kg/ha.

C.D. for S marginal means =46.5 Kg/ha.

C.D. for I means at the same level of F=79.9 Kg/ha.

C.D. for F means at the same level of I=80.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(216), 64(184), 65(78).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'ICM'.**

**Object :-** To study the effect of irrigations, fertilizers and spacings on the yield of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 63, Cotton for 64, Groundnut for 65. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63 and 64, 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black soil. (iii) 17.7.63 ; 6.7.64 ; 22.7.65. (iv) (a) 1 to 2 ploughings, 2 harrowings. (b) Dibbling. (c) 10 Kg/ha for 63 and 64 ; 12 Kg/ha. for 65. (d) As per treatments. (e) 1 plant hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) 170—CO<sub>2</sub>. (vii) As per treatments. (viii) 3 to 7 interculturings, 3 to 4 weeding. (ix) 29 cm. for 63 ; 57 cm. for 64 and 34 cm. for 65. (x) 23.1.64 to 16.4.64 ; 13.1.65 to 20.3.65 and N.A. for 65.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigations :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.

**Sub-plot treatments**

All combinations of (1) and (2)

(1) 2 levels of fertilizers :  $F_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $F_2=67.2$  Kg/ha. of N +33.6 Kg/ha. of  $P_2O_5$ .

(2) 2 spacings :  $S_1=91$  cm. × 30 cm. and  $S_2=91$  cm. × 61 cm.

N applied as A/s by broadcast on 15.7.63 and  $P_2O_5$  as Super drilled on 19.6.63, Dates of irrigations are N.A.

Dates of irrigations for  $I_1$  are 4.10.64 and 12.11.64 ; for  $I_2$  are 4.10.64 ; 24.10.64 and 23.11.64 ; for  $I_3$  are 4.10.64 ; 25.10.64 ; 12.11.64 and 26.11.64.

N applied as A/S by broadcast on 6.7.64 and  $P_2O_5$  as Super drilled on 26.6.64.

Dates of irrigations for  $I_1$  are 19.10.65 and 18.11.65 for  $I_2$  are 8.10.65 ; 28.10.65 ; for  $I_3$  are 8.10.65 ; 28.10.65 ; 8.11.65 and 18.11.65.

N applied as A/S by broadcast on 23.3.65 and 8.10.65,  $P_2O_5$  as Super drilled on 21.7.65.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of top shoot borer, jassides, aphids and red leaf. Endrex was sprayed in 63, Basudin (thrice) folidol (thrice) and Hexatin (once were sprayed) in 64 and 65. (iii) Kapas yield. (iv) (a) 1963—65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since the main-plots error variances are heterogeneous, and the Treatments × years Interaction is absent, the individual results are presented below.

## 5. RESULTS :

**63(216)**

(i) 572 Kg/ha. (ii) (a) 52.8 Kg/ha. (b) 114.4 Kg/ha. (iii) Main effect of F alone is significant. (iv) Av. yield kapas in Kg/ha.

	$I_1$	$I_2$	$I_3$	$S_1$	$S_2$	Mean
$F_1$	553	468	584	531	539	535
$F_2$	613	622	592	621	597	609
Mean	583	545	588	576	568	572
$S_1$	593	528	607			
$S_2$	573	562	569			

C.D. for F marginal means=67.8 Kg/ha.

**64(184)**

(i) 868 Kg/ha. (ii) (a) 322.4 Kg/ha. (b) 103.6 Kg/ha. (iii) Main effect of F is highly significant. Interaction  $F \times I$  is significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	671	881	896	822	810	816
F <sub>2</sub>	693	1099	968	902	938	920
Mean	682	990	932	862	874	868
S <sub>1</sub>	695	972	919			
S <sub>2</sub>	669	1008	945			

C.D. for F marginal means = 47.0 Kg/ha.  
 C.D. for I means at the same level of F = 288.5 Kg/ha.  
 C.D. for F means at the same level of I = 106.3 Kg/ha.

65(78)

(i) 581 Kg/ha. (ii) (a) 159.9 Kg/ha. (b) 100.9 Kg/ha. (iii) Main effects of S and interaction I×F is highly significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	512	514	672	640	492	566
F <sub>2</sub>	502	698	588	670	522	596
Mean	507	606	630	655	507	581
S <sub>1</sub>	552	671	742			
S <sub>2</sub>	462	541	518			

C.D. for S marginal means = 57.7 Kg/ha.  
 C.D. for I means at the same level of F = 144.0 Kg/ha.  
 C.D. for F means at the same level of I = 99.9 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 64(182).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'ICM'.**

Object :- To find out economic spacing, no. of irrigation and fertilizers dose for Cotton.

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> (ii) Medium black. (iii) 5.7.64. (iv) (a) 1 ploughing and 2 harrowings. (b) Dibbling. (c) Nil. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) *Kalyan*. (vii) As per treatments. (viii) 6 interculturings and 3 weedings. (iv) 57 cm. (x) 15.3.65 and 12.5.65.

### 2. TREATMENTS :

#### Main plot treatments :

3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=3 (on 19, 9.3.10 and 3.11.64), I<sub>2</sub>=5 irrigations on 3.9, 3.10, 18.10, 3.11 and 18.1.64.

#### Sub-plot treatments :

All combinations of (1), and (2)

(1) 2 levels of fertilizers : F<sub>0</sub>=0 and F<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>,

(2) 3 spacings : S<sub>1</sub>=61cm.×30 cm., S<sub>2</sub>=61 cm.×46 cm. and S<sub>3</sub>=61 cm.×61 cm.

N applied as A/S by broadcast on 5.7.1964 and P<sub>2</sub>O<sub>5</sub> drilled as Super on 29.6.64.  
 Intensity and method of irrigation N.A.

## 3. DESIGN :

(i) Split plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) 1.04 m. × 4.3 m. for S<sub>1</sub>, 10.4 m. × 4.6 m. for S<sub>2</sub>, 10.4 m. × 4.2 m. for S<sub>3</sub>. (b) 9.1 m. × 3.7 m. (v) —. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of jassides, and top shoot borers, Folidol and Hexatin were sprayed. (iii) *Kapas* yield. (iv) (a) to (c) No. (v) to (vii) Nil.

## 5. RESULTS :

(i) 438 Kg/ha. (ii) (a) 156.4 Kg/ha (b) 152.8 Kg/ha. (iii) Main effects of I and F are highly significant. Interaction I × F is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	390	476	570	453	496	486	479
F <sub>1</sub>	300	305	586	415	387	390	397
Mean	345	390	578	434	441	438	438
S <sub>1</sub>	375	379	547				
S <sub>2</sub>	366	393	566				
S <sub>3</sub>	294	399	621				

C.D. for I marginal means = 82.1 Kg/ha.  
 C.D. for F marginal means = 58.7 Kg/ha.  
 C.D. for F means at the same level of I = 101.6 Kg/ha.  
 C.D. for I means at the same level of F = 108.9 Kg/ha.

**Crop :- Cotton (*Kharif*).**

**Ref :- Gj. 60(113)**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'ICM'.**

Object :- To study the effect and inter-relation of irrigation, dates of sowing, spacings and Nitrogen on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) Nil. (ii) Medium black. (iii) As per treatments. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) N.A. (d) Between rows—91 cm and between plants ; as per treatments. (e) 3 to 4. (v) 12.4 C.L./ha. of F.Y.M. (vi) CO<sub>2</sub>—170. (vii) Irrigated. (viii) 3 interculturings. (ix) N.A. (x) 18.1.61 ; 24.2.61 and 24.3.61.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations

**Sub-plot treatments :**

3 dates of sowing : D<sub>1</sub>=27.5.1960 ; D<sub>2</sub>=15.6.1960 and D<sub>3</sub>=3.7.1960.

**Sub-sub-plot treatments :**

3 plant spacings : S<sub>1</sub>=23, S<sub>2</sub>=46 and S<sub>3</sub>=69 cm.

**Sub-sub-sub-plot treatments :**

3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

Intensity of each irrigation being 3 acre inches. Time of irrigation being 1st week of October and 2nd week of Nov. for I<sub>1</sub> ; 1st, 4th weeks of Oct. and 2nd week of November for I<sub>2</sub> ; 1st and 3rd weeks of both October and November for I<sub>3</sub>.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot, 3 sub-sub-sub-plots/sub sub-plot. (b) N.A. (iii) 2. (iv) (a) 8.2 m. × 5.5 m. (b) 6.9 m. × 3.7 m. (v) 69 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids, jassides etc. Endrex was sprayed. (iii) *Kapas* yield. (vi) (a) 1958—1961. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 272 Kg/ha. (ii) (a) 33.8 Kg/ha. (b) 120.2 Kg/ha. (c) 89.1 Kg/ha. (d) 51.5 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of *kapas* in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
I <sub>1</sub>	290	295	297	290	305	288	302	290	291	294
I <sub>2</sub>	214	254	285	247	266	241	254	267	231	251
I <sub>3</sub>	249	302	261	266	267	279	285	268	259	271
Mean	251	284	281	268	279	269	280	275	260	272
N <sub>0</sub>	265	293	283	286	295	260				
N <sub>1</sub>	253	279	293	268	263	294				
N <sub>2</sub>	235	279	267	250	278	253				
S <sub>1</sub>	241	302	260							
S <sub>2</sub>	271	273	293							
S <sub>3</sub>	241	276	290							

C.D. for I marginal means = 280 Kg/ha.

**Crop :- Cotton (*Kharif*).**

**Site :- Cental Exptl. Stn., Junagadh.**

**Ref :- Gj. 61(183).**

**Type :- 'ICM'.**

Object :- To study the interaction of irrigation dates, of sowing, spacings and fertilizers on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar-Cotton-Bajra*. (b) *Jowar*. (c) 22.4 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) As per treatments. (iv) (a) 2 harrowings. (b) Hand sowing. (c) 11 Kg/ha. (d) As per treatments. (e) 3 to 4. (v) 12.4 C.L./ha. of F.Y.M. (vi) CO<sub>2</sub>-170. (vii) Irrigated. (viii) 4 interculturings. (ix) 141 cm. (x) 27.2.62 ; 14.3.62 and 11.4.62.

## 2. TREATMENTS :

## Main-plot treatments :

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

## Sub-plot treatments :

3 dates of sowing : D<sub>1</sub>=4.6.1961 ; D<sub>2</sub>=2.7.1961 and D<sub>3</sub>=9.7.1961.

## Sub-sub-plot treatments :

3 plant spacings : S<sub>1</sub>=23 cm., S<sub>2</sub>=46 cm. and S<sub>3</sub>=69 cm.

## Sub-sub-sub-sub-plot treatments :

3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=22.4 and N<sub>2</sub>=44.8 Kg/ha.

Intensity of each irrigation being 3 acre inches. Time for irrigation being 1st week of October and 2nd week of November for I<sub>1</sub>, 1st, 4th weeks of October and 2nd week of November for I<sub>2</sub> ; 1st and 3rd weeks of both October and November for I<sub>3</sub>.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot, 3 sub-sub-plots/sub-plot and 3 sub-sub-sub-plots/sub-sub-plot. (b) 74.1 m. × 49.4 m. (iii) 2. (iv) (a) 8.2 m. × 5.5 m. (b) 6.9 m. × 3.7 m. (v) 69 cm. × 91 cm. (v) Yes.

## 4. GENERAL :

(i) N.A. (ii) Nil. 20 c.c. of Endrex was sprayed on 5.10.61. (iii) Kapas yield. (iv) (a) 1958—1961. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Due to heavy rains and stormy winds most of plots were washed away and water was stagnant in some plots and hence yield was affected. (vii) Nil.

## 5. RESULTS :

(i) 891 Kg/ha. (ii) (a) 353.2 Kg/ha. (b) 252.8 Kg/ha (c) 178.2 Kg/ha. (d) 159.1 Kg/ha (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
I <sub>1</sub>	891	780	685	796	790	770	781	829	746	785
I <sub>2</sub>	957	964	845	939	891	935	914	912	939	922
I <sub>3</sub>	942	1071	952	1054	977	933	945	1031	989	988
Mean	930	938	827	930	886	879	880	924	891	898
N <sub>0</sub>	941	900	800	931	861	848				
N <sub>1</sub>	933	962	878	927	904	941				
N <sub>2</sub>	917	953	804	931	893	849				
S <sub>1</sub>	963	964	862							
S <sub>2</sub>	918	903	838							
S <sub>3</sub>	909	947	782							

**Crop :-** (Kharif).

**Ref :-** Gj. 63(62), 64(246) 65(220).

**Site :-** Central Exptl. Stn., Junagadh.

**Type :-** 'ICM'.

**Object :-** To find out the best combination of irrigation, spacing and fertilizer dose for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil in 1963 and 1965; Cotton—Groundnut in 1964. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. + 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1963 and 1965; Nil in 1964. (ii) Medium black. (iii) 3.6.1963; 4.7.1964; 18.7.1965. (iv) (a) 4 ploughings and 6 harrowings in 1963, 1 ploughing and 3 harrowings in 1964 and 2 ploughings and 6 harrowings. (b) Hand sowing in 1963. Dibbling in 1964 and 1965. (c) 7 Kg/ha. (d) As per treatments. (e) 3 to 4 to 1963; 1 in 1964; 1—2 seeds in 1965. (v) 12.4 C.L./ha. of F.Y.M. (vi) I.S.C.—67. (vii) Irrigated. (viii) 6, 5, 4. interculturings during 1963, 1964, 1965, respectively and 3 weedings during 1965. (ix) 57 cm., 137 cm. and 5). (x) 6.2.1964 to 6.4.1964; N.A. for 1964 and 1965 expts.

## 2. TREATMENTS :

## Main-plot treatments :

3 levels of irrigation  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.

## Sub-plot treatments :

All combinations of (1) and (2)

2 spacings :  $S_1=91 \times 30$  cm. and  $S_2=91 \times 60$  cm.2 fertilizers :  $M_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $M_2=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication and 4 sub-plots/main-plots. (b) N.A. (iii) 4. (iv) N.A. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Kapas yield. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances for sub-plot are heterogeneous.

## 5. RESULTS :

63(62)

(i) 821 Kg/ha. (ii) (a) 204.4 Kg/ha. (b) 142.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	$I_1$	$I_2$	$I_3$	$M_1$	$M_2$	Mean
$S_1$	842	877	827	834	862	848
$S_2$	708	867	810	807	782	795
Mean	775	872	818	821	822	821
$M_1$	795	867	800			
$M_2$	755	876	835			

64(246)

(i) 508 Kg/ha. (ii) (a) 236.8 Kg/ha. (b) 144.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of kapas in Kg/ha.

	$I_1$	$I_2$	$I_3$	$M_1$	$M_2$	Mean
$S_1$	418	514	664	501	564	532
$S_2$	444	467	542	492	476	484
Mean	431	490	603	497	520	508
$M_1$	414	536	540			
$M_2$	449	445	666			

65(220)

(i) 1008 Kg/ha. (ii) (a) 355.8 Kg/ha. (b) 286.3 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	967	1162	1195	1101	1107	1108
S <sub>2</sub>	705	996	1024	906	910	908
Mean	836	1079	1110	1008	1008	1008
M <sub>1</sub>	892	1027	1104			
M <sub>2</sub>	779	1131	1115			

C.D. for S marginal means = 169.6 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(64), 64(243).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'ICM'.**

Object :- To find out the best combination of spacing, irrigation and fertilizer for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Groundnut. (b) Groundnut. (c) 12.4 C.L/ha. of F.Y.M+11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 1.7.63, 2.7.64. (iv) (a) 4 ploughings and 3 to 6 harrowings. (b) Dibbling. (c) 9 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L/ha. of F.Y.M. (vi) Kalyan. (vii) As per treatments. (viii) 3 to 5 interculturings. (ix) 57 cm. for 63, 137 cm. for 64. (x) 18.2.64 to 28.3.64, 15.2.65 to 16.3.65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=3 and I<sub>2</sub>=5 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=61 cm. × 30 cm., S<sub>2</sub>=61 cm. × 46 cm. and S<sub>3</sub>=61 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>0</sub>=Control (no manure) and M<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

Dates of irrigation for I<sub>1</sub> are 3rd week of Sept., Oct., and Nov., for I<sub>2</sub> are 3rd week of Sept. and 1st and 3rd weeks of Oct. and Nov.

N applied as C/A/N in two doses on 26.8.64 and 1.10.64, P<sub>2</sub>O<sub>5</sub> as Super on 26.6.1964.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 4.4 m. for S<sub>1</sub>, 10.4 m. × 4.6 m. for S<sub>2</sub> and 10.4 m. × 4.9 m. for S<sub>3</sub>. (b) 9.1 m × 3.7 m. (v) As per treatments. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1963-contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**6. RESULTS :**

**63(64)**

(i) 871 Kg/ha. (ii) (a) 227.2 Kg/ha. (b) 154.7 Kg/ha. (iii) Main effects of I alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.



	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	725	923	923	870	844	857
S <sub>2</sub>	752	898	979	872	880	876
S <sub>3</sub>	751	936	956	872	890	881
Mean	743	919	952	871	871	871
M <sub>0</sub>	727	929	958			
M <sub>1</sub>	759	908	947			

C.D. of I marginal means=119.4 Kg/ha.

64(243)

(i) 1004 Kg/ha. (ii) (a) 339.1 Kg/ha. (b) 154.7 Kg/ha. (iii) Main effects of I and M are highly significant. (iv) Av. yield of kapas in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	806	1139	1089	1006	1017	1011
S <sub>2</sub>	800	1129	1150	965	1088	1026
S <sub>3</sub>	795	1066	1060	903	1044	974
Mean	800	1111	1100	958	1050	1004
M <sub>0</sub>	765	1074	1035			
M <sub>1</sub>	835	1149	1165			

C.D. of I marginal means=178.0 Kg/ha.

C.D. of M marginal means=59.0 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(61), 64(245), 65(218).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'ICM'.**

**Object :-**To find out the best combination of irrigation, spacings and fertilizers for Cotton.

## 1. BASAL CONDITIONS ;

(i) (a) Nil in 1963 and 1965, Cotton-Groundnut in 1964. (b) Wheat, Groundnut in 1964 and 1965. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1963, 12.4 C.L/ha. of F.Y.M+11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1964 and 1965. (ii) Medium black. (iii) 30.6.1963, 4.7.1964 and 26.7.1965. (iv) (a) 4 ploughings and 6 harrowings in 1963, 3 harrowings in 1964 and 2 ploughings and 6 harrowings in 1965. (b) Hand sowing (dibbling). (c) 7 Kg/ha. (d) As per treatments. (e) 3 to 4, 1 plant/hill in 1964, 1-2 seeds/dibble. (v) 12.4 C.L/ha. of F Y.M, (vi) CO<sub>2</sub>-170. (vii) Irrigated. (viii) 6 interculturings in 1963. 5 interculturings in 1964, and 3 interculturings and 3 weedings in 1965. (ix) 57 cm., 137 cm., and 59 cm. (x) 6.2.1964 to 6.4.1964, 8.2.1965 and 9.3.1965 and 17.1.1966 to 9.2.1966.

## 2. TREATMENTS :

### Main-plot treatments :

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

### Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=1.5 times M<sub>1</sub>.

N applied in two doses on 2.8.1963 and 12.9.1963 and P<sub>2</sub>O<sub>5</sub> applied on 28.6.1963.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) Nil. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good, Normal in 1964 and 1965. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1963 to 1965. (b) Nil. (c) Results of combined analysis are given under 5. (v) and (vi) Nil. (vii) Both the error variances are homogeneous and Treatments × years interactions are absent.

## 5. RESULTS :

(i) 981 Kg/ha. (ii) (a) 270.6 Kg/ha. (based on 22 d.f. composed of pooled error (a) + Treatments × years interaction). (b) 133.3 Kg/ha. (based on 95 d.f. composed of pooled error (b) + Treatments × years interaction). (iii) Main effect of S alone is significant. (iv) Av. yield of seed cotton in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	974	1046	1144	1076	1034	1055
S <sub>2</sub>	820	886	1014	893	920	907
Mean	897	966	1079	984	977	981
M <sub>1</sub>	871	971	1110			
M <sub>2</sub>	923	961	1048			

C.D. for S marginal means = 44.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Ref :- Gj. 63(162), 64(94).**

**Type :- 'ICM'.**

**Object :-** To find out the best combination of spacing, irrigation and fertilizer for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Sugarcane. (c) N.A., 134.5 Kg/ha. of N + 24.7 C.L/ha. of F.Y.M. (ii) Medium black. (iii) 28.6.1963, 27.6.1964. (iv) (a) 1 ploughing and 2 harrowings, 1 ploughing and 1 harrowing. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. (vi) ISC-67. (vii) Irrigated. (viii) 5 interculturations, 4 interculturations. (ix) 124 cm., 191 cm. (x) 27.2.1964 to 22.3.1964, 3.3.1965 to 23.3.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=67.2 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S drilled on 4.9.1963, 2.10.1963, 16.9.1964 and 5.10.1964 and P<sub>2</sub>O<sub>5</sub> as Super drilled on 4.9.1963 and 4.9.1964. Intensity of each irrigation being 2.5 acre inches. Time of irrigation during 1963 N.A. Dates of irrigation during 1964 for I<sub>1</sub> are 26.10.1964, 12.11.1964, for I<sub>2</sub> are 26.10.1964, 12.11.1964 and 7.12.1964 and for I<sub>3</sub> are 26.10.1964, 12.11.1964, 7.12.1964 and 24.12.1964.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good, Normal. (ii) Slight attack of aphids, endrin was applied in 1963. Attack of pink boll worms in 1964 endrin was applied. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Due to continuous and heavy rains, interculturing and weeding was not possible at proper times and hence plots were weedy in 1964. (vii) Both the error variances are homogeneous and Treatments  $\times$  years interaction are absent.

## 5. RESULTS :

(i) 1158 Kg/ha. (ii) (a) 259.9 Kg/ha. (based on 14 d.f. composed of pooled error and years  $\times$  I interaction). (b) 138.7 Kg/ha. (based on 61 d.f. compound of pooled error and two and three factors interactions with years). (iii) Main effect of M alone highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	1083	1162	1102	1117	1114	1116
M <sub>2</sub>	1117	1256	1226	1193	1207	1200
Mean	1100	1209	1164	1155	1161	1158
S <sub>1</sub>	1110	1188	1167			
S <sub>2</sub>	1090	1231	1161			

C.D. for M marginal means = 78.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(161), 64(93).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'ICM'.**

Object :- To find out the best combination of spacings, irrigations and fertilizers for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton, *Jowar*. (c) 44.8 Kg/ha. of N + 12.4 C.L./ha. of F.Y.M. in 1963, 12.4 C.L./ha. of F.Y.M + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 3 levels of N at 11.2, 22.4 and 33.6 Kg/ha. in 1964. (ii) Medium black. (iii) 29.6.1963, 13.7.1964. (iv) (a) 3 ploughings and 4 harrowings, 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) 2087. (vii) As per treatments. (viii) 4 interculturings, 5 interculturings. (ix) 124, cm., 191 cm. (x) 4 and 23.3.1964, 18.2.1965 to 20.3.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigation : I<sub>0</sub>=0, I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=122 cm.  $\times$  30 cm. and S<sub>2</sub>=122 cm.  $\times$  61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=67.2 Kg/ha. of N + 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S drilled on 5, 23.9.1963 and 18.9.1964, P<sub>2</sub>O<sub>5</sub> as Super on 14.9.1963 and 23.9.1964.

Dates of irrigation for 1963 : I<sub>1</sub> are 23.9.1963, 31.10.1963, for I<sub>2</sub> are 24.9.1963, 31.10.1963 and 27.11.1963, for 1964 I<sub>1</sub> are 23.10.1964, 15.11.1964 and for I<sub>2</sub> are 23.10.1964, 15.11.1964 and 6.12.1964.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 15.2 m.  $\times$  7.3 m. (b) 11.6 m.  $\times$  4.9 m. (v) 183 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of boll worms of gray mildew, endrin was applied during 1963, Nil during 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Heavy rainfalls during growth period in the year 1964. (vii) Both the error variances are homogeneous and Treatments  $\times$  years interactions are absent.

## 5. RESULTS :

(i) 695 Kg/ha. (ii) (a) 142.3 Kg/ha. (based on 22 d.f. composed of pooled error and years  $\times$  I interaction). (b) 246.5 Kg/ha. (based on 7 d.f. composed of two and three factors interactions with years). (iii) Main effect of I alone highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	536	728	747	638	703	670
M <sub>2</sub>	534	747	880	714	727	720
Mean	535	737	814	674	715	695
S <sub>1</sub>	504	724	799			
S <sub>2</sub>	567	750	828			

C.D. for I marginal means=147.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- 63(160), 64(92).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'ICM'.**

Object :—To find out the best combination of spacings, irrigations and fertilizers for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat ; Groundnut. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> in 1963 and Nil in 1964. (ii) Medium black. (iii) 27.6.1963 ; 5.7.1964. (iv) (a) 2 ploughings and 2 harrowings in 1963 and 1 ploughing and 2 harrowings in 1964. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1.(v) 12.4 C.L./ha. of F.Y.M. (vi) *Digvijay*. (vii) As per treatments. (viii) 5 interculturings. (ix) 124 cm. ; 191 cm. (x) 6, 25.3.1964 ; 12.2.1965 to 19.3.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigation : I<sub>0</sub>=0, I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=122 cm.  $\times$  30 cm. and S<sub>2</sub>=122 cm.  $\times$  61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N +22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N as A/S drilled on 5, 23.9.1963 and on 18.9.1964 ; P<sub>2</sub>O<sub>5</sub> as Super on 14.9.63 and 18.9.1964. Intensity of irrigation 2.5 acre inches. Dates of irrigation during 1963 for I<sub>1</sub>=24.9.1963 and 29.10.1963 ; for I<sub>2</sub>=24.9.1963 ; 29.10.1963 and 28.11.1963 ; during 1964 for I<sub>1</sub>=3.10.1964 and 14.11.1964 and for I<sub>2</sub> are 3.10.1964 ; 14.11.1964 and 7.12.64.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 15.2 m.  $\times$  7.3 m. (b) 11.6 m.  $\times$  4.9 m. (v) 183 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of bollworms and gray mildew, endrin applied during 1963 and Nil during 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Heavy rains during growth period in 1964. (vii) Both the error variances are homogeneous and Treatments  $\times$  years interactions are absent.

## 5. RESULTS :

(i) 635 Kg/ha. (ii) (a) 227.1 Kg/ha. based on 22 d.f. composed of pooled error and Treatments  $\times$  years interaction). (b) 126.7 Kg/ha. (based on 97 d.f. composed of pooled error and two and three factors interaction with years). (iii) Main effect of I alone highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	515	597	713	640	576	608
M <sub>2</sub>	533	644	806	688	634	661
Mean	524	621	760	664	605	635
S <sub>1</sub>	538	646	809			
S <sub>2</sub>	510	596	710			

C.D. for I marginal means=135.8 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(233).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'ICM'.**

**Object :-**To study the optimum spacing, fertilizers and water requirement of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Paddy-Wheat-Cotton. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black soil. (iii) 5.7.65. (iv) (a) 3 harrowings. (b) Dibbling. (c) 10 Kg/ha. (d) As per treatments. (e) 2-3 seeds/dibble. (v) 12.4 C.L./ha. of F.Y.M.+49.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+49.4 Kg/ha. of K<sub>2</sub>O. (vi) Gujarat-67. (vii) As per treatments. (viii) 3 interculturings. (ix) 99 cm. (x) 25.1.66 ; 12.2.66 ; 23.2.66.

**2. TREATMENTS :**

**Main-plot treatments :**

4 irrigational treatments : I<sub>0</sub>=N<sub>0</sub> irrigation, I<sub>1</sub>=irrigated at 30% available moisture soil, I<sub>2</sub>=Irrigated at 50% available moisture soil and I<sub>3</sub>=Irrigated at 70% available moisture soil.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>1</sub>=49.4, N<sub>2</sub>=98.8 and N<sub>3</sub>=148.2 Kg/ha.

(2) 3 spacings : S<sub>1</sub>=122 cm. × 31 cm., S<sub>2</sub>=122 cm. × 61 cm. and S<sub>3</sub>=122 cm. × 92 cm.

Irrigations to be given at 10 irrigations from 1.10.65 to 13.1.66 at 3 acre inches.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication, 9 sub-plots/main-plot. (b) —. (iii) 3. (iv) (a) 9.8 m. × 9.1 m. (b) 7.3 m. × 7.3 m. (v) 122 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of aphids and jassides. (iii) *Kapas* yield. (iv) (a) 1965—1967. (b) No. (c) Nil. (v) N.A. (vi) —. (vii) The irrigations could not be given according to the requirements of treatments. Hence irrigational treatments are *vitiated*. Analysis is modified accordingly.

**5. RESULTS :**

(i) 1481 Kg/ha. (ii) 270.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
S <sub>1</sub>	1388	1417	1556	1454
S <sub>2</sub>	1513	1628	1525	1555
S <sub>3</sub>	1369	1465	1468	1434
Mean	1423	1503	1516	1481

**Crop :- Cotton (Kharif).**  
**Site :- Trial-cum-Demons. Farm, Kim.**

**Ref :- Gj. 63(183), 64(117).**  
**Type :- 'ICM'.**

Object :—To study the optimum spacing, fertilizers and water requirement of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Groundnut for 63, *Jowar* for 64. (c) 22.4 Kg/ha. of  $P_2O_5$  + 12.4 C.L./ha. of F.Y.M. for 63, 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  + 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 15.7.63, 15.7.64. (iv)(a) 1 harrowing. (b) Dibbling. (c) 9 Kg/ha. (d) As per treatments. (e) 1 to 2 plants/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) I.S.C.—67. (vii) As per treatments. (viii) 2 to 5 interculturings. (ix) N.A. (x) 18.5.64; 25.2.65 to 4.5.65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigation :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings :  $S_1=91$  cm.  $\times$  30 cm. and  $S_2=91$  cm.  $\times$  61 cm.

(2) 2 manurial treatments :  $M_1=44.8$  Kg/ha. of N as A/S + 22.4 Kg/ha. of  $P_2O_5$  as Super and  $M_2=67.2$  Kg/ha. of N as A/S + 33.6 Kg/ha. of  $P_2O_5$  as Super.

Dates of irrigations are 12.12.1963; 12.1.1964 for  $I_1$ ; 12.12.63; 6.1.1964; 30.1.1964 for  $I_2$  and 12.12.1963; 1.1.1964; 8.1.1964 and 30.1.1964 for  $I_3$ .

Intensity of each irrigation being 2 acre inches. N and  $P_2O_5$  drilled on 11.12.1963.

Dates of irrigations are 15.11.1964; 15.12.1964 for  $I_1$ ; 15.11.1964; 7.12.1964 and 30.12.1964 for  $I_2$  and 15.11.64; 30.11.1964; 15.12.1964 and 7.1.1965 for  $I_3$ . N drilled on 23.9.1964; 13.10.1964 and  $P_2O_5$  drilled on 23.9.1964.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 6 (iv) (a) 9.1 m.  $\times$  6.7 m. (b) 7.3 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

**4. GENERAL :**

(i) Below normal in 63, due to heavy and constant rains in August gaps were formed in 64. (ii) Bright attack of aphids and bollworms. Endrex was sprayed. (iii) *Kapas* yield. (iv) (a) 1963—64. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since sub-plot error variances are heterogeneous individual results are presented below.

**5. RESULTS :**

**63(183)**

(i) 407 Kg/ha. (ii) (a) 73.5 Kg/ha. (b) 77.0 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	$I_1$	$I_2$	$I_3$	$S_1$	$S_2$	Mean
$M_1$	393	398	506	464	333	399
$M_2$	403	427	414	484	346	415
Mean	398	413	409	474	340	407
$S_1$	461	485	476			
$S_2$	335	341	343			

C.D. for S marginal means = 36.5 Kg/ha.

**64(117)**

(i) 953 Kg/ha. (ii) (a) 183.3 Kg/ha. (b) 185.6 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	807	972	1037	1057	820	939
M <sub>2</sub>	954	989	961	1026	910	968
Mean	880	980	999	1042	865	953
S <sub>1</sub>	989	1033	1103			
S <sub>2</sub>	772	928	895			

C.D. for S marginal means=88.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Trial-cum-Demons. Farm, Kim.**

**Ref :- Gj. 65(185).**

**Type :- 'ICM'.**

Object :—To study the optimum spacing, fertilizers and water requirement of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar*. (c) 20 Kg/ha. of N+20 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Heavy clay soil. (iii) 24.6.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) —. (d) As per treatments. (e) 1-2 seeds/hill. (v) Nil. (vi) Gujarat-67. (vii) As per treatments. (viii) 3 interculturings. (ix) 73 cm. (x) 17.2.66 ; 2.3.66 ; 27.3.66.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1) and (2)

(1) 4 levels of irrigations : I<sub>0</sub>=No irrigation, I<sub>1</sub>=Irrigated at 30% available moisture, I<sub>2</sub>=Irrigated at 50% available moisture and I<sub>3</sub>=Irrigated at 70% available moisture.

(2) 3 levels of N as A/S : N<sub>1</sub>=49.4, N<sub>2</sub>=98.8 and N<sub>3</sub>=148.2 Kg/ha.

**Sub-plot treatments :**

3 spacings : S<sub>1</sub>=122 cm. × 31 cm., S<sub>2</sub>=122 cm. × 61 cm. and S<sub>3</sub>=122 cm. × 92 cm.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 12 main-plots/replication. (b) 3 sub-plots/main-plot. (iii) 3. (iv) (a) 9.8 m. × 9.1 m. (b) 7.3 m. × 7.3 m. (v) 122 cm. × 92 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Attack of jassides. Endrin and Savin sprayed 2 times. (iii) *Kapas* yield. (iv) (a) 1965—1968. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1071 Kg/ha. (ii) (a) 308.7 Kg/ha. (b) 174.1 Kg/ha. (iii) Main effect of I and S are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
I <sub>0</sub>	919	819	819	863	835	859	852
I <sub>1</sub>	1075	980	1071	1127	1009	990	1042
I <sub>2</sub>	1118	1081	1364	1274	1213	1075	1188
I <sub>3</sub>	1213	1179	1208	1318	1198	1085	1200
Mean	1081	1015	1115	1146	1064	1002	1071
S <sub>1</sub>	1208	1021	1208				
S <sub>2</sub>	1011	1043	1137				
S <sub>3</sub>	1025	980	1002				

C.D. of I marginal means=174.2 Kg/ha.

C.D. of S marginal means=82.6 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- GJ. 63(180), 64(113).

Site :- Trial-cum-Demons. Farm, Kln.

Type :- 'ICM'.

Object :- To study the effect of irrigation, spacing and manurial doses on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. in 1963; 33.6 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. in 1964. (ii) Medium black. (iii) 13.7.1964; 22.7.1964. (iv) (a) 1 harrowing; 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. (vi) Digvijay. (vii) As per treatments. (viii) 1 interculturing; 5 interculturings. (ix) N.A. (x) 12.11.1964 to 23.4.1964; 3.2.1965 to 28.4.1965.

## 2. TREATMENTS :

Main-plot treatments :

3 levels of irrigation :  $I_0$ =No irrigation ;  $I_1$ =2 and  $I_2$ =3 irrigations.

Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 spacings :  $S_1$ =122 cm.  $\times$  30 cm. and  $S_2$ =122 cm.  $\times$  61 cm.(2) 2 manurial treatments :  $M_1$ =44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super and  $M_2$ =1.5 times  $M_1$ .

Dates of irrigation for  $I_1$  are 17.11.1963, 15.12.1963; 30.11.1964 and 30.12.1964 and for  $I_2$  are 17.11.1963 11.12.1963 and 29.12.1963 and 30.11.1964, 22.12.1964 and 13.1.1965. Intensity of each irrigation being 2 acre inches.

N and  $P_2O_5$  applied by ring method on 9.9.1963 and applied by drilling on 18.9.1964.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 15.2 m.  $\times$  7.3 m. (b) 11.6 m.  $\times$  4.9 m. (v) 183 cm.  $\times$  122 cm. (vi) Yes.

## 4. GENERAL :

(i) Good; due to heavy rains in August, gaps were formed. (ii) Nil, endrine was sprayed in 1963. Nil in 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Experiment could not be conducted during 1965. Error (a) heterogeneous and Treatments  $\times$  years interaction absent. Error (b) homogeneous.

## 5. RESULTS :

## 63(180)

(i) 874 Kg/ha. (ii) (a) 259.5 Kg/ha. (ii) (b) 135.3 Kg/ha. (iii) Main effect of S and interaction  $I \times S$  are significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$I_0$	$I_1$	$I_2$	$M_1$	$M_2$	Mean
$S_1$	770	1040	931	927	900	914
$S_2$	804	876	825	802	868	835
Mean	787	958	878			874
$M_1$	779	980	836			
$M_2$	795	937	920			

C.D. for S marginal means=64.3 Kg/ha.

C.D. for S means at the same level of  $I$ =111.3 Kg/ha.

C.D. for I means at the same level of S=180.2 Kg/ha.

## 64(113)

(i) 549 Kg/ha. (ii) (a) 102.7 Kg/ha. (b) 133.5 Kg/ha. (iii) Main effects of I and S alone are highly significant. (iv) Av. yield of *kapas* in Kg/ha.



	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	477	677	679	589	633	611
S <sub>2</sub>	364	576	525	511	466	488
Mean	420	626	602	550	549	509
M <sub>1</sub>	451	619	580			
M <sub>2</sub>	390	634	624			

C.D. for I marginal means = 66.0 Kg/ha.

C.D. for S marginal means = 63.4 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- 63(242), 64(233), 65(24).**

**Site :- Irrigation Demons. Farm, Kukda.**

**Type :- 'ICM'.**

**Object :-** To find out suitable irrigation, spacing and fertilizer dose for Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Cotton-Wheat. (b) Wheat. (c) Nil during 1963 and 1964 and 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> during 1965. (ii) Medium black soil. (iii) 12.7.1963; 9.7.1964; 8.7.1965. (iv) (a) 2 ploughings 1 harrowing for 63(242); 1 ploughing and 3 harrowings for 64(233) and 1 ploughing, 2 harrowings for 65(24). (b) Dibbling. (c) 6 Kg/ha. (d) Between rows 61 cm.; between plants as per treatments. (e) 2. (v) Nil during 1963 and 1964; 12.4 C.L./ha. of F.Y.M. during 1965. (vi) *Kalyan*. (vii) Irrigated. (viii) Nil. (ix) 41 cm.; 36 cm., 37 cm. (x) 2 and 20.3.1964; N.A.; 10.2.1966 to 28.3.1966.

#### 2. TREATMENTS :

##### Main-plot treatments :

3 no. of irrigations : I<sub>0</sub>=No irrigation; I<sub>1</sub>=3 irrigations (28th July, 15th Oct. and 14th Nov. (and I<sub>2</sub>=5 irrigations (28th July, 27th Sept.; 15th Oct.; 29th Oct. and 14th Nov.)

##### Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 fertilizer doses : F<sub>0</sub>=No fertilizer and F<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 3 spacings between plants : S<sub>1</sub>=30 cm., S<sub>2</sub>=46 cm. and S<sub>3</sub>=61 cm.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication; 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 4.3 m. for S<sub>1</sub>; 10.4 m. × 4.6 m. for S<sub>2</sub>; 10.4 m. × 4.9 for S<sub>3</sub>. (b) 9.1 m. × 3.7 m. (v) 1 row around. (vi) Yes.

#### 4. GENERAL :

(i) Good. (ii) Nil; Nil; attack of jassides and aphids, endrine was sprayed twice. (iii) *kapas* yield. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) Halvad, Jamnagar, Chansura. (vi) Nil; crop slightly affected by frost. (vii) Error (a) and errors (b) heterogeneous.

#### 5. RESULTS :

63(242)

(i) 1152 Kg/ha. (ii) (a) 364.8 Kg/ha. (b) 184.8 Kg/ha. (iii) Main effect of I is significant. Main effect of F is highly significant. Other effects are not significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	1139	1046	820	1040	973	991	1002
F <sub>1</sub>	1405	1327	1174	1334	1330	1242	1302
Mean	1272	1186	997	1187	1152	1116	1152
S <sub>1</sub>	1282	1293	987				
S <sub>2</sub>	1311	1182	962				
S <sub>3</sub>	1223	1084	1042				

C.D. for I marginal mean=191.6 Kg/ha.

C.D. for F marginal mean=71.0 Kg/ha.

64(233)

(i) 1419 Kg/ha. (ii) (a) 596.5 Kg/ha. (b) 314.0 Kg/ha. (iii) Main effect of I is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	953	1553	1647	1419	1371	1363	1384
F <sub>1</sub>	1006	1636	1723	1481	1471	1466	1455
Mean	979	1594	1685	1450	1394	1414	1419
S <sub>1</sub>	961	1610	1779				
S <sub>2</sub>	986	1539	1658				
S <sub>3</sub>	990	1634	1618				

C.D. for I marginal means =313.2 Kg/ha.

65(24)

(i) 1303 Kg/ha. (ii) (a) 1163.1 Kg/ha. (b) 327.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	1228	1220	1404	1272	1306	1274	1284
F <sub>1</sub>	1139	1418	1407	1433	1250	1281	1321
Mean	1184	1319	1406	1352	1278	1278	1303
S <sub>1</sub>	1180	1375	1502				
S <sub>2</sub>	1175	1307	1352				
S <sub>3</sub>	1196	1274	1363				

Crop :- Cotton (*Kharif*).

Ref :- Gj. 63(241), 64(232), 65(73).

Site :- Irrigation Demons. Farm, Kukda.

Type :- 'ICM'.

Object :- To find out the suitable irrigation, spacings and fertilizer dose for Cotton.

## 1. BASAL CONDITIONS :

(i) Nil. (b) *Sann*, Groundnut ; Wheat. (c) Nil. (ii) Medium black soil. (iii) 11.7.1963 ; 5.7.1964 and 18.7.1965. (iv) (a) 2 ploughings and 2 harrowings ; 3 harrowings 2 ploughings and 1 harrowing. (b) Dibbling. (c) 6 Kg/ha. ; 6 Kg/ha. ; 7.4 Kg/ha. (d) As per treatments. (e) 2. (v) 12.4 C.L./ha. of F.Y.M. (vi) CO<sub>2</sub>-170. (vii) Irrigated. (viii) Nil. (ix) 41 cm. ; 36 cm., 37 cm. (x) 24.1.1964 to 6.2.1964 ; 27.12.1964 to 12.2.1965 ; 15.1.1966 to 2.3.1966.

## 2. TREATMENTS :

## Main-plot treatments :

3 no. of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of fertilizers : F<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 2 spacings : S<sub>1</sub>=91 cm.×30 cm. and S<sub>2</sub>=91 cm.×61 cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m.×6.7 m. (b) 7.3 m.×5.5 m. (v) 91 cm.×61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil in 1963, 1965 ; attack of jassids, endrine was sprayed twice. (iii) *Kapas* yield. (iv) (a) 1963-1965. (b) No. (c) Results of combined analysis given under 5. (vi) Crop slightly attacked by frost. (vii) Both the error variances are homogeneous and Treatments×years interactions are absent.

## 5. RESULTS :

(i) 1340 Kg/ha. (ii) (a) 447.4 Kg/ha. based on 22 d.f. composed of pooled error and interaction of I with years. (b) 270.9 Kg/ha. based on 95 d.f. composed of pooled error and two and three factors. interaction with years. (iii) Main effect of S alone significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	1165	1343	1464	1445	1203	1324
F <sub>2</sub>	1280	1446	1339	1433	1277	1355
Mean	1222	1395	1402	1439	1240	1340
S <sub>1</sub>	1323	1490	1506			
S <sub>2</sub>	1122	1300	1297			

C.D. for S marginal means=89.8 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- Gj. 63(240), 64(234), 65(22).

Site :- Irrigation-Demons. Farm, Kukda.

Type :- 'ICM'.

Object :- To find out the suitable irrigation, spacing and fertilizer doses for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Sann*, *Lucrene*, Groundnut. (c) Nil during 1963 and 1964 ; 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 11.7.1963 ; 9.7.1964 and 10.7.1965. (iv) (a) 2 ploughings and 2 harrowings in 1963 and 1964 ; 2 ploughings and 3 harrowings in 1965. (b) Dibbling. (c) 6 Kg/ha. ; 6 Kg/ha. and 7.4 Kg/ha. (d) As per treatments. (e) 2. (v) 12.4 C.L./ha. of F.Y.M. (vi) Gujarat 67. (vii) Irrigated. (viii) Nil. (ix) 41 cm. ; 36 cm. and 37 cm. (x) N.A. ; 30.1.1965 to 11.3.1965 ; 16.1.1966 to 9.3.1966.

## 2. TREATMENTS :

**Main-plot treatments :**3 no. of irrigations :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of fertilizers :  $F_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $F_2=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .(2) 2 spacings  $S_1=91$  cm.  $\times$  30 cm. and  $S_2=91$  cm.  $\times$  61 cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m.  $\times$  6.7 m. (b) 7.3 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Slight attack of jassides in 1963, attack of aphids, jassides and black arm disease. Endrine was sprayed twice in 1964 ; Nil in 1965. (iii) *Kapas* yield. (iv) (a) 1963 to 1965. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous.

## 5. RESULTS :

(i) 1494 Kg/ha. (ii) (a) 244.4 Kg/ha. based on 22 d.f. composed of pooled error and interaction of I with years. (b) 212.5 Kg/ha. based on 95 d.f. composed of pooled error and two and three factors interaction with years. (iii) Main effect of I is significant while S effect is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	$I_1$	$I_2$	$I_3$	$S_1$	$S_2$	Mean
$F_1$	1244	1487	1633	1550	1359	1455
$F_2$	1421	1577	1604	1644	1425	1534
Mean	1332	1532	1618	1597	1392	1494
$S_1$	1476	1596	1719			
$S_2$	1189	1469	1518			

C.D. for I marginal means=101.6 Kg/ha.

C.D. for S marginal means=70.4 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 65(248).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'ICM'.**

Object :-To study the effect of irrigations on soil moisture crops with different spacings and fertilizers on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajri*. (c) 74.1 Kg/ha. of N+37.1 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam soil. (iii) 13.7.65. (iv) (a) 3 ploughings, 2 harrowings. (b) Dibbling. (c) 10 Kg/ha. (d) As per treatments. (e) 1-2 seeds/dibble. (v) 12.4 C.L./ha. of F.Y.M.+49.4 Kg/ha. of  $P_2O_5$ +49.4 Kg/ha. of  $K_2O$ . (vi) Gujarat-67. (vii) As per treatments. (viii) 5 weeding, and 5 interculturings. (ix) 36 cm. (x) 1.3.66 ; 25.3.66.

## 2. TREATMENTS :

**Main-plot treatments :**4 levels of irrigation :  $T_0$ =No irrigation,  $I_1$ =3 irrigations at 20% available moisture in soil,  $I_2$ =3 irrigations at 40% available moisture in soil and  $I_3$ =5 irrigations at 60% available moisture in soil.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 levels of N as A/S :  $N_1=49.4$ ,  $N_2=98.8$  and  $N_3=148.2$  Kg/ha.(2) 3 spacings :  $S_1=122$  cm.  $\times$  31 cm.,  $S_2=122$  cm.  $\times$  61 cm. and  $S_3=122$  cm.  $\times$  91 cm.Dates of irrigations for  $I_1$  are 13.12.65 ; 1.1.66 and 19.1.66 ; for  $I_2$  are 8.12.65, 22.12.65 and 7.1.66 and for  $I_3$  are 2.12.65, 13.12.65, 24.12.65, 3.1.66 and 13.1.66.**3. DESIGN :**(i) Split-plot. (ii) (a) 4 main-plots/replication, 9 sub-plots/main-plot. (b) Nil. (iii) 3. (iv) (a) 7.3 m.  $\times$  7.3 m. (b) 5.5 m.  $\times$  4.9 m. (v) 91 cm.  $\times$  122 cm. (vi) Yes.**4. GENERAL :**

(i) Good. (ii) Slight attack of aphids, jassides and bollworms. Endrine sprayed twice. (iii) Seed cotton yield. (iv) (a) 1965 to 1968. (b) No. (c) Nil. (v) N. (vi) No rains after August. (vii) Nil.

**5. RESULTS :**(i) 1369 Kg/ha. (ii) (a) 542.7 Kg/ha. (b) 314.4 Kg/ha. (iii) Main effect of I and S and interaction  $I \times N$  are significant. (iv) Av. yield of *kapas* in Kg/ha.]

	$N_1$	$N_2$	$N_3$	$S_1$	$S_2$	$S_3$	Mean
$I_0$	1045	1033	1275	1049	1049	1255	1118
$I_1$	1771	1431	1609	1663	1618	1530	1604
$I_2$	1174	1177	1235	1385	1136	1066	1196
$I_3$	1285	1779	1613	1794	1588	1296	1559
Mean	1319	1355	1433	1473	1348	1287	1369
$S_1$	1400	1546	1473				
$S_2$	1253	1362	1428				
$S_3$	1303	1157	1400				

C.D. for I marginal means = 361.4 Kg/ha.

C.D. for S marginal means = 146.7 Kg/ha.

C.D. for I marginal means at the same level of  $N=431.1$  Kg/ha.C.D. for N marginal means at the same level of  $I=293.5$  Kg/ha.**Crop :- Cotton (Kharif).****Ref :- Gj. 63(226), 64(214).****Site :- Trial-cum-Demons. Farm, Pilwai.****Type :- 'ICM'.**

Object :- To study the optimum spacing, fertilizer and water requirement of Cotton.

**1. BASAL CONDITIONS :**(i) (a) Cotton—Bajra—Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ , (ii) Sandy loam. (iii) 3.7.63, 17.7.64. (iv) (a) 3 ploughings and 3 harrowings. (b) Dibbling. (c) 5 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) ICS—67. (vii) As per treatments, (viii) 4 to 7 weedings, 6 to 7 interculturings. (ix) 90 cm. for 63, 47 cm. for 64. (x) 14.2.64 to 16.3.64 ; 5.2.65 to 20.4.65.**2. TREATMENTS :****Main-plot treatments :**3 irrigational treatments :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of fertilizers :  $F_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and  $F_2=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .(2) 2 spacings :  $S_1=91$  cm.  $\times$  31 cm. and  $S_2=91$  cm.  $\times$  61 cm.N applied as A/S and  $P_2O_5$  applied as Super.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) —. (iii) 4. (iv) (a) 6.7 m × 9.1 m. (b) 5.5 m × 7.3 m. (v) 61 cm × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids, jassides and cotton bugs. Endrine was sprayed. (iii) *Kapas* yield. (iv) (a) 1963—1964. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Both the errors variances are homogeneous and Treatments × years interaction are absent.

## 5. RESULTS :

(i) 1424 Kg/ha. (ii) (a) 261.5 Kg/ha. (based on 14 d.f. made of pooled error + Treatments × years interaction). (b) 210.4 Kg/ha. (based on 61 d.f. made of pooled error + Treatments × years interaction). (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	1324	1426	1398	1412	1353	1383
F <sub>2</sub>	1376	1548	1472	1485	1446	1465
Mean	1350	1487	1435	1448	1400	1424
S <sub>1</sub>	1374	1491	1481			
S <sub>2</sub>	1326	1483	1389			

**Crop :- Bajri (Kharif).**

**Ref. GJ. 64(209).**

**Site :- Trial-cum-Demons. Farm Pilwai.**

**Type :- 'ICM'.**

**Object :-** To study the effect of different spacings, irrigations and manures on the yield of Bajra.

## 1. BASAL CONDITIONS :

(i) (a) *Bajra* - Wheat. (b) Wheat. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy loam. (iii) 30.6.64. (iv) (a) 3 ploughings + 2 harrowings. (b) Drilling. (c) 5 Kg/ha. (d) As per treatments. (e) Nil. (v) 12.4 C.L./ha of F.Y.M. (vi) Babapuri. (vii) Irrigated. (viii) 1 weeding and 1 interculturing. (ix) 47 cm. (x) 14.10.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 number of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=2 and I<sub>2</sub>=3 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=46 cm × 15 cm. and S<sub>2</sub>=46 cm × 23 cm.

(2) 3 levels of fertilisers : F<sub>1</sub>=22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, F<sub>2</sub>=2 F<sub>1</sub> and F<sub>3</sub>=3 F<sub>1</sub>.

N as A/S and P<sub>2</sub>O<sub>5</sub> as Super drilled. Details of irrigations N.A.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 8.2 m × 6.4 m. (b) 7.3 m × 5.5 m. (v) 45.7 cm × 45.7 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of white grubs, Blister beetle and ergot disease. (iii) Yield of gram. (iv) (a) 1963. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Expt. failed in 1963.

## 5. RESULTS :

(i) 740 Kg/ha. (ii) (a) 61.0 Kg/ha. (b) 186.6 Kg/ha. (iii) Main effect of I alone is significant. (iv) Average yield of grain in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
F <sub>1</sub>	828	604	878	843	698	770
F <sub>2</sub>	779	442	760	639	681	660
F <sub>3</sub>	735	878	760	789	793	788
Mean	781	641	799	757	724	740
S <sub>1</sub>	860	652	760			
S <sub>2</sub>	702	631	839			

C.D. for I marginal means=151.5 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(249), 64(266), 65(29).**

**Site :- Cotton-Breeding-Sub. Stn., Porbandar.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum number of irrigations spacings and fertilizer dose for Cotton.

**1. BALAL CONDITIONS :**

(i) (a) *Bajra*-Cotton. (b) *Bajra*. (c) 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of N. (ii) Medium light shallow soil. (iii) 28, 29.6.63 ; 26.7.64 ; 28, 29.7.65. (iv) (a) 1 ploughing and 1 to 2 harrowings. (b) Dibblings. (c) 10 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) CO<sub>2</sub>—170 (medium). (vii) As per treatments. (viii) 4 to 9 interculturings, 3 weeding and 5 harrowings. (ix) 35 cm. for 63, 80 cm. for 64, 37 cm. for 65. (x) 16.2.64 ; 15.1.65 ; 20.2.66.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 levels of manures : M<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=67.2 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N applied as A/S, P<sub>2</sub>O<sub>5</sub> and Super.

Dates of irrigations for I<sub>1</sub> are 2.10.63 and 5.11.63 ; for I<sub>2</sub> are 2.10.63 ; 30.10.63 and 12.11.63 and for I<sub>3</sub> are 2.10.63 ; 23.10.63 ; 5.11.63 and 26.11.63. for I<sub>1</sub> are 6.10.64 and 8.11.64 for I<sub>2</sub> are 7.10.64 ; 29.10.64 and 13.11.64 and for I<sub>3</sub> are 7.10.64 ; 23.10.64 ; 8.11.64 and 18.11.64 for I<sub>1</sub> are 8.10.65 and 20.10.65 for I<sub>2</sub> are 8.10.65 ; 20.10.65 ; and 8.11.65 ; and for I<sub>3</sub> are 8.10.65 ; 20.10.65 8.11.65 and 21.11.65.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4 (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil, Insecticides were applied two to three times as precautionary measures. (ii) *Kapas* yield. (iv) (a) 1963—1965. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous, main-plot Treatments × years interaction is absent while Sub-plot Treatments × years interaction is present.

**5. RESULTS :**

(i) 984 Kg/ha. (ii) (a) 347.5 Kg/ha. base on 22 d.f. made of pooled error+(Year × Treatments) interaction. (b) 258.4 Kg/ha. based on 14 d.f. made of (Years × Treatments) interaction. (iii) Main effect of I and S is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	903	1006	1199	1062	1010	1036
S <sub>2</sub>	807	972	1015	928	934	931
Mean	855	989	1107	995	972	984
M <sub>1</sub>	904	1010	1072			
M <sub>2</sub>	806	968	1142			

C.D. for I marginal means=147.1 Kg/ha.

C.D. for S marginal means=92.4 Rg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(252), 64(263), 65(32).**

**Site :- Cotton Breed. Sub-Stn., Porbandar. Type :- TCMF.**

**Object :-** To find out the optimum number of irrigations, spacing and fertilizer dose for Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Groundnut-Cotton for 63 and 65 ; Bajra-Wheat-Cotton for 64. (b) Groundnut for 63 and 65, Wheat for 65. (c) 12.4 C.L./ha. of F.Y.M. for 63 and 64, 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+22.4 Kg/ha. of N for 65. (ii) Medium light shallow soil. (iii) 1.7.63 ; 24, 25.7.64 ; 3, 4.8.65. (iv) (a) 1 to 2 ploughings, 2 to 3 harrowings, 1 planking. (b) Dibbling. (c) 10 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) Kalyan. (vii) As per treatments. (viii) 3 to 6 interculturings. (ix) 35 cm. for 63 80 cm. for 64, 37 cm. for 65. (x) 2.2.64 ; 7.2.65 ; 24.2.66.

#### 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigations : I<sub>0</sub>=0, I<sub>1</sub>=3 and I<sub>2</sub>=5 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=61 cm. × 30 cm., S<sub>2</sub>=61 cm. × 46 cm. and S<sub>3</sub>=61 cm. × 61 cm.

(2) 2 levels of manures : M<sub>0</sub>=0 and M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

Dates of irrigations for I<sub>1</sub> are 22.9.63 ; 22.10.63 and 23.11.63, for I<sub>2</sub> are 22.9, 7.10, 22.10, 4.11 and 24.11.63. Dates of irrigations for I<sub>1</sub> are 13.10.65 ; 24.10.65 and 5.11.65, for I<sub>2</sub> are 13.10.65 ; 24.10.65 ; 5.11.65 ; 21.11.65 and 9.12.65.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 4.3 m. for S<sub>1</sub>, 10.4 m. × 4.6 m. for S<sub>2</sub> and 10.4 m. × 4.9 m. for S<sub>3</sub>. (b) 9.1 m. × 3.7 m. (v) As per treatments. (vi) Yes.

#### 4. GENERAL :

(i) Normal. (ii) Nil, insecticides applied once as precautionary measures. (iii) Kapas yield. (iv) 1963—1965. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since sub-plot error variances are heterogeneous, individual results are presented below.

#### 5. RESULTS :

63(252)

(i) 838 Kg/ha. (ii) (a) 316.3 Kg/ha. (b) 173.4 Kg/ha. (iii) Main effects of M and I are highly significant and interaction I × M is significant. (iv) Av. yield of kapas in kg/ha.



	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	258	920	1253	715	906	810
S <sub>2</sub>	310	958	1265	751	938	845
S <sub>3</sub>	341	963	1276	800	919	860
Mean	303	947	1265	755	921	838
M <sub>0</sub>	280	855	1131			
M <sub>1</sub>	326	1040	1398			

C.D. for I marginal means = 166.2 Kg/ha.  
 C.D. for M marginal means = 66.1 Kg/ha.  
 C.D. for I means at the same level of M = 185.3 Kg/ha.  
 C.D. for M means at the same level of I = 114.4 Kg/ha.

64(263)

(i) 645 Kg/ha. (ii) (a) 216.5 Kg/ha. (b) 90.6 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	453	702	840	661	670	665
S <sub>2</sub>	457	698	779	638	652	645
S <sub>3</sub>	466	670	739	632	618	625
Mean	459	690	786	644	646	645
M <sub>0</sub>	477	684	770			
M <sub>1</sub>	441	696	802			

C.D. for I marginal means = 113.6 Kg/ha.

65(32)

(i) 686 Kg/ha. (ii) (a) 347.4 Kg/ha. (b) 139.5 Kg/ha. (iii) Main effect of I is highly significant and interaction S × M is significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	Mean
S <sub>1</sub>	328	665	932	667	616	642
S <sub>2</sub>	438	782	932	656	779	717
S <sub>3</sub>	393	721	979	702	693	698
Mean	387	723	948	675	696	686
M <sub>0</sub>	407	719	900			
M <sub>1</sub>	366	726	996			

C.D. for I marginal means = 182.5 Kg/ha.  
 C.D. for means in the body of S × M table = 92.1 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- GJ. 63(251), 64(264), 65(31).**

**Site :- Cotton Breed. Sub-Stn, Porbandar. Type :- 'ICM'.**

**Object :—**To find out the optimum number of irrigations, spacings and fertilizer dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) *Bajra*—Cotton for 63, 65; Groundnut—Cotton for 64. (b) *Bajra* for 63, 65, Groundnut for 64. (c) 12.4 C.L./ha. of F.Y.M.+11.2 Kg/ha. of  $P_2O_5$ +22.4 Kg/ha. of N for 63 and 65, 12.4 C.L./ha. of F.Y.M. for 64. (ii) Medium light shallow soil. (iii) 2, 3.7.63; 26.7.64; 31.7.65. (iv) (a) 1 to 2 ploughings, 1 to 2 harrowings. (b) Dibbling. (c) 10 Kg/ha. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) ISC—67 (medium). (vii) As per treatments. (viii) 5 to 10 interculturings, 3 harrowings. (ix) 35 cm. for 63; 80 cm. for 64; 37 cm. for 65. (x) 5.2.64, 12.2.65, 14.2.66.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigations :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings :  $S_1=91$  cm.  $\times$  30 cm. and  $S_2=91$  cm.  $\times$  61 cm.

(2) 2 levels of manures :  $M_1=44.8$  Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ , and  $M_2=67.2$  Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ .

N applied as A/S,  $P_2O_5$  as Super.

Dates of irrigations for  $I_1$  are 4.10.63, 3.11.63; for  $I_2$  are 4.10.63, 31.10.63 and 13.11.63 and for  $I_3$  are 4.10.63, 21.10.63, 3.11.63 and 27.11.63.

For  $I_1$  are 10.10.64 and 8.11.64, for  $I_2$  are 10.10.64, 29.10.64 and 13.11.64 and for  $I_3$  are 11.10.64, 24.10.64, 8.11.64 and 19.11.64.

For  $I_1$  are 10.10.65 and 19.10.65, for  $I_2$  are 8.10.65, 20.10.65 and 8.11.65 and for  $I_3$  are 10.10.65, 19.10.65, 6.11.65 and 21.11.65.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m.  $\times$  6.7 m. (b) 7.3 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil, insecticides were applied two to three times as precautionary measures. (iii) *Kapas* yield. (iv) (a) 1963—65. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Since sub-plot error variances are heterogeneous, individual results are presented below.

**5. RESULTS :**

**63(251)**

(i) 819 Kg/ha. (ii) (a) 200.6 Kg/ha. (b) 194.7 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	$I_1$	$I_2$	$I_3$	$M_1$	$M_2$	Mean
$S_1$	659	914	786	692	881	786
$S_2$	720	850	982	768	932	851
Mean	690	882	884	730	907	819
$M_1$	625	772	793			
$M_2$	754	992	975			

C.D. for M marginal means=115.3 Kg/ha.

**64(264)**

(i) 717 Kg/ha. (ii) (a) 158.5 Kg/ha. (b) 115.6 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	775	857	838	802	845	823
S <sub>2</sub>	562	613	660	655	568	612
Mean	668	735	749	728	706	717
M <sub>1</sub>	650	736	799			
M <sub>2</sub>	687	735	699			

C.D. for S marginal means = 68.3 Kg/ha.

65(231)

(i) 843 Kg/ha. (ii) (a) 188.4 Kg/ha. (b) 132.7 Kg/ha. (iii) Main effect of I is significant and S is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	822	854	1092	859	986	923
S <sub>2</sub>	652	720	916	757	768	763
Mean	737	787	1004	808	877	843
M <sub>1</sub>	729	730	965			
M <sub>2</sub>	746	844	1042			

C.D. for I marginal means = 163.0 Kg/ha.

C.D. for S marginal means = 78.6 Kg/ha.

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 60(143), 61(144), 62(133), 63(149).**  
**Type :- 'ICM'.**

Object :- To find out the response of manures and irrigation with suitable spacings for Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) Cotton—*Jowar*. (b) *Jowar*. (c) Nil for 60(143) ; G. M + 22.4 Kg/ha. of N for 62(133) and 22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(144) and 63(149). (i) LCCF black. (ii) 30.6.1960, 26.6.1961, 1.7.1962, 2.7.1963. (iv) (a) Nil for 60(143) ; 3. 1 and 2 harrowings for 61(144), 62(133) and 63(149) respectively. (b) Dibbling. (c) 6 Kg/ha. (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) 2087 (Vijalpa). (vii) Irrigated. (viii) 5 interculturing, 3 weedings and 2 thinning for 60(143), 3 interculturing 61(144), 62(133) and 2 interculturing and 1 hand weeding for 63(149). (ix) 87 cm. ; 122 cm. ; 62 cm. ; 120 cm. (x) 8.3.1961 and 13.4.1961 ; 20.4.1962 ; 12.3.1963 ; 21.3.1964.

#### 2. TREATMENTS :

##### Main-plot treatments :

All combinations of (1) and (2)

(1) 3 levels of irrigations : I<sub>1</sub>=1, I<sub>2</sub>=2 and I<sub>3</sub>=3 irrigations.

(2) 3 spacings : S<sub>1</sub>=61 cm. × 91 cm. ; S<sub>2</sub>=61 cm. × 122 cm. and S<sub>3</sub>=61 cm. × 152 cm.

##### Sub-plot treatments :

3 manurial treatments : M<sub>1</sub>=22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, M<sub>2</sub>=2M<sub>1</sub> and M<sub>3</sub>=3M<sub>1</sub>.

Manures applied on 14.9.1960 ; N as A/S and P<sub>2</sub>O<sub>5</sub> as Super.

In 1962, 1st irrigation on 25.8.1962, 2nd on 8.12.1962 and 3rd on 15.1.1963.

N and P applied by ring method.

In 1963, dates of irrigation for I<sub>1</sub> are 14.10.1963, I<sub>2</sub> are 14.10.1963, 25.11.1963 and I<sub>3</sub> are 14.10.1963, 8.11.1963 and 25.11.1963. N and P applied on 5.9.1963.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block ; 3 sub-plots/main-plot. (b) N.A. (iii) 2. (iv) (a) 18.3 m. × 3.7 m. for S<sub>1</sub> and 18.3 m. × 4.9 m. for S<sub>2</sub> and 18.3 m. × 6.1 m. for S<sub>3</sub> for 1960 ; 18.3 m. × 8.5 m. for 1961 ; 18.3 m. × 9.1 m. for 1962 and 18.3 m. × 8.5 m. for 1963. (b) 14.6 m. × 1.8 m. for S<sub>1</sub>, 14.6 m. × 2.4 m. for S<sub>2</sub> and 14.6 m. × 3.1 m. for S<sub>3</sub> for 1960, 18.3 m. × 6.1 m. for 1961, 18.3 m. × 6.7 m. for 1962 and 18.3 m. × 6.1 m. for 1963. (v) 183 cm. × 91 cm. for S<sub>1</sub>, 183 cm. × 122 cm. for S<sub>2</sub>, 183 cm. × 152 cm. for S<sub>3</sub> for 1963, 122 cm. on either side for 1961, 1963 and 162 cm. on either side for 1962. (vi) Yes.

## 4. GENERAL :

(i) Normal for 1960 and 1963 ; Nil satisfactory for 1961 and poor for 1962. (ii) Slight attack of boll worms for 1960, slight attack of boll worms wooly mites and red mites for 1961 ; heavy attack of red mites, light attack of boll worms and wooly mites for 1962, 0.04% trithion nuteicide of 10 grams cereman in 1 gallon of water sprayed on 28.1.1963 and Nil for 1963. (iii) Kapas yield. (iv) (a) 1960 to 1963. (b) No. (c) Nil. (v) N.A. (vi) Nil for 1960 and 1962 ; due to continuous rains in July and August growth was hampered during 1961 and severe cold in Feb. 1964 and 36.5 mm. rains on 26.11.1963. (vii) Error (a) is heterogeneous, interaction main-plots × years is absent : Error (b) is homogeneous.

## 5. RESULTS :

60(143)

(i) 546 Kg/ha. (ii) (a) 125.3 Kg/ha. (b) 100.0 Kg/ha. (iii) Main effect of M alone is significant. (iv) Av. yield of Kapas in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
I <sub>1</sub>	548	598	512	532	546	581	553
I <sub>2</sub>	615	550	486	510	528	613	550
I <sub>3</sub>	631	538	433	458	560	583	534
Mean	598	562	477	500	545	592	546
M <sub>1</sub>	582	544	375				
M <sub>2</sub>	594	541	500				
M <sub>3</sub>	619	601	557				

C.D. for M marginal means=70.02 Kg/ha.

61(144)

(i) 347 Kg/ha. (ii) (a) 167.9 Kg/ha. (b) 102.3 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of Kapas in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
I <sub>1</sub>	351	276	353	286	361	333	327
I <sub>2</sub>	420	345	289	275	318	461	351
I <sub>3</sub>	346	329	410	275	378	433	362
Mean	372	317	351	279	352	409	347
M <sub>1</sub>	341	239	256				
M <sub>2</sub>	337	351	369				
M <sub>3</sub>	439	361	427				

C.D. for M marginal means=71.64 Kg/ha.

62(133)

(i) 284 Kg/ha. (ii) (a) 63.6 Kg/ha. (b) 57.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Kapas in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
I <sub>1</sub>	230	266	286	275	256	251	261
I <sub>2</sub>	284	297	252	281	257	295	278
I <sub>3</sub>	299	335	308	302	297	344	314
Mean	271	299	282	286	270	297	284
M <sub>1</sub>	270	290	298				
M <sub>2</sub>	259	285	267				
M <sub>3</sub>	285	323	282				

63(149)

- (i) 676 Kg/ha. (ii) (a) 210.8 Kg/ha. (b) 105.8 Kg/ha. (iii) Main effect of M alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
I <sub>1</sub>	740	623	821	554	862	767	728
I <sub>2</sub>	638	622	654	519	654	741	638
I <sub>3</sub>	648	652	690	511	665	814	663
Mean	675	632	722	528	727	774	676
M <sub>1</sub>	490	523	571				
M <sub>2</sub>	797	649	735				
M <sub>3</sub>	739	725	859				

C.D. for M marginal means = 74.17 Kg/ha.

**Crop :- Cotton (Kharif).**  
**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 65(259).**  
**Type :- 'ICM'.**

Object :- Effect of different soil moisture regimes, spacing and manuring on Cotton yield.

### 1. BASAL CONDITIONS :

- (i) (a) Cotton-Jowar. (b) Jowar. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Black soil. (iii) 3.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) —. (d) As per treatments. (e) 1-2 seeds/dibble. (v) 12.4 C.L/ha. of F.Y.M.+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Digvijay. (vii) As per treatments. (viii) 8 interculturings. (ix) 89 cm. (x) April 66 onwards

### 2. TREATMENTS :

#### Main-plot treatments

All combinations of (1) and (2).

- (1) 4 levels of irrigations : I<sub>0</sub>=No irrigation, I<sub>1</sub>=40% available moisture in soil, I<sub>2</sub>=60% available moisture in soil and I<sub>3</sub>=80% available moisture in soil.

- (2) 4 levels of N as A/S : N<sub>1</sub>=44.8, N<sub>2</sub>=89.7 and N<sub>3</sub>=135.5 Kg/ha.

#### Sub-plot treatments

3 spacings : S<sub>1</sub>=122 cm.×31 cm., S<sub>2</sub>=122 cm.×61 cm. and S<sub>3</sub>=122 cm.×92 cm.

N applied on 9.9.65 and 18.10.65.

### 3. DESIGN :

- (i) Split-plot. (ii) (a) 12 main-plots/replication ; 3 sub-plots/main-plot. (b) —. (iii) 3. (iv) (a) 9.1 m.×8.5 m. (b) 5.5 m.×6.2 m. (v) 183 cm.×122 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Attack of aphids, jassides, bollworms, folidol applied 6 times. (iii) Seed cotton yield. (iv) (a) 1965 only. (b) No. (c) Nil. (v) N.A. (vi) Failure of rains in September. (vii) Nil.

## 5. RESULTS :

- (i) 895 Kg/ha. (ii) (a) 301.4 Kg/ha. (b) 193.2 Kg/ha. (iii) Main effect of I and N are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
I <sub>0</sub>	733	704	857	847	707	741	765
I <sub>1</sub>	905	1305	1196	1026	1094	1286	1135
I <sub>2</sub>	506	1058	1278	913	957	970	947
I <sub>3</sub>	422	882	894	681	749	768	733
Mean	642	987	1056	867	877	941	895
S <sub>1</sub>	649	945	1005				
S <sub>2</sub>	607	990	1034				
S <sub>3</sub>	669	1026	1130				

C.D. for I marginal means=170.1 Kg/ha.

C.D. for N marginal means=147.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Site :- Agri. Res. Stn., Surat.**

**Ref :- Gj. 63 (146).**

**Type :- 'ICM'.**

Object :- To study the effect of irrigation, spacing and fertilizer on Cotton.

## 1. BASAL CONDITIONS :

- (i) (a) Cotton-Jowar. (b) Jowar. (c) Nil. (ii) Deep black soil. (iii) 3.7.63. (As there were 50% gaps on 8.7.63. resowing was done on 15.7.63). (iv) (a) Nil. (b) Dibbling. (c) 8 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) ISC-67. (vii) Irrigated. (viii) 7 interculturings and 3 weedings. (ix) 120 cm. (x) 28.4.64.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigation : I<sub>1</sub>=2, I<sub>2</sub>=3 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2).

(1) 2 spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 manurial treatments : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=67.2 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

N and P<sub>2</sub>O<sub>5</sub> applied by spot method on 13.9.1963. For all I's irrigations were given as : 1st irrigation on 11.10.1963, 2nd irrigation on 9.11.1963, 3rd irrigation on 13.12.1963 and 4th irrigation on 14.2.1964. Intensity of irrigation : N.A.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 15.2 m. × 7.3 m. (b) 11.6 m. × 3.7 m. (v) 183 cm. × 183 cm. (vi) Yes.

## 4. GENERAL :

- (i) Not satisfactory. (ii) Heavy attack of heliothis, aphids, jassides and bollworms ; Paranox, Folidol and savin were sprayed. (iii) *Kapas* yield. (iv) (a) to (c) No. (v) N.A. (vi) Severe cold during Feb. 64 ; 3.6 cm. on 26th Nov., 64. (vii) Due to constant rains on 5.7.63, only 50% seeds were germinated so resowing was done but after resowing also due to constant rains (22.7.63) germination was gappy.

## 5. RESULTS :

(i) 404 Kg/ha. (ii) (a) 123.3 Kg/ha. (b) 70.1 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	365	340	470	394	389	392
M <sub>2</sub>	391	348	513	426	409	417
Mean	378	344	491	410	399	404
S <sub>1</sub>	371	348	512			
S <sub>2</sub>	386	340	471			

C.D. for I marginal means = 79.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(171), 64( 12).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'ICM'.**

Object :—To find out the optimum number of irrigations with suitable spacing and fertilizers dose for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* for 63 ; Wheat for 64. (c) 22.4 Kg/ha. of N as A/S for 63 ; 112.1 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O+24.7 C.L./ha. of F.Y.M. (ii) Sandy loam. (iii) 6.7.63 ; 30.6.64. (iv) (a) 1 to 3 ploughings and 1 to 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) ISC-67. (vii) As per treatments. (viii) 4 to 6 weedings and 4 to 5 interculturings. (ix) 102 cm. for 63 and 77 cm. for 64. (x) 3 pickings from 11.3.64 ; 7.3.65 to 26.4.65.

## 2. TREATMENTS :

**Main-plot treatments**

3 levels of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=2 and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments**

All combinations of (1) and (2)

(1) 2 levels of manures : M<sub>1</sub>=44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> and M<sub>2</sub>=67.2 Kg/ha. N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

(2) 3 level of spacing : S<sub>1</sub>=91 cm.×31 cm. and S<sub>2</sub>=91 cm.×61 cm. N applied as A/S on 22.8.63 and P<sub>2</sub>O<sub>5</sub> as Super on 22.8.63.

Dates of irrigation for I<sub>1</sub> are 1st week of Dec. and Nov., for I<sub>2</sub> are 1st, 4th and 2nd week of Oct. and Nov. for I<sub>3</sub> are 1st and 3rd week of Oct. and Nov.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil, insecticides were applied 3 times as precautionary measures. (iii) *Kapas* yield. (iv) (a) 1963-64. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) Nil. (vii) Both the error variances are homogeneous. Interaction years×main-plot treatments is absent while that of years×sub-plot treatments is present.

## 5. RESULTS :

(i) 693 Kg/ha. (ii) (a) 147.4 Kg/ha. (based on 14 d.f. made up of pooled error+Treatment×year interaction). (b) 171.9 Kg/ha. (based on 7 d.f. made up of Treatment×year interaction). (iii) Main effect of I alone is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	Mean
M <sub>1</sub>	683	739	606	701	651	676
M <sub>2</sub>	775	745	607	745	673	709
Mean	729	742	607	723	662	693
S <sub>1</sub>	746	774	649			
S <sub>2</sub>	712	710	564			

C.D. for I marginal means=79.0 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(173), 64(110).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum number of irrigations with suitable spacing and fertilizer dose for Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat ; *Tobacco*. (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super in 1963 ; 24.7 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N as A/S+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super+67.2 Kg/ha. of K<sub>2</sub>O as Pot. Sul. in 1964. (ii) Sandy loam. (iii) 6.7.1963 ; 3.7.1964. (iv) (a) 3 ploughings and 1 harrowing in 1963 3 ploughings and 2 harrowings in 1964. (b) D.bbling. (c) N.A. (d) As per treatments. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) 134 Co<sub>2</sub>-M (vii) As per treatments. (viii) 4 weedings and 6 interculturings in 1963 ; 5 weedings and 6 interculturings in 1964. (ix) 102 cm. ; 77 cm. (x) 2 pickings from 7.3.1964 ; 24.2.1965 to 14.4.1965.

**2. TREATMENTS :**

**Main-plot treatments :**

3 levels of irrigations : I<sub>1</sub>=2, I<sub>2</sub>=3, and I<sub>3</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 levels of spacings : S<sub>1</sub>=91 cm. × 30 cm. and S<sub>2</sub>=91 cm. × 61 cm.

(2) 2 levels of fertilizers : M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super and M<sub>2</sub>=1.5 times M<sub>1</sub>.

N applied on 23.8.1963, 25.9.1963 and P<sub>2</sub>O<sub>5</sub> on 23.8.1963.

Dates of irrigation for I<sub>1</sub> are 1st week of Oct. and 1st week of November, for I<sub>2</sub> are 1st and 4th week of Oct. and 2nd week of November and for I<sub>3</sub> are 1st and 3rd week of October and 1st and 3rd week of Nov. Intensity of each irrigation being 2.5 acre inches.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/block ; 4 sub-plots/block. (b) Nil. (iii) 4. (iv) (a) 9.1 m. × 6.7 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil in 1963 ; Insecticides applied thrice in 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Yield was affected by frost in 1963. Both the errors are heterogeneous.

**5. RESULTS :**

**63 (173)**

(1) 324 Kg/ha. (ii) (a) 59.3 Kg/ha. (b) 82.2 Kg/ha. (iii) Main effect of I is significant and interactions I × M, I × S are highly significant (iv) Av. yield of *Kapas* in Kg/ha.



	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	455	280	283	348	331	339
S <sub>2</sub>	283	308	333	344	272	308
Mean	369	294	308	346	302	324
M <sub>1</sub>	413	246	380			
M <sub>2</sub>	325	343	237			

C.D. for I marginal means = 51.4 Kg/ha.

C.D. for S or M means at the same level of I = 84.3 Kg/ha.

C.D. for I means at the same level of S or M = 75.5 Kg/ha.

64(110)

(i) 707 Kg/ha. (ii) (a) 626.9 Kg/ha. (b) 277.8 Kg/ha. (iii) None of the effect is significant. (iv) Av. yield of *Kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	747	721	679	629	802	716
S <sub>2</sub>	726	777	595	684	714	699
Mean	737	749	637	656	758	707
M <sub>1</sub>	747	780	442			
M <sub>2</sub>	726	718	831			

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 65(268).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'ICM'.**

Object :—To study the optimum spacing, fertilizers and water requirements of Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 111.2 Kg/ha. of N+74.1 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) *Goradu* soil. (iii) 22.7.65. (iv) (a) 2 ploughings, 1 harrowing. (b) Dibbling. (c) —. (d) As per treatments. (e) 1 seed/dibble. (v) 12.4 C.L./ha. F.Y.M.+49.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+49.4 Kg/ha. of K<sub>2</sub>O. (vi) Gujarat-67 (late). (vii) As per treatments. (viii) 5 weedings. (ix) 42 cm. (x) 28.1.66, 13.2.66.

**2. TREATMENTS :**

**Main-plot treatments :**

4 irrigational treatments : I<sub>0</sub>=No irrigation, I<sub>1</sub>=irrigated at 20% available moisture, I<sub>2</sub>=irrigated at 40% available moisture and I<sub>3</sub>=Irrigated at 60% available moisture.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=122 cm. × 31 cm., S<sub>2</sub>=122 cm. × 61 cm. and S<sub>3</sub>=122 cm. × 92 cm.

(2) 3 levels of N as A/S : N<sub>1</sub>=49.4, N<sub>2</sub>=98.8 and N<sub>3</sub>=148.2 Kg/ha.

N applied in two equal doses on 7.9.65 and 27.9.65.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 9 sub-plots/main-plot. (b) Nil. (iii) 3. (iv) (a) 9.8 m. × 9.1 m. (b) 7.3 m. × 7.3 m. (v) 122 cm. × 92 cm. (vi) Yes.

**4. GENERAL :**

(i) Good. (ii) Nil. (iii) *Kapas* yield. (iv) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) —. (vii) Since the experiment is continued, hence the individual results is given.

## 5. RESULTS :

(i) 1182 Kg/ha. (ii) (a) 632.3 Kg/ha. (b) 359.3 Kg/ha. (iii) Interaction I×N is highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
I <sub>0</sub>	815	1283	730	1052	789	987	943
I <sub>1</sub>	1062	1294	1294	1042	1160	1089	1217
I <sub>2</sub>	1305	1094	1390	1369	1226	1195	1263
I <sub>3</sub>	1151	1201	1562	1394	1331	1188	1305
Mean	1083	1218	1244	1304	1127	1115	1182
S <sub>1</sub>	1110	1344	1458				
S <sub>2</sub>	1120	1184	1075				
S <sub>3</sub>	1019	1127	1199				

C.D. for I means at the same level of N=499.6 Kg/ha.  
C.D. for N means at the same level of I=335.3 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(174), 64(111).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'ICM'.**

Object :—To find out the optimum number of irrigations with suitable spacing and fertilizer dose for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super. (ii) Sandy loam. (iii) 4.7.1963, 1.7.1964. (iv) (a) 2 ploughings and 2 harrowings, 2 ploughings and 3 harrowings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 2. (v) 12.4 C.L./ha. of F.Y.M. (vi) Digvijay. (vii) As per treatments. (viii) 3 weedings and 9 interculturings, 6 weedings and 7 interculturings. (ix) 102 cm. and 77 cm. (x) 2 pickings starting from 6.3.1964, 14.2.1965 to 19.4.1965.

## 2. TREATMENTS :

**Main-plot treatments :**

3 levels of irrigations : I<sub>0</sub>=No irrigation, I<sub>1</sub>=2 and I<sub>2</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings : S<sub>1</sub>=152 cm. × 30 cm. S<sub>2</sub>=152 cm × 61 cm.

(2) 3 manurial treatments : M<sub>0</sub>=Control (no manure), M<sub>1</sub>=44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, and M<sub>2</sub>=67.2 Kg/ha. of N as A/S+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super.

N applied on 21.8.1963, 24.9.1963, 7.8.1964 and 14.9.1964 and P<sub>2</sub>O<sub>5</sub> on 21.8.1963 and 7.8.1964.

Dates of irrigation are 3rd week of Oct. and 3rd week of Nov. and for I<sub>0</sub> are 3 week of Oct., 1st and 3rd week of Nov. and 1st week of Dec. Intensity of each irrigation being 2.5 acre inches.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.7 m. × 7.3 m. (b) 7.6 m. × 6.1 m. (v) 152 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Yield was effected by frost during 1963. Both the errors are heterogeneous.

## 5. RESULTS :

63(174)

(i) 352 Kg/ha. (ii) (a) 33.4 Kg/ha. (b) 37.5 Kg/ha. (iii) Main effects of I, S and M and their two factors interaction are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	462	343	317	338	364	419	374
S <sub>2</sub>	386	319	284	341	319	329	330
Mean	424	331	301	340	342	374	352
M <sub>0</sub>	413	292	315				
M <sub>1</sub>	399	353	274				
M <sub>2</sub>	461	347	313				

C.D. for I marginal means =17.5 Kg/ha.  
 C.D. for M marginal means =17.6 Kg/ha.  
 C.D. for S marginal means =14.4 Kg/ha.  
 C.D. for S means at the same level of I =24.9 Kg/ha.  
 C.D. for I means at the same level of S =43.1 Kg/ha.  
 C.D. for M means at the same level of I =30.5 Kg/ha.  
 C.D. for I means at the same level of M =53.7 Kg/ha.  
 C.D. for means in the body of S×M table=24.9 Kg/ha.

64(111)

(i) 706 Kg/ha. (ii) (a) 234.0 Kg/ha. (b) 170.9 Kg/ga. (iii) Main effect of I alone is highly significant.  
 (iv) Av. yield of *kapas* in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	956	562	638	646	732	778	719
S <sub>2</sub>	829	614	634	651	737	690	693
Mean	893	588	636	649	735	734	706
M <sub>0</sub>	812	589	545				
M <sub>1</sub>	972	604	628				
M <sub>2</sub>	895	572	735				

C.D. for I marginal means=123.0 Kg/ha.

**Crop :- Cotton (Kharif).**

**Ref :- Gj. 63(80), 64(17).**

**Site :- Irrigation-cum-Demons. Farm, Umralla.**

**Type :- 'ICM'.**

**Object :-** To find out the optimum spacing and fertilizer dose under irrigated conditions for Cotton.

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Groundnut. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 11.7.1963, 10.7.1964. (iv) (a) 1 ploughing and 2 harrowings, 1 ploughing and 1 harrowing. (b) Drilling. (c) 17 Kg/ha. (d) 61 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) C.J. 73. (vii) As per treatments. (viii) 1 weeding and 1 interculturing, 2 weedings and 2 interculturings. (ix) 46 cm ; 95 cm. (x) 29.11.1963 to 16.1.1964, 15.12.1964 to 25.1.1965.

### 2. TREATMENTS ,

**Main-plot treatments :**

3 levels of irrigation : I<sub>0</sub>=No irrigation, I<sub>1</sub>=2 and I<sub>2</sub>=4 irrigations.

**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 3 spacings between plants :  $S_1=15$  cm.,  $S_2=23$  cm. and  $S_3=30$  cm.(2) 2 manurial treatments :  $M_0$ =Control (no manure) and  $M_1=44.8$  Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.N applied in two equal doses, 1st dose at sowing and 2nd dose one month after sowing.  $P_2O_5$  applied at sowing. Intensity of each irrigation being 2 acre inches.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. 2, 4. (iv) (a) 8.5 m×7.3 m. (b) 7.3 m×5.5 m. (v) 61 cm×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of jassides and boll worms. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Nil. (vii) Errors (a) and (b) are both homogeneous and Treatments×years interaction is absent.

## 5. RESULTS :

(i) 932 Kg/ha. (ii) (a) 213.7 Kg/ha. (based on 6 d.f. composed of errors (a) and years×I interaction. (b) 109.2 Kg/ha. (based 41 d.f. composed of error (b) and years×one factor and 2 factor interactions. (iii) None of the effects is significant. (iv) Av. yield of *kapas* in Kg/ha.

	$I_0$	$I_1$	$I_2$	$M_0$	$M_1$	Mean
$S_1$	892	945	938	927	923	925
$S_2$	941	955	919	880	996	938
$S_3$	922	912	963	884	980	932
Mean	918	937	940	897	966	932
$M_0$	876	870	946			
$M_1$	960	1004	934			

**Crop :- Cotton (Kharif).****Ref :- Gj. 63(82), 64(22).****Site :- Irrigation-cum-Demons, Farm, Umralla.****Type :- 'ICM'.**

Object :—To find out the optimum spacing and fertilizer dose under irrigated conditions for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Paddy. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black soil. (iii) 11.7.1963, 1.7.1964. (iv) (a) 2 ploughings and 1 harrowing, 1 ploughing and 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. (vi)  $CO_2=170$ . (vii) As per treatments. (viii) 3 weedings and 3 interculturings, 3 weedings. (ix) 46 cm., 95 cm. (x) 25.2.1964 and 16.3.1964, 13.2.1965 to 31.3.1965.

## 2. TREATMENTS :

**Main-plot treatments :**3 levels of irrigation :  $I_1=2$ ,  $I_2=3$  and  $I_3=4$  irrigations.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings :  $S_1=91$  cm×30 cm., and  $S_2=91$  cm×61 cm.(2) 2 manurial treatments :  $M_1=44.8$  Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super and  $M_2=1.5$  times  $M_1$ .N applied in two doses : 1st at sowing, 2nd one-month after,  $P_2O_5$  applied at sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A., 26.8 m×18.9 m. (iii) 4. (iv) (a) 9.1 m×6.7 m. (b) 7.3 m×5.5 m. (v) 91 cm×61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil, Gammoxine and endrine was sprayed in 1963, Attack of aphids and boll worms, spraying of endrine 5 times in 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) (a) N.A. (vi) Heavy floods came from the river which resulted in severe shedding of bunds. (vii) Errors (b) heterogeneous.

## 5. RESULTS :

63(82)

(i) 1009 Kg/ha. (ii) (a) 139.8 Kg/ha. (b) 128.1 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Average yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1125	1088	1106	1154	1058	1106
S <sub>2</sub>	830	899	1007	905	919	912
Mean	978	994	1056	1029	989	1009
M <sub>1</sub>	997	1007	1084			
M <sub>2</sub>	958	981	1028			

C.D. for S marginal means = 75.9 Kg/ha.

64(22)

(i) 1064 Kg/ha. (ii) (a) 85.7 Kg/ha. (b) 298.2 Kg/ha. (iii) Main effect of S and interaction I × M are significant. (iv) Average yield of *kapas* in Kg/ha.

	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	Mean
S <sub>1</sub>	1165	1165	1214	1176	1186	1187
S <sub>2</sub>	885	954	1003	939	955	947
Mean	1025	1059	1108	1058	1071	1064
M <sub>1</sub>	1126	893	1154			
M <sub>2</sub>	925	1225	1063			

C.D. for S marginal means = 176.7 Kg/ha.  
 C.D. for M means at the same level of I = 306.0 Kg/ha.  
 C.D. for I means at the same level of M = 226.3 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref :- Gj. 63(81), 64(23).

Site :- Irrigation-cum-Demons. Farm, Umralla.

Type :- 'ICM'.

Object :- To find out the optimum spacing and fertilizes dose under irrigated conditions for Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, Paddy. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 9.7.1963, 1.7.1964. (iv) (a) 2 ploughings and 1 harrowing, 1 ploughing 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. (vi) ISC-67. (vii) As per treatments. (viii) 3 weedings and 2 interculturings, 3 weedings. (ix) 46 cm., 95 cm. (x) 25.2.1964 and 16.3.1964, 16.2.1965 to 1.4.1965.

## 2. TREATMENTS :

**Main-plot treatments :**3 levels of irrigations :  $I_1=2$ ,  $I_2=3$ , and  $I_3=4$  irrigations.**Sub-plot treatments :**

All combinations of (1) and (2)

(1) 2 spacings :  $S_1=91$  cm,  $\times 30$  cm. and  $S_2=91$  cm  $\times 61$  cm.(2) 2 manurial treatments :  $M_1=44.8$  Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super and  $M_2=1.5$  times  $M_1$ .N applied in two doses, 1st at sowing and 2nd one month after  $P_2O_5$  applied at sowing. Intensity of irrigation being 2 acre inches.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 4 sub-plots/main-plot. (b) N.A. (iii) 4. (a)  $9.1m \times 6.7$  m. (b)  $7.3$  m  $\times 5.5$  m. (v)  $91$  cm  $\times 61$  cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Heavy attack of boll worms and aphids in both years. Insecticides applied thrice in 1963. Endrine sprayed 5 times in 1964. (iii) *Kapas* yield. (iv) (a) 1963 to 1964. (b) No. (c) Nil. (v) N.A. (vi) Heavy flood came from river which resulted in severe shedding of buds and bolls. (vii) Both the errors are heterogeneous.

## 5. RESULTS :

## 63(81)

(i) 433 Kg/ha. (ii) (a) 87.0 Kg/ha. (b) 111.0 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	$I_1$	$I_2$	$I_3$	$M_1$	$M_2$	Mean
$S_1$	431	419	457	444	427	436
$S_2$	370	465	453	456	403	429
Mean	401	442	455	450	415	433
$M_1$	417	431	503			
$M_2$	385	453	407			

## 64(23)

(i) 623 Kg/ha. (ii) (a) 245.9 Kg/ha. (b) 160.7 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of *kapas* in Kg/ha.

	$I_1$	$I_2$	$I_3$	$M_1$	$M_2$	Mean
$S_1$	695	579	680	671	631	651
$S_2$	673	517	594	575	614	595
Mean	684	548	637	623	623	623
$M_1$	710	504	655			
$M_2$	658	592	619			

**Crop :- Cotton (Kharif).****Ref. :- Gj. 65(163).****Site :- Irrigational Demons. Farm, Umralla.****Type :- 'ICM'.****Object :-**To determine the water requirements of Cotton with different Spacings and fertilizer doses.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat, (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 17.7.65. (iv) (a) 1 ploughing, 3 harrowings. (b) Hand sowing. (c) 17 Kg/ha. (d) As per treatments. (e) One plant/hill. (v) 12.4 C.L./ha. of F.Y.M. +24.7 Kg/ha of  $P_2O_5$ . (vi) C.J. 63 (*Sanjay*). (vii) As per treatments. (viii) 3 interculturing, 4 weedings. (ix) 32 cm. (x) 25.11.65; 15.12.65; 6.1.66.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 4 levels of irrigations :  $I_0$ =No irrigation,  $I_1$ =irrigation at 20% available moisture on 10.10.65 ;  $I_2$ =irrigation at 40% available moisture on 2.10.65 and 1.11.65,  $I_3$ =Irrigation at 60% available moisture on 15.9.1966 ; 8.10.1966 and 30.10.1965.

(2) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=24.7$  and  $N_2=49.4$  Kg/ha.

## Sub-plot treatments :

3 spacings :  $S_1=61$  cm.  $\times$  15.2 cm.,  $S_2=61$  cm.  $\times$  22.9 cm. and  $S_3=61$  cm.  $\times$  30.5 cm.  $\frac{1}{2}$  dose of N at sowing and other  $\frac{1}{2}$  dose at one month after sowing.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 12 main-plots/replication, 3 sub-plots/main-plot. (b) Nil. (iii) 3. (iv) (a) 9.7 m.  $\times$  9.1 m. (b) 7.3 m.  $\times$  7.3 m. (v) 122.0 cm.  $\times$  91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) *Kapas* yield. (iv) (a) 1965-1967. (b) No. (c) Nil. (v) N.A. (vi) —. (vii) Since the experiment is continued, hence individual result is given.

## 5. RESULTS :

(i) 1056 Kg/ha. (ii) (a) 538.7 Kg/ha. (b) 200.0 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of *kapas* in Kg/ha.

	$N_0$	$N_1$	$N_2$	$S_1$	$S_2$	$S_3$	Mean
$I_0$	763	608	634	651	689	665	668
$I_1$	818	1252	1235	1110	1165	1030	1102
$I_2$	1120	1105	1192	1242	1096	1079	1139
$I_3$	1247	1047	1652	1333	1368	1245	1315
Mean	987	1003	1178	1084	1080	1005	1056
$M_0$	981	1016	1256				
$M_1$	995	1042	1202				
$M_2$	986	951	1077				

C.D. of I marginal means=309.4 Kg/ha.

Crop :- Cotton (*Kharif*).

Ref. :- GJ. 63(210), 64(177), 65(102).

Site :- Cotton Breeding Sub-Stn., Jagudan.

Type :- 'D'.

Object :- To study the effect of chemical brassicol to control root rot disease of Cotton.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* in 63(210), Cotton in others. (c) Nil in 63(210), 12.4 C.L./ha. of F.Y.M. in others. (ii) Sandy and Goredu soil. (iii) 17.7.1963 ; 13.7.1964 ; 18.7.1965. (iv) (a) 1 ploughing and 3 harrowings in 1964 ; 1 ploughing and 2 harrowings in other years. (b) Dibbling. (c) 12 Kg/ha. (d) 61 cm.  $\times$  23 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) *Kalyan* (medium). (vii) Irrigated. (viii) 2 intercultures and 2 weedings. (ix) 78 cm., 4 cm., 33 cm. (x) 16.2.1964 ; 3.3.1965 and 27.2.1966.

## 2. TREATMENTS :

T<sub>0</sub>=Control (no brassical treatment).

T<sub>1</sub>=Seed treatment with brassical. Cotton seed were treated with chemical brassical 75% at the rate of 600 gm. per 100 Kg. of seed.

T<sub>2</sub>=Soil treatment with brassical.

The soils were treated with chemical brassical 75% at the rate of 20 Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) 14.6 m. × 16.5 m. (iii) 6. (iv) (a) 4.9 m. × 16.5 m. (b) 3.7 m. × 15.5 m. (v) 61 cm. × 46 cm. (vi) Yes.

## 4. GENERAL :

(i) Not good in 1963 Normal in other years. (ii) Attack of root rot disease. Control measure as per treatments. (iii) *Kapas* yield. (iv) (a) 1963-1965. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Errors heterogenous, interaction absent.

## 5. RESULTS :

## 1963(210)

(i) 55 Kg/ha. (ii) 24.8 Kh/ha. (iii) Treatments differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Av. yield	55	58	51

## 1964(177)

(i) 356 Kg/ha. (ii) 121.4 Kg/ha. (iii) Treatments differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Av. yield	374	350	344

## 1265(102)

(i) 926 Kg/ha. (ii) 209.3 Kg/ha. (iii) Treatments differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Av. yield	892	882	1005

**Crop :- Cotton (*Kharif*).**

**Ref. :- Gj. 65(211), 64(176), 65(103).**

**Site :- Cotton Breeding Sub-Stn., Jagudan.**

**Type :- 'D'.**

Object :- To study the effect of different leguminous crops on incidence of root rot on Cotton.

## 1. BASAL CONDITIONS :

(i) Nil. (b) *Jowar* in 1963 ; Cotton and legumes in other years. (c) Nil in 1963, 12.4 C.L./ha. of F.Y.M. in 1964, 1965. (ii) Sandy and Goredu. (iii) 16.7.1963 ; 12.7.1964 and 19.7.1965. (iv) (a) 1 ploughing and 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) 61 cm. × 23 cm. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) *Kalyan* (medium). (vii) Irrigated. (viii) 2 weedings and 2 interculturings. (ix) 78 cm., 54 cm., 33 cm. (x) 17.2.1964 ; 8.2.1965 and 28.2.1966.

## 2. TREATMENTS :

5 cultural treatments : T<sub>1</sub>=Cotton and *Mung* mixed sowing, I<sub>2</sub>=Cotton and *Motu* mixed sowing, T<sub>3</sub>=Cotton and *udid* mixed sowing, T<sub>4</sub>=Cotton and groundnut mixed sowing and T<sub>5</sub>=Cotton alone (control).

## 3 DESIGN :

(i) R.B.D. (ii) (a) 5. (b) 18.3 m. × 34.8 m. (iii) 5. (iv) (a) 6.1 m. × 17.4 m. (b) 3.7 m. × 15.5 m. (v) 122 cm. × 92 cm. (vi) Yes.



## 4. GENERAL :

(i) Not good in 1963 ; Normal in other years. (ii) Attack of root rot disease observed. No extra control measures were taken. (iii) *Kapas* yield. (iv) (a) 1963 to 1965. (b) Yes. (c) Results of combined analysis given under 5. (v) N.A. (vi) Occurrence of heavy frost affected the crop. (vii) Date on the root rot disease N.A. Errors heterogenous, interaction present.

## 5. RESULTS :

(i) 295 Kg/ha. (ii) 258.6 Kg/ha. based on 8 d.f. composed of Treatments  $\times$  years interaction. (iii) Treatments are not significantly different. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	345	158	312	334	324

**Crop :- Cotton (Kharif).**

**Ref. :- Gj. 63(270), 64(288), 65(110).**

**Site :- Cotton-Breeding Sub-Stn., Jagudan.**

**Type :- 'D'.**

Object :—To assess the effectiveness of insecticides viz., Endrin and Sevin on Cotton.

## 1. BASAL CONDITIONS :

(i) (a) *Jowar-Cotton* for 63 and 64, Nil in 65. (b) *Jowar* for 63 and 65, *Bjara* in *Kharif* and *Isabgol* in *Rabi* in 65. (c) 12.4 C.L./ha. of F.Y.M. (ii) Sandy and *Goradu* soil. (iii) 17.7.63 ; 14.7.64 ; 19.7.65. (iv) (a) 1-2 ploughings ; 2 harrowings. (b) Dibbling. (c) 12 Kg/ha. (d) 61 cm.  $\times$  61 cm. (e) 1 plant/hill. (v) 12.4 C.L./ha. of F.Y.M. for 63 and 64 ; 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha of N for 65. (vi) *Kalyan* (medium). (vii) Irrigated. (viii) 3 interculturings and 3 to 4 weedings. (ix) 80 cm. in 63 ; 54 cm. in 64 ; 33 cm. in 65. (x) 15.2.64 ; 19.2.65 ; 28.2.66.

## 2. TREATMENTS :

## 63(270) and 64(288)

11 insecticidal treatments : T<sub>0</sub>=Control (no insecticides), N<sub>1</sub>=4 sprayings of Endrin at an interval of 15 days from 15th October ; T<sub>2</sub>=4 sprayings of Endrin at an interval of 20 days from 15th October ; T<sub>3</sub>=3 sprayings of Endrin at an interval of 25 days from 1st November ; T<sub>4</sub>=3 sprayings of Endrin at an interval of 20 days from 1st November ; T<sub>5</sub>=2 sprayings of Endrin at an interval of 30 days from 1st November ; T<sub>6</sub>=4 sprayings of Sevin at an interval of 15 days from 15th October ; T<sub>7</sub>=4 sprayings of Sevin at interval of 20 days from 15th October ; T<sub>8</sub>=3 sprayings of Sevin at an interval of 25 days from 1st November ; T<sub>9</sub>=3 sprayings of Sevin at an interval of 20 days for 1st November ; T<sub>10</sub>=2 sprayings of Sevin at an interval of 30 days from 1st November.

Endrin 0.03% and Sevin 0.2% in 148 to 198 gallons of water/ha.

## 65(110)

All combinations of (1) and (2) + one control

(1) 3 dates of sprayings : D<sub>1</sub>=30th September, D<sub>2</sub>=15th October and D<sub>3</sub>=30th October.

(2) 3 levels of sprayings of Sevin : S<sub>1</sub>=4, S<sub>2</sub>=3, S<sub>3</sub>=2 sprayings at an interval of 15 days.

Sevin 0.2% in 148 to 198 gallons of water/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 11 for 63 and 64, 10 for 65. (b) N.A. (iii) 4. (iv) (a) 6.1 m.  $\times$  12.2 m. (b) 4.9 m.  $\times$  11.0 m. for 63 and 64 ; 6.1 m.  $\times$  11.0 m. for 64. (v) 61 cm.  $\times$  61 cm. for 63 and 64 ; 61 cm. between plots for 65. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of aphids, jassids, thrips and bollworm. As per treatments. (iii) *Kapas* yield. (iv) (a) 1963-65 (modified in 65). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

## 63(270)

(i) 376 Kg/ha. (ii) N.A. (iii) N.A. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>
Yield	222	417	468	374	348	290	510	424	362	349	367

64(288)

(i) 462 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>	T <sub>9</sub>	T <sub>10</sub>
Yield	301	829	388	434	775	385	441	472	252	455	355

65(110)

(i) 760 Kg/ha. (ii) 201.8 Kg/ha. (iii) None of the effect is significant. (iv) Av. yield of *kapas* in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
D <sub>1</sub>	990	738	775	834
D <sub>2</sub>	683	874	672	743
D <sub>3</sub>	718	727	534	660
Mean	797	780	660	760

**Crop :- Cotton (Kharif).****Ref :- Gj. 62(221), 63(236), 64(219).****Site :- Agri. Res. Stn., Vijapur.****Type :- 'D'.**

Object :—To study the effect of different insecticides in controlling termites on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 62; wheat for 63; Maize for 64. (c) Nil. (ii) Sandy loam soil. (iii) 26.7.62; 18.7.63; 4.7.64. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) N.A. (d) 122 cm. × 61 cm. (e) 2 to 3. (v) 12.4 C.L./ha. of F.Y.M. (vi) Medium. (vii) Unirrigated. (viii) 1 weeding. (ix) 56 cm. for 62; 100 cm. for 63; 56 cm. for 64. (x) N.A.

**2. TREATMENTS :**

6 insecticidal treatments : T<sub>0</sub>=Control, T<sub>1</sub>=B.H.C. 5% dust at 22.4 Kg/ha., T<sub>2</sub>=B.H.C. 10% dust at 22.4 Kg/ha., T<sub>3</sub>=Aldrin 5% dust at 11.2 Kg/ha.; T<sub>4</sub>=Aldrin 5% dust at 22.4 Kg/ha. and T<sub>5</sub>=Chlorodene 5% dust at 22.4 Kg/ha.

Time and method of application N.A.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 7.9 m. × 9.8 m. (b) 4.3 m. × 4.9 m. (v) 183 cm. × 244 cm. (vi) Yes.

**4. GENERAL :**

(i) Good in 62 and 64, medium in 63. (ii) Attack of termites, jassides, top shoot borers and black arm. (iii) Yield of *kapas*. (iv) (a) 1962–1964. (b) No. (c) Results of combined analysis are presented under 5. Results. (v) N.A. (vi) Crop was affected by frost in 63. (vii) Error variances homogeneous and interaction absent.

**5. RESULTS :**

(i) 670 Kg/ha. (ii) 149.2 Kg/ha. [(based on 55 d.f. made of pooled error + (Treatments × years interaction)]. (iii) Treatment differences are highly significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	604	786	722	650	626	630

C.D.=121.8 Kg/ha.

**Crop :- Cotton (Kharif).****Ref :- Gj. 65(109).****Site :- Agri. Res. Stn., Vijapur.****Type :- 'D'.**

Object :—To study the effect of different levels of B.H.C. 5% dust in controlling termites on Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar*. (c) Nil. (ii) Sandy loam soil. (iii) 11.7.65. (iv) (a) 1 ploughing, and 1 harrowing. (b) Dibbling. (c) 5 to 7 Kg/ha. (d) 122 cm. × 61 cm. (e) 2 plants/hill. (v) 12.4 C.L./ha. of F.Y.M. (vi) Medium. (vii) Un-irrigated. (viii) 1 weeding. (ix) 31 cm. (x) 7.1.66 and 29.1.66.

**2. TREATMENTS :**

6 levels of B.H.C. :  $T_0$ =Control,  $T_1$ =11.2,  $T_2$ =16.8,  $T_3$ =22.4,  $T_4$ =28.0 and  $T_5$ =33.6 Kg/ha. of 5% dust.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) Nil. (iii) 4. (iv) (a) 7.9 m. × 9.8 m. (b) 4.3 m. × 4.9 m. (v) 183 cm. × 244 cm. (vi) Yes.

**4. GENERAL :**

(i) Poor due to scanty rains. (ii) Nil. (iii) Seed cotton yield. (iv) (a) 1962 to 1965; (b) Yes. (c) Nil. (v) N.A. (vi) Scanty rains. (vii) Since the experiment is continued, hence individual result is given.

**5. RESULTS :**

(i) 137 Kg/ha. (ii) 30.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *kapas* in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	149	141	150	117	116	150

**Crop :- Tobacco (Kharif).****Ref :- Gj. 60(128), 61(113).****Site :- Institute of Agriculture, Anand.****Type 'M'.**Object :—To find out the appropriate level of N for bidi Tobacco when the field is given manured with and without  $P_2O_5$ .**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajri* for 60(128); *Tobacco* for 61(113). (c) N.A. for 60(128); 179.3 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  for 61(113). (ii) Black soil. (iii) 31.8.1960; 31.8.1961. (iv) (a) 3 ploughings, 4 harrowings for 60(128); 2 ploughings for other. (b) Transplanting. (c) N.A. (d) 91 cm. × 91 cm. (e) N.A. (v) Nil. (vi) Kelin-49 for 60(128); K-20 for other. (vii) Irrigated. (viii) 3 interculturings and 2 weedings for 60(128); one interculturing for other. (ix) 48 cm.; 78 cm. (x) 7.1.1961; 24.1.1962.

**2. TREATMENTS :****Main-plot treatments :**

2 levels of  $P_2O_5$  as Super :  $P_0$ =0 and  $P_1$ =44.8 Kg/ha.

**Sub-plot treatments :**

3 levels of N as G.N.C. :  $N_1$ =89.7,  $N_2$ =134.5 and  $N_3$ =179.3 Kg/ha.

Sar'n as G.M. applied to main-plot treatment.  $P_2O_5$  applied before sowing of G.M. crop and N broadcast.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication; 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14.6 m. × 13.7 m. (b) 11.0 m. × 10.1 m. (v) 183 cm. × 183 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Cured tobacco yield. (iv) (a) 1957—1961. (b) No. (c) Results of combined analysis given under 5. (v) and (vi) Nil. (vii) The results of expts. 57(128), 58(119) and 59(138) have also been taken while giving combined results. Error variances are homogeneous and Treatments × year interaction is present.

## 5. RESULTS :

(i) 1394 Kg/ha. (ii) (a) 65.4 Kg/ha. [4 d.f. made up of Treatment  $\times$  years interaction]. (b) 154.2 Kg/ha. [16 d.f. made up of various components of Treatments  $\times$  years interaction]. (iii) Main effect of N alone is highly significant. (iv) Av. yield of cured tobacco in Kg/ha.

	N <sub>1</sub>	N <sub>2</sub>	N <sub>3</sub>	Mean
P <sub>0</sub>	1180	1413	1569	1387
P <sub>1</sub>	1168	1438	1600	1402
Mean	1174	1425	1584	1394

C.D. for N marginal means = 146.1 Kg/ha.

**Crop :- Tobacco (Kharif).**

**Ref :- Gj. 63(267), 64(284), 65(52).**

**Site :- Agri. College Farm, Anand.**

**Type :- 'M'.**

Object :- To study the effect of C/N, A/S with and without F.Y.M. on Tobacco.

## 1. BASAL CONDITIONS :

(i) (a) *Bajri-Tobacco*. (b) *Bajri*. (c) 44.8 Kg/ha. of N + 12.3 C.L./ha. of F.Y.M. (ii) Sandy loam. (iii) 20.8.1963; 15.8.1964; 17.8.1965. (iv) (a) 2 ploughings, 1 harrowing. (b) Transplanting. (c) Nil. (d) 91 cm.  $\times$  91 cm. (e) 1 seedling/hill. (v) Nil. (vi) K-20. (vii) Irrigated. (viii) 2 weedings, 1 to 2 interculturings. (ix) 87.9 cm.; 57.6 cm.; 58.0 cm. (x) 6, 8.1.1964, 3.2.1964; 21, 25.1.1965, 17, 24.2.1965; 10.1.66, 5.2.66.

## 2. TREATMENTS :

4 manurial treatments : M<sub>1</sub> = 89.7 Kg/ha. of N as G.N.C. + 89.7 Kg/ha. of N as C/N, M<sub>2</sub> = 89.7 Kg/ha. of N as G.N.C. + 89.7 Kg/ha. of N as A/S, M<sub>3</sub> = M<sub>1</sub> + 12.4 C.L./ha. of F.Y.M. and M<sub>4</sub> = M<sub>2</sub> + 12.4 C.L./ha. of F.Y.M.

F.Y.M. broadcast before sowing.

1st dose of N i.e. 89.7 Kg/ha. of N + 44.8 Kg/ha. of N as fertilizer applied in furrows before sowing and 2nd dose of N i.e. 44.8 Kg/ha. of N as top dressing after 2 weeks of transplanting.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 6.4 m.  $\times$  11.0 m. (b) 4.6 m.  $\times$  9.1 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 63(267); good for others. (ii) Nil. (iii) Cured tobacco yield. (iv) (a) 1963-67. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

## 63(267)

(i) 817 Kg/ha. (ii) 170.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tobacco in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	829	767	719	955

## 64(284)

(i) 1074 Kg/ha. (ii) 131.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of tobacco in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1103	1060	1032	1103

65(52)

(i) 1028 Kg/ha. (ii) 140.4 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of tobacco in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	1032	1132	1086	862

C.D.=172.7 Kg/ha.

**Crop :- Cigarette Tobacco (Kharif).**

**Ref :- Gj. 64(218), 65(107).**

**Site :- Agri. Res. Stn., Vijapur.**

**Type :- 'CV'.**

**Object :-**To study the effect of different planting times on different varieties of Tobacco.

**1. BASAL CONDITIONS :**

(i) (b) Nil. (b) Wheat. (c) Nil. (ii) Sandy loam soil. (iii) As per treatments. (iv) (a) 2 ploughings and 2 harrowings. (b) Transplanting. (c) 4 Kg/ha., 10 Kg/ha. (d) 80 cm × 60 cm. (e) 1. (v) 12.4 C.L/ha. of F.Y.M+10 Kg/ha. of N+60 Kg/ha. of K<sub>2</sub>O. (vi) As per treatments. (vii) Irrigated. (viii) 2 weedings and 3 interculturings. (ix) N.A., 32 cm. (x) 8 pickings from 9.11.64 to 2.2.65, Six pickings from 22.10.65 to 3.1.66.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 varieties : V<sub>1</sub>=Hicks, V<sub>2</sub>=Harrison special and V<sub>3</sub>=Delcrest.

(2) 4 dates of sowing : D<sub>1</sub>=3rd week of July, D<sub>2</sub>=4th week of July, D<sub>3</sub>=1st week of August and D<sub>4</sub>=2nd week of August.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 3.2 m × 11.4 m. (b) 1.6 m × 10.2 m. (v) 80 cm × 60 cm. (vi) Yes.

**4. GENERAL :**

(i) Medium. (ii) Leaf spot disease. (iii) Cured Tobacco leaves yield. (iv) (a) 1964-65. (b) No. (c) Results of combined analysis are presented under 5. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 1567 Kg/ha. (ii) 367.9 Kg/ha. [based on 77 d.f. made up of pooled error+(Treatment × years) interaction]. (iii) Main effect of V alone is significant. (iv) Average yield of cured leaf in Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Mean
V <sub>1</sub>	1396	1578	1493	1486	1488
V <sub>2</sub>	1987	1741	1565	1741	1759
V <sub>3</sub>	1591	1665	1323	1241	1455
Mean	1658	1662	1460	1489	1567

C.D. for V marginal means=257.5 Kg/ha.

**Crop :- Cigarette Tobacco (Kharif).**

**Ref :- Gj. 63(235), 64(217), 65(106).**

**Site :- Agri. Res. Stn., Vijapur.**

**Type :- 'ICM'.**

**Object :-**To determine the optimum number of irrigations and fertiliser dose for Tobacco.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton for 63(235) Wheat for other years. (c) Nil. (ii) Sandy loam soil. (iii) 28, 29.8.63, 9.8.64 and 12.8.64, 21.8.65. (iv) (a) 1-2 ploughings, 2-3 harrowings. (b) Transplanting. (c) 3 Kg/ha. for nursery. (d) 80 cm × 60 cm. (e) 1. (v) 20 Kg/ha. of MgO + 1003 Q/ha. of F.Y.M. (vi) Delcrest. (vii) As per treatments. (viii) 2-3 weedings, 4 interculturations. (ix) 100 cm., 56 cm., 32 cm. (x) 4 pickings 12.12.63 to 15.1.64, 6 pickings 8.11.64 to 18.1.65, 8 pickings from 23.11.65 to 4.2.66.

## 2. TREATMENTS :

## Main-plot treatments :

3 number of irrigations :  $I_1=6$ ,  $I_2=8$  and  $I_3=10$  irrigations.

## Sub-plot treatments :

5 levels of manures :  $M_0=0$ ,  $M_1=20$  Kg/ha. of N  $M_2=M_1+100$  Kg/ha. of  $P_2O_5$ ,  $M_3=M_1+60$  Kg/ha. of  $K_2O$  and  $M_4=M_1+100$  Kg/ha. of  $P_2O_5+60$  Kg/ha. of  $K_2O$ .

## Sub-Sub-plot treatments :

2 levels of topping :  $T_0$ =no topping and  $T_1$ =topping.

Irrigations given from 9.10.1963 to 5.2.64 for 63(235).

N applied as A/S,  $P_2O_5$  as Super and  $K_2O$  as Mur. pot.

## 3. DESIGN :

(i) Split-split-plot. (ii) (a) 3 main-plots/replication, 5 sub-plots/main-plot, 2 sub-sub-plots/sub-plot. (ii) N.A. (iii) 2. (iv) (a) 12.0 m × 8.0 m. (b) 10.8 m × 6.4 m. (v) 60 cm × 80 cm. (vi) Yes.

## 4. GENERAL :

(i) Medium, satisfactory, Good. (ii) Orobancha trouble, leaf curled brown spots observed for 63(235). Heavy attack of leaf spot disease for 64(217), Nil for 65(106). (iii) Cured leaf yield. (iv) (a) 1963-1965. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Sub-plot and sub-sub-plot variances are heterogeneous.

## 5. RESULTS :

## 1963(235)

(i) 946 Kg/ha. (ii) (a) 185.2 Kg/ha. (b) 123.1 Kg/ha. (c) 134.8 Kg/ha. (iii) Main effects of M and T are significant. (iv) Average yield of cured leaf in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$T_0$	$T_1$	Mean
$I_1$	856	866	779	923	840	829	877	853
$I_2$	1024	946	954	1103	922	910	1070	990
$I_3$	1109	948	950	1075	896	938	1034	996
Mean	996	920	894	1034	886	899	993	946
$T_0$	909	863	862	980	883			
$T_1$	1085	978	927	1088	890			

C.D. for M marginal means = 109.5 Kg/ha.

C.D. for T marginal means = 74.2 Kg/ha.

## 1964(217)

(i) 936 Kg/ha. (ii) (a) 620.7 Kg/ha. (b) 157.7 Kg/ha. (c) 213.7 Kg/ha. (iii) Main effect of T alone is highly significant. (iv) Average yield of cured leaf in Kg/ha.

	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$T_0$	$T_1$	Mean
$I_1$	1072	865	1112	938	967	910	1072	991
$I_2$	1051	870	741	915	1063	813	1043	928
$I_3$	982	949	963	780	770	828	949	889
Mean	1035	895	939	878	933	850	1021	936
$T_0$	872	750	873	892	865			
$T_1$	1199	1039	1005	863	1001			

C.D. for T marginal means = 117.6 Kg/ha.

1965(106)

(i) 1904 Kg/ha. (ii) (a) 571.0 Kg/ha. (b) 405.1 Kg/ha. (c) 482.2 Kg/ha. (iii) Main effect of T is highly significant. (iv) Average yield of cured leaf in Kg/ha.

	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	T <sub>0</sub>	T <sub>1</sub>	Mean
I <sub>1</sub>	1919	1729	1674	2093	1894	1709	2015	1862
I <sub>2</sub>	1793	2175	1873	1968	1852	1855	2011	1933
I <sub>3</sub>	1693	2028	1923	1776	2175	1759	2079	1919
Mean	1802	1977	1823	1946	1974	1774	2035	1904
T <sub>0</sub>	1716	1894	1762	1796	1702			
T <sub>1</sub>	1888	2061	1885	2095	2246			

C.D. for T marginal means=187.6 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(112).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

Object :- To study the response of Groundnut to Di-ammo-phosphate and Ammo-Sulp-Phosphate.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 26.7.65. (iv) (a) 1 ploughing, 1 harrowing. (b) Dibbling. (c) Nil. (d) 61.0 cm × 5.1 cm. (e) 1 seed/dibble. (v) Nil. (vi) S.B. XI. (vii) Unirrigated. (viii) 2 interculturings. (ix) 60.2 cm. (x) 2.11.65.

**2. TREATMENTS :**

M<sub>0</sub>=Control (No fertilizer), M<sub>1</sub>=Dia ammonium phosphate @ 11.2 Kg/ha. N+28.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. M<sub>2</sub>=Ammonium Sulphate Phosphate @ 11.2 Kg/ha. of N+28.0 Kg/ha. P<sub>2</sub>O<sub>5</sub>, M<sub>3</sub>=Ammo. Sulphate+Super Phosphate @ 11.2 Kg/ha. of N+28.0 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
The required dose of P<sub>2</sub>O<sub>5</sub> adjusted with addition of Super Phosphate wherever necessary.  
Fertilizers applied at sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.4 m × 6.1 m. (b) 9.1 m × 4.9 m. (v) 61.0 cm × 61.0 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Mild attack of aphids. (iii) Pods yield. (iv) (a) 1955-confd. (b) No. (c) Nil. (v) to (vii) Nil.

**5. RESULTS :**

(i) 560 Kg/ha. (ii) 67.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of Pods in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	519	560	573	589

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(115).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

Object :- To study the effect of Nitrogen when applied as top dressing on Groundnut with and without P<sub>2</sub>O<sub>5</sub>.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha.  $P_2O_5$ . (ii) Medium black. (iii) 28.9.63. (iv) (a) 1 ploughing, 1 harrowing. (b) Dibbling. (c) N.A. (d) 45.7 cm×5.1 cm. (e) 1-2 seeds/dibble. (v) Nil. (vi) S.B-XI. (vii) Unirrigated. (viii) 2 interculturings. (ix) 60.2 cm. (x) 2.11.65.

## 2. TREATMENTS :

$M_0$ =Control No fertilizer,  $M_1$ =11.2 Kg/ha. of N at sowing,  $M_2$ =22.4 Kg/ha. of  $P_2O_5$  at sowing,  $M_3$ =11.2 Kg/ha. of N+22.4 Kg/ha.  $P_2O_5$  at sowing,  $M_4$ =22.4 Kg/ha. of  $P_2O_5$  at sowing+11.2 Kg/ha. of N one month after sowing of  $M_5$ =11.2 Kg/ha. N one month after sowing.

N as A/S and  $P_2O_5$  as Super phosphate.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 13.7 m×3.7 m. (b) 12.8 m×2.8 m. (v) 45.7 cm×45.7 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Mild attack of aphids. (iii) Pods [yield. (iv) (a) 1965—1967. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 537 Kg/ha. (ii) 50.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Average yield of Pods in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
Av. yield	496	573	501	663	486	504

C.D.=75.5 Kg/ha.

**Crop :- Groundnut (*Kharif*).**

**Ref :- Gj. 63(56).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

Object :—To study the response of Groundnut to micronutrients by foliar application.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajra*. (c) 22.4 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 12.7.63. (iv) (a) 1 ploughing and 3 harrowings. (b) Drilling. (c) 30 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) AH-32. (vii) Unirrigated. (viii) 2 interculturings. (ix) 56 cm. (x) 22.10.63.

## 2. TREATMENTS :

6 micronutrients :  $M_0$ =Control (1121 litres/ha. of water),  $M_1$ =2.2 Kg/ha. of Boron as borax+560 gm./ha. of bentenite+1121 litres/ha. of water,  $M_2$ =9.0 Kg/ha. of Copper as C/S+9.0 Kg/ha. of lime+1121 litres/ha. of water,  $M_3$ =3.4 Kg/ha. of Manganese as Mn. Sul.+2.2 Kg/ha. of lime+1121 litres/ha. of water,  $M_4$ =34 Kg/ha. of Zinc as Zinc Sulphate+2.2 Kg/ha. of lime+1121 litres/ha. of water,  $M_5$ =210 gm./ha. of Molybdenum as sodium molybdate+1121 litres/ha. of water.

8.6 pints/ha. of Tenac was added to all sprays. Spraying done at two stages : 1121 litres/ha. of solution sprayed one month after complete germination of crop and 1121 litres/ha. of solution sprayed at the time of flowering.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) 20.1 m.×10.1 m. (b) 18.3 m.×8.2 m. (v) 91 cm.×91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Mild attack of *tikka* and aphids. (iii) Yield of pods and tops. (iv) (a) and (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 710 Kg/ha. (ii) 74.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.



Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>
Av. yield	647	727	631	752	847	657

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 60(24), 61(105), 62(21).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'M'.**

**Object :-** To find out the optimum dose of N, P and K in combination with F.Y.M. for Groundnut.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) *Jowar* for 60(24), 61(105); *Bajra* for 62(21). (c) 44.8 Kg/ha. of manure mixture for 60(24); 12.4 C.L./ha. of F.Y.M. for others. (ii) Medium black. (iii) 26.6.1960; 19.7.1961; 13.7.1962. (iv) (a) One ploughing+one harrowing. (b) Drilling. (c) 90 Kg/ha. (d) 46 cm. between rows. (e) —. (v) Nil. (vi) A.H.-32. (vii) Unfrigated. (viii) 2 to 3 interculturings. (ix) 40 cm.; 33 cm.; 29 cm. (x) 5.10.1960; 19.10.1961; 31.10.1962.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=56.0 and P<sub>2</sub>=112.1 Kg/ha.

(3) 3 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0, K<sub>1</sub>=112.1 and K<sub>2</sub>=224.2 Kg/ha.

**Sub-plot treatments :**

2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

**3. DESIGN :**

- (i) Split-plot confd. (ii) (a) 3 blocks/replication; 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 11.0 m. × 6.1 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

- (i) Normal for 60(24), 61(105); unsatisfactory for 62(21). (ii) Nil for 60(24); attack of aphids and *tikka* for 61(105), 62(21). (iii) Yield of pods. (iv) (a) 1959—1962. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Rainfall was below normal for 61(105), 62(21). (vii) As the sub-plot error variances are heterogeneous, results of individual years are presented below.

**5. RESULTS :**

**60(24)**

- (i) 1700 Kg/ha. (ii) (a) 146.6 Kg/ha. (b) 163.3 Kg/ha. (iii) Main effect of F is highly significant and that of N is significant. (iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
P <sub>0</sub>	1490	1659	1776	1695	1644	1587	1738	1545	1642
P <sub>1</sub>	1627	1733	1740	1719	1715	1665	1806	1595	1700
P <sub>2</sub>	1712	1741	1818	1841	1729	1700	1817	1696	1757
Mean	1610	1711	1778	1752	1696	1651	1787	1612	1700
F <sub>0</sub>	1729	1761	1871	1817	1776	1768			
E <sub>1</sub>	1490	1661	1686	1687	1616	1533			
K <sub>0</sub>	1667	1820	1769						
K <sub>1</sub>	1639	1670	1780						
K <sub>2</sub>	1523	1643	1786						

C.D. for N marginal means=119.7 Kg/ha.

C.D. for F marginal means=102.4 Kg/ha.

61(105)

- (i) 883 Kg/ha. (ii) (a) 95.2 Kg/ha. (b) 78.5 Kg/ha. (iii) Main effects of N and K are significant.  
(iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
P <sub>0</sub>	841	826	892	885	853	822	838	868	853
P <sub>1</sub>	847	924	998	1000	940	830	935	912	923
P <sub>2</sub>	807	881	930	929	881	809	873	873	873
Mean	832	877	940	938	891	820	882	884	883
F <sub>0</sub>	815	859	972	935	912	798			
F <sub>1</sub>	848	895	909	940	870	842			
K <sub>0</sub>	889	887	1037						
K <sub>1</sub>	855	920	899						
K <sub>2</sub>	752	824	885						

C.D. for N or K marginal means=77.6 Kg/ha.

62(27)

- (i) 522 Kg/ha. (ii) (a) 175.8 Kg/ha. (b) 138.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
P <sub>0</sub>	413	411	517	457	377	506	439	455	447
P <sub>1</sub>	553	581	509	529	532	582	572	524	548
P <sub>2</sub>	628	528	560	678	485	553	590	554	572
Mean	531	507	529	555	465	547	534	511	522
F <sub>0</sub>	501	557	543	553	495	553			
F <sub>1</sub>	561	457	514	556	435	541			
K <sub>0</sub>	572	532	561						
K <sub>1</sub>	545	385	465						
K <sub>2</sub>	477	604	560						

**Crop :- Groundnut (Kharif).**

**Ref :- GJ. 63(57), 64(32), 65(111).**

**Site :- Agri. Res. Stn., Amrli.**

**Type :- 'M'.**

**Object :-** To study the response of Groundnut to iron by soil and foliar application.

#### 1. BASAL CONDITIONS :

- (i) (a) Nil for 63(57), 65(111); Cotton-Bajra-Groundnut-cotton for 64(32). (b) Cotton for 63(57), bajra for 64(32), 65(111). (c) 11.2 Kg/ha. of each of N and P<sub>2</sub>O<sub>5</sub> for 63(57); 22.4 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super for 65(111). (ii) Medium black. (iii) 12.7.1963; 9.7.1964; 27.7.1965. (iv) (a) 1 ploughing, 2 to 3 harrowings. (b) Drilling for 63(57); dibbling for others. (c) 67 Kg/ha. for 63(57); 74 Kg/ha. for 64(32); N.A. for others. (d) 46 cm. between rows for 63(57), 64(32); 46 cm. x 5 cm. for 65(111). (e) Nil. (v) Nil. (vi) AH-32 for 63(57), 64(32); SB-11 for 65(111). (vii) Unirrigated. (viii) 2 interculturations for 63(57), 65(111); 1 weeding and 2 interculturations for 64(32). (ix) 56 cm.; 73 cm.; 60 cm. (x) 22.10.1963; 10.11.1964; 2.11.1965.

## 2. TREATMENTS :

3 iron treatments :  $I_0$ =Control,  $I_1$ =11.2 Kg/ha. of Fe. Sul.+11.2 Kg/ha. of lime+5 Kg/ha. of Tenac+1123 litres/ha. of water and  $I_2$ =56.0 Kg/ha. of Fe. Sul.+1123 litres/ha. of water.  $I_2$  applied as soil application and  $I_1$  applied as foliar spray twice.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 2. (iv) (a) 18.3 m.×5.5 m. for 63(57); 13.7 m.×14.6 m. for others. (b) 18.3 m.×5.5 m. for 63(57); 12.2 m.×12.8 m. for 64(32), 12.8 m.×13.7 m. for 65(111), (v) Nil for 63(57); 76 cm.×91 cm. for 64(32); 46 cm.×46 cm. for 65(111). (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Mild attack of aphids and tikka for 63(57); Nil for others. (iii) Yield of pods. (iv) 1963—65. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Rains started late in September for 64(32) only. (vii) Error variances are homogeneous and Treatments×years interaction is absent.

## 5. RESULTS :

(i) 647 Kg/ha. (ii) 73.8 Kg/ha. [10 d.f. made up of Treatments×years interaction and pooled error]. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$
Av. yield	658	618	664

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 64(155), 65(68).**

**Site :- Irrigation Demons. Farm, Halvad.**

**Type :- 'M'.**

Object :- To study the direct and residual effects of  $P_2O_5$  on groundnut followed by Wheat.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Wheat. (b) Wheat. (c) Nil for 64(155), 44.8 Kg/ha. for 65(68). (ii) Medium black. (iii) 9.7.64 and 25.7.65. (iv) (a) 1 to 2 ploughing and harrowing. (b) Drilling. (c) 67 Kg/ha. for 64(155), 74 Kg/ha. for 65(68). (d) 46 cm. (e) N.A. (v) Nil. (vi) AH-32 for 64(155), SB-11 for 65(68). (vii) Un-irrigated. (viii) 2 to 4 weedings. (ix) 46 cm. for 64(155), 66.8 cm. for 65(68). (x) Oct. 64, 4.12.65.

## 2. TREATMENTS :

$T_0$ =Control.

$T_1$ =22.4 Kg/ha. of  $P_2O_5$  every year to Groundnut followed by Wheat.

$T_2$ =22.4 Kg/ha. of  $P_2O_5$  every alternate year Groundnut followed by Wheat.

$T_3$ =44.8 Kg/ha. of  $P_2O_5$  every alternate year Groundnut followed by Wheat.

$T_4$ =44.8 Kg/ha. of  $P_2O_5$  every year Groundnut followed by Wheat.

$T_5$ =67.2 Kg/ha. of  $P_2O_5$  every year Groundnut followed by Wheat.

$T_6$ =67.2 Kg/ha. of  $P_2O_5$  every alternate year Groundnut followed by Wheat.

$T_7$ =67.2 Kg/ha. of  $P_2O_5$  every third year Groundnut followed by Wheat.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m.×5.5 m. (b) 9.1 m.×4.6 m. (v) 61 cm.×46 cm.

## 4. GENERAL :

(i) Normal for 64(155), Not satisfactory for 65(68). (ii) Nil. (iii) Yield of Pods. (iv) (a) 1964 to 1965. (b) Yes. (v) and (vi) N.A. (vii) As the error variances are heterogeneous and Treatment×years interaction is absent, the individual results are presented below.

## 5. RESULTS :

## 64(155)

(i) 914 Kg/ha. (ii) 158 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$(T_0+T_2+T_3+T_6+T_7)$	$T_1$	$T_4$	$T_5$
Av. yield	934	831	909	903

65(68)

(i) 489 Kg/ha. (ii) 113.6 Kg/ha. (iii) Treatment difference are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>
Av. yield	484	490	421	395	595	556	553	419

**Crop :- Groundnut (Kharif).**

**Ref :- 62(199).**

**Site :- Agri. Res. Stn., Halvad.**

**Type :- 'M'.**

Object :- To study the effect of different micronutrient on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 15.7.62. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 134 Kg/ha. (d) Row to row 46 cm. (e) N.A. (v) Nil. (vi) AK 12-24. (vii) Unirrigated. (viii) 4 interculturings. (ix) 35 cm. (x) 1.11.62.

**2. TREATMENTS :**

6 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Zinc as 3.4 Kg/ha. of Zn. Sul. T<sub>2</sub>=Molybdenium as 70 gm/ha. of Sodium molybdate, T<sub>3</sub>=Boron as 2.2 Kg/ha. of Borax, T<sub>4</sub>=Copper as 8.9 Kg/ha. of Cu. Sul. and T<sub>5</sub>=Manganese as 3.4 Kg/ha. of Mn. Sul.

Foliar application of the micronutrients done in two applications ; 1st application are 28.8.1962 and 2nd on 14.9.1962.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) 10.1 m.×20.1 m. (b) 8.2 m.×18.3 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory due to draught condition. (ii) Heavy attack of *aphids*. (iii) Pods and tops yield. (iv) (a) to (c) No. (v) N.A. (vi) Nil. (vii) Sowing was late due to late rainfall.

**5. RESULTS :**

(i) 278 Kg/ha. (ii) 48.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	254	331	254	279	294	259

**Crop :- Groundnut (Kharif).**

**Ref :- GJ. 63(213).**

**Site :- Irrigation, Demons. Farm, Jamnagar.**

**Type :- 'M'.**

Object :- To study the effect of different micronutrients through soil application on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 8.7.63. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 69 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) AK-12-24. (vii) Irrigated. (viii) 2 interculturings. (ix) 28 cm. (x) 27.10.63.

**2. TREATMENTS :**

7 micronutrient treatments : T<sub>0</sub>=Control, T<sub>1</sub>=Manganese as 56.0 Kg/ha. of Mn. Sul, T<sub>2</sub>=Zinc as 28.0 Kg/ha. of Zn. Sul, T<sub>3</sub>=Copper as 28.0 Kg/ha. of Cu. Sul. T<sub>4</sub>=Boron, as 11.2 Kg/ha. of Borax, T<sub>5</sub>=Molybdenium as 1.1 Kg/ha. of Sodium Molybdate and T<sub>6</sub>=Mixture of above all together.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 2. (iv) (a) and (b) 10.1 m. × 10.1 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Inadequate rain fall coupled with non availability of canal water affected the crop very much. (ii) Light attack of *Tikka*. (iii) Pods and tops yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 383 Kg/ha. (ii) 123.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	347	409	372	394	421	390	351

**Crop :- Groundnut (*Kharif*).**

**Ref. :- Gj. 63(71).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of different Phosphatic fertilizers on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 29.6.63. (iv) (a) 3 ploughings. (b) Dibbling. (c) 67 Kg/ha. (d) 91 cm. × 5 cm. (e) N.A. (v) Nil. (vi) Gondal-221-31. (vii) Unirrigated (viii) 4 weedings. (ix) 57 cm. (x) 26.10.63.

## 2. TREATMENTS :

3 forms of application of 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub> : F<sub>1</sub>=Nitro. Phos, F<sub>2</sub>=Super and F<sub>3</sub>=Foliar spray of P<sub>2</sub>O<sub>5</sub>. Treatments F<sub>2</sub> and F<sub>3</sub> are given a dose of Nitrogen from Urea equal to Nitrogen in Nitro. Phos.

## 3. DESIGN :

(i) R.B.D. (Duplicate plots). (ii) (a) 3. (b) N.A. (iii) 2. (iv) (a) 13.7 m. × 4.3 m. (b) 11.9 m. × 2.4 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Attack of *tikka* and aphids. (iii) Pods and tops yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 652 Kg/ha. (ii) 39.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>
Av. yield	707	681	569

**Crop :- Groundnut (*Kharif*).**

**Ref. :- Gj. 65(204).**

**Site :- Oilseeds Research Farm, Junagadh.**

**Type :- 'M'.**

Object :—To study the response of Groundnut to Diammo. phosphate, Ammo. Sulphate Phosphate etc. on the yield of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L/ha. of F.Y.M. + 22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 22.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha. (d) 91.5 cm. × 5.1 cm. (e) 1. (v) Nil. (vi) AH-334 (late). (vii) Unirrigated. (viii) 3 weedings and 2 interculturations. (ix) 57 cm. (x) 2.11.65.

## 2. TREATMENTS :

4 sources of N and P at 11.2 and 22.4 Kg/ha. respectively :  $S_0$ =Control (no fertilizer),  $S_1$ =Di. Ammo. Phos.  $S_2$ =Ammo. Sul. phos. and  $S_3$ =A/S+Super. Doses of  $P_2O_5$  are adjusted by addition of Super to make  $P_2O_5$  22.4 Kg/ha. wherever necessary.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) —. (iii) 6. (iv) (a) 10.4 m. × 7.3 m. (b) 8.5 m. × 5.5 m. (v) 91.5 cm × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Poor due to scanty rains. (ii) Nil. (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains in Aug., Sept. and Oct. affected the yields. (vii) Nil.

## 5. RESULTS :

(i) 173 Kg/ha. (ii) 58.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$
Av. yield	226	114	189	162

C.D.=72.5 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 64(248), 65(211).**

**Site :- Central Expt. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of F.Y.M. with N.P.K. on Groundnut-Cotton rotation.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Cotton for 65 (211). Groundnut-Bajra for 64 (248). (b) and (c) As per treatments. (ii) Medium black. (iii) 14.6.64 and 24.7.65. (iv) (a) 1 to 2 ploughings and harrowing. (b) Dibbling. (c) 90 Kg/ha. for 64 (248), 67.2 Kg/ha. 65(211). (d) 91.5 cm. × 5.1 cm. (e) 1. (v) Nil. (vi) Samarala-1 for 64(248), A-H-334 for 65 (211). (vii) Urrigate 1. (viii) 3 to 4 interculturings. (ix) 137 cm. for 64 (248), 59.2 cm. for 65(211). (x) 8.10.64, 6.11.65.

## 2. TREATMENTS :

7 factorial treatments :  $T_0$  = Control,  $T_1$  = 12.4 C.L./ha. of F.Y.M.,  $T_2$  = 5.2 C.L./ha. of F.Y.M. + N.P.K. equivalent to 6.2 C.L./ha. of F.Y.M.  $T_3$  = N.P.K. equivalent to 12.4 C.L./ha. of F.Y.M.,  $T_4$  = 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N,  $T_5$  = N.P.K. equivalent to 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N and  $T_6$  = 22.4 Kg/ha. of N as A/S.

Note :—No control plot for 65 (211).

## 3. DESIGN :

(i) R.B.D. (ii) (a) 7 for 64 (248), 6 for 65 (211). (b) N.A. (iii) 4. (iv) (a) and (b) 9.2 m. × 5.5 m. for 64(248), for 65 9.1 m × 3.7 m. 7.2 m. × 1.8 m. (v) 61.0 cm. × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Attack of leaf caterpillars for 64 (248), Nil for 65 (211). (iii) Pods yield. (iv) (a) 1954-contd. (b) Yes. (c) Nil. (v) N.A. (vi) Shortage of rains. (vii) Nil.

## 5. RESULTS :

## 64(248)

(i) 759 Kg/ha. (ii) 100.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. yield	717	692	791	840	791	741	741

## 65(211)

(i) 345.4 Kg/ha. (ii) 93.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>
Av. yield	329	277	451	329	277	407

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 63(72).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of Sulphur, CaO, CaCO<sub>3</sub> and Morrums on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Groundnut. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 29.6.63. (iv) (a) 4 ploughings. (b) Dibbling. (c) 67 Kg/ha. (d) 91 cm. × 5 cm. (e) N.A. (v) Nil. (vi) Goudal 221-31. (vii) Unirrigated. (viii) 8 weedings. (ix) 57 cm. (x) 25.10.63.

**2. TREATMENTS :**

5 manurial treatments : M<sub>0</sub>=Control, M<sub>1</sub>=22.4 Kg/ha. of Sulphur, M<sub>2</sub>=5021.4 Kg/ha. of CaO, M<sub>3</sub>=3766.1 Kg/ha. of Ca Co<sub>3</sub> and M<sub>4</sub>=49.4 C.L./ha. of Morrums.

Manures applied in furrows before sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) 18.3 m. × 13.7 m. (iii) 4. (iv) (a) 13.7 m. × 3.7 m. (b) 11.9 m. × 1.8 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Satisfactory. (ii) Attack of *tikka* and aphids. (iii) Pods and tops yield. (iv) (a) 1963 only. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 679 Kg/ha. (ii) 97.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield pods in Kg/ha,

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
Av. yield	655	682	716	614	730

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 63(83), 65(215).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of Super vs. Digested B.M. on Groundnut with different doses of N.

**1. BASAL CONDITIONS :**

(i) (a) Nil for 63(83), Cotton-Groundnut for 65(215). (b) *Jowar* and *Bajara* for 63(83), Cotton for 65(215). (c) Nil for 63(83), 12.4 C.L./ha. of F.Y.M+22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(215). (ii) Medium black soil. (iii) 30.6.1963, 20.7.1965. (iv) (a) Nil for 63(83), 1 ploughing for 65(215). (b) Drilling. (c) 45 Kg/ha. for 63(83), 74.1 Kg/ha. for others. (d) 91 cm. between rows for 63(83), 91 cm × 5 cm. for 65 (111) (e) N.A. (v) Nil for 63(83), 12.4 C.L./ha. of F.Y.M. for other. (vi) Punjab-1. (vii) Unirrigated. (viii) 2 to 3 interculturings. (ix) 57 cm., 59 cm. (x) 23.10.1963, 30.10.1965.

**2. TREATMENTS:**

All combinations of (1) and (2)

(1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.

(2) 2 sources of 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> : S<sub>1</sub>=Super and S<sub>2</sub>=Digested B.M.

**3. DESIGN:**

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.8 m × 11.0 m. (b) 9.1 m × 7.3 m. (v) 183 cm × 183 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 63(83), Below normal for other. (ii) Slight attack of aphids which was controlled by dusting sulphur and spraying Gammaxine. (iii) Yield of Pods. (iv) (a) 1963-65 (Expt. 1964 vitiated). (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains in September affected the yield of Crop. (vii) Error variances found to be heterogeneous and interaction of treatments with years found to be absent, therefore, the individual years results presented below.

## 5. RESULTS :

## 63(83)

(i) 1999 Kg/ha. (ii) 64.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	2018	1981	1943	1981
S <sub>2</sub>	2055	2018	1981	2018
Mean	2036	2000	1962	1999

## 62(215)

(i) 928 Kg/ha. (ii) 206.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	1123	973	842	876
S <sub>2</sub>	825	935	868	979
Mean	974	954	855	928

**Crop :- Groundnut (Kharif).**

**Site :- Oil Seeds Res. Farm, Junagadh.**

**Ref :- Gj. 65(213).**

**Type :- 'M'.**

Object :- To see the effect of Gypsum on groundnut and black soil of Gujarat.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M+22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 23.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha. (d) 91.5 cm×5.1 cm. (e) 1. (v) Nil. (vi) AH-334 (late). (vii) Unirrigated. (viii) 3 interculturings, 2 weedings. (ix) 59 cm. (x) 23.11.65.

## 2. TREATMENTS :

6 manurial treatments : M<sub>1</sub>=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>2</sub>=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Triple Super, M<sub>3</sub>=95.3 Kg/ha. of gypsum, M<sub>4</sub>=61.6 Kg/ha. of Cal. Chloride, M<sub>5</sub>=61.6 Kg/ha. of Cal. Chloride+18.7 Kg/ha. of Sulphur, and M<sub>6</sub>=18.7 Kg/ha. of Sulphur.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) Nil. (iii) 4. (iv) (a) 10.4 m.×7.3 m. (b) 9.1 m.×5.5 m. (v) 61 cm.×92 cm. (vi) N.A.

## 4. GENERAL :

(i) Medium. (ii) Nil. (iii) Pods and tops yield. (iv) (a) 1965-Contd. (b) No. (c) N.A. (v) N.A. (vi) Shortage of rains in September affected the yield. (vii) N.A.



## 5. RESULTS :

(i) 76 Kg/ha. (ii) 25.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatments	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>
Av. yield	66	96	72	72	94	59

**Crop :- Groundnut (Kharif).**

**Ref :- 65(206).**

**Site :- Oil Seeds Res. Farm, Junagadh.**

**Type :- 'M'.**

Object :-To study the effect of different micronutrients by foliar application on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> (ii) Medium black soil. (iii) 23.7.65. (iv) (a) 1 ploughing, 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha. (d) 91.5 cm × 5.1 cm. (e) 1 seed/dibble. (v) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Punjab-1 (Medium). (vii) Unirrigated. (viii) 2 interculturings, 2 weedings. (ix) 59.2 cm. (x) 31.10.65.

## 2. TREATMENTS :

8 micronutrient treatments : M<sub>0</sub>=Control (water spray only), M<sub>1</sub>=Boron at 0.9 Kg/ha. as Borax M<sub>2</sub>=Copper at 3.6 Kg/ha. as Cu. Sul. +3.63 Kg/ha. of lime, M<sub>3</sub>=Zinc at 1.4 Kg/ha. as Zn. Sul.+0.9 Kg/ha. of lime, M<sub>4</sub>=Mn at 1.4 Kg/ha. as Mn. Sul.+0.9 Kg/ha. of lime, M<sub>5</sub>=molybdenum at 1 Kg/ha. as Sod. Molybdate, M<sub>6</sub>=Fe. at 4.5 Kg/ha. as Fe. Sul.+4.5 Kg/ha. of lime and M<sub>7</sub>=Mixture of all the above treatments.

Chemicals have been sprayed taking 455 litres of water for each.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 4.6 m. (b) 8.5 m. × 2.8 m. (v) 91.5 cm. × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Attack of tikka and aphids. (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains in Aug., Sept. and Oct. affected the yield. (vii) Nil.

## 5. RESULTS :

(i) 151 Kg/ha. (ii) 35.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>
Av. yield	173	147	150	152	145	169	131	138

**Crop :- Groundnut (Kharif).**

**Ref :- 65(205).**

**Site :- Oil Seeds Res. Farm, Junagadh.**

**Type :- 'M'.**

Object :-To study the effect of different micronutrients by soil application on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 23.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.3 Kg/ha. (d) 91 cm. × 5 cm. (e) 1 seed/dibble. (v) 11.2 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O. (vi) Punjab-1 (medium). (vii) Unirrigated. (viii) 2 interculturings, 3 weedings. (ix) 59 cm. (x) 31.10.65.

## 2. TREATMENTS :

8 micro-nutrient treatments : M<sub>0</sub>=Control (no micro-nutrient), M<sub>1</sub>=11.2 Kg/ha. of Borax, M<sub>2</sub>=11.2 Kg/ha. of Cu. Sul., M<sub>3</sub>=28.0 Kg/ha. of Mn.Sul., M<sub>4</sub>=1.1 Kg/ha. of Sod. Molybdate, M<sub>5</sub>=56.0 Kg/ha. of Fe, Sul. and M<sub>6</sub>=Mixture of all the above chemicals.

Chemicals are applied to the soil.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 4.6 m. (b) 8.5 m. × 2.8 m. (v) 91.5 cm. × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Attack of tikka and aphids. (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains in Aug., Sept., Oct. affected the yield. (vii) N.A.

## 5. RESULTS :

(i) 92 Kg/ha. (ii) 39.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>
Av. yield	100	78	78	97	112	68	100	107

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**Crop :- Groundnut (Kharif).**

**Ref :- 65(214).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the effect of C/N v/s A/S on the yield of Groundnut soil.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Cotton. (b) Cotton. (c) As per treatments. (ii) Medium black. (iii) 18.7.65. (iv) (a) One harrowing. (b) Dibbling. (c) 74.1 Kg/ha. (d) 91.5 cm. between rows. (e) N.A. (v) Nil. (vi) S.B. XI (vii) Unirrigated. (viii) 4 interculturings. (ix) 59 cm. (x) 28.10.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 sources of 44.8 Kg/ha. of N : S<sub>1</sub>=C/N and S<sub>2</sub>=A/S.

(2) 2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=12.4 C.L./ha.

These manures were applied to the preceding cotton crop.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91.5 cm. × 91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Nil. Dusting of Sulphur. (iii) Pods and tops yield. (iv) (a) 1965-Contd. (b) Yes. (c) Nil. (v) N.A. (vi) Shortage of rains in Sept. affected the crop. (vii) Nil.

## 5. RESULTS :

(i) 607 Kg/ha. (ii) 95.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	F <sub>0</sub>	F <sub>1</sub>	Mean
S <sub>1</sub>	544	614	579
S <sub>2</sub>	676	592	634
Mean	610	603	607

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**Crop :- Groundnut (Kharif).**

**Ref :- GJ. 65(181).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :—To study the role of decomposition of organic matter and its build up in soil with the Groundnut and Cotton crops in fixed rotation.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Cotton. (b) Cotton. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 20.7.65. (iv) (a) 1 ploughing. (b) Drilling. (c) 74.1 Kg/ha. (d) 91.5 cm. row to row. (e) Nil. (v) Nil. (vi) Samarala-1. (vii) Unirrigated. (viii) 2 weedings. 2 interculturings. (ix) 59 cm. (x) 3.11.65.

## 2. TREATMENTS :

6 levels of F.Y.M. :  $T_0$ =Control (No F.Y.M.),  $T_1$ =12.4,  $T_2$ =24.7,  $T_3$ =61.8,  $T_4$ =123.5 and  $T_5$ =247.0 C.L./ha. of F.Y.M.  
F.Y.M. applied before sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 10.1 m.  $\times$  9.1 m. (b) 8.2 m.  $\times$  7.3 m. (v) 91.5 cm.  $\times$  91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids. Gammaxine was applied. (iii) Pods and tops yield. (iv) (a) 1965-Contd. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) Expt. is to be taken on Groundnut followed by Cotton in alternate years on the same site.

## 5. RESULTS :

(i) 524 Kg/ha. (ii) 134.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Av. yield	476	459	569	480	513	644

**Crop :- Groundnut.**

**Ref :- 65(180).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'M'.**

Object :- To study the effect of composed Super phosphate on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 20.7.65. (iv) (a) 1 ploughing. (b) Drilling. (c) 74.1 Kg/ha. (d) 91.5 cm.  $\times$  5.1 cm. (e) —. (v) Nil. (vi) —. (vii) Unirrigated. (viii) 3 interculturings. (ix) 59 cm. (x) 1.11.65.

## 2. TREATMENTS :

4 manurial treatments :  $M_1$ =12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of  $P_2O_5$  composted along with F.Y.M.,  $M_2$ =12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of  $P_2O_5$  applied separately,  $M_3$ =12.4 Kg/ha. of  $P_2O_5$  as Supper, and  $M_4$ =12.4 C.L./ha. of F.Y.M.  
Manures/fertilizers applied at sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4 (b) N.A. (iii) 6. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 9.1 m.  $\times$  4.3 m. (v) 91.5 cm.  $\times$  152.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Shortage of rains in Sept. and Oct. affected the treatment. (ii) Attack of aphids. Dusting of Sulphur and gammaxine. (iii) Pods and tops yield. (iv) (a) 1965-67. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 734 Kg/ha. (ii) 245.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$M_1$	$M_2$	$M_3$	$M_4$
Av. yield	745	728	794	670

**Crop :- Groundnut (Kharif).****Ref :- Gj. 60(68).****Site :- Central Exptl. Stn., Junagadh.****Type :- 'M'.****Object :-**To find out the optimum requirement of N-P-K with and without F.Y.M. for Groundnut.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 26.6.60. (iv) (a) 1 ploughing. (b) Dibbling. (c) 90 Kg/ha. (d) 91 cm. × 10 cm. (e) 2 seeds/dibble. (v) Nil. (vi) Punjab-1 (medium). (vii) Unirrigated. (viii) 2 interculturings and 3 weedings. (ix) 82 cm. (x) 24.10.60.

**2. TREATMENTS :****Main-plot treatments :**2 levels of F.Y.M. :  $F_0=0$  and  $F_1=24.7$  C.L./ha.**Sub-plot treatments :**

All combinations of (1), (2) and (3)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=22.4$  Kg/ha.(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=56.0$  Kg/ha.(3) 2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=28.0$  Kg/ha.**3. DESIGN :**

(i) Split-plot. (ii) (a) 2 main-plots/replication ; 8 sub-plots/main-plot. (b) 38.4 m. × 29.3 m. (iii) 6. (iv) (a) 19.2 m. × 3.7 m. (b) 18.3 m. × 2.7 m. (v) 46 cm. × 46 cm. (vi) Yes.

**4. GENERAL :**(i) Good. (ii) Light attack of *tikka*. (iii) Yield of pods and tops. (iv) (a) 1952-1960 (modified in 1955). (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.**5. RESULTS :**

(i) 1642 Kg/ha. (ii) (a) 155.8 Kg/ha, (b) 172.1 Kg/ha. (iii) Main effect of F alone is significant. (iv) Av. yield of pod in Kg/ha.

	$N_0$	$N_1$	$P_0$	$P_1$	$K_0$	$K_1$	Mean
$F_0$	1608	1590	1610	1588	1598	1600	1599
$F_1$	1686	1682	1668	1700	1648	1720	1684
Mean	1647	1636	1639	1644	1623	1660	1642
$K_0$	1647	1599	1616	1630			
$K_1$	1647	1673	1662	1658			
$P_0$	1623	1655					
$P_1$	1671	1617					

C.D. for F marginal means=81.8 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 63(155), 64(8), 65(240).****Site :- Trial-cum-Demons. Farm, Kholwad.****Type :- 'M'.****Object :-**To study the effect of  $P_2O_5$  on Groundnut.**1. BASAL CONDITIONS :**(i) (a) Nil. (b) Cotton for 63 (155) and 64 (8), Brinjal for 65 (240). (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. for 63 (155), and 64 (8); 49.4 Kg/ha. of N+24.7 Kg/ha. of  $P_2O_5$  for 65(240). (ii) Medium black soil. (iii) 1.7.63, 26.6.64, 8.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 67 Kg/ha. (d) 91 cm. × 15 cm. for 63 (155), 64 (8), 61 cm. × 10 cm. for 65 (240). (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. +11.2 Kg/ha. of N. (vi) Bochala. (vii) Unirrigated. (viii) 2 to 3 weedings. (ix) 124 cm. for 63 (155); 191 cm. for 64 (8); 99 cm. for 65 (240). (x) 11.10.63, 23.11.64 and 2.12.65.

## 2. TREATMENTS :

4 levels of  $P_2O_5$  as Super :  $P_1=22.4$ ,  $P_2=44.8$ ,  $P_3=67.2$  and  $P_4=90.0$  Kg/ha.

## 3. DESIGN :

R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 10.4 m.  $\times$  5.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  92 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Slight attack of aphids and tikka. (iii) Yield of pods. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Error are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

63(155)

(i) 1573 Kg/ha. (ii) 215.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$P_1$	$P_2$	$P_3$	$P_4$
Av. yield	1606	1674	1659	1354

64(8)

(i) 970 Kg/ha. (ii) 163.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$P_1$	$P_2$	$P_3$	$P_4$
Av. yield	1028	957	1005	891

65(240)

(i) 790 Kg/ha. (ii) 348.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$P_1$	$P_2$	$P_3$	$P_4$
Av. yield	627	919	707	909

**Crop :- Groundnut (Kharif)**

**Ref :- Gj. 64(88), 65(241).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Type :- 'M'.**

**Object :-** To study the effect of  $P_2O_5$  on Groundnut and its residual effect on succeeding Wheat crop.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Wheat. (b) Cotton for 64 (88); Wheat for 65 (241). (c) Nil for 64 (88), 49.4 Kg/ha. of N for 65(241) (ii) Medium black soil. (iii) 14.7.64, 7.7.65. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling. (c) 67 Kg/ha. for 64 (88), 98.8 Kg/ha. for 65(241) (d) 30 cm.  $\times$  15 cm. for 64 (88), 61 cm.  $\times$  61 cm. for 65(241). (e) 1.(v) 24.7 Kg/ha. of N for 65(241) only. (vi) AH-32. (vii) Unirrigated. (viii) 3 interculturings and weeding. (ix) 191 cm. for 64 (88), 99.2 cm. for 65 (241). (x) Last week of Oct.

## 2. TREATMENTS :

8 manurial treatments :  $M_0$ =Control,  $M_1=22.4$  Kg/ha. of  $P_2O_5$  every year,  $M_2=22.4$  Kg/ha. of  $P_2O_5$  every alternate year,  $M_3=44.8$  Kg/ha. of  $P_2O_5$  every year,  $M_4=44.8$  Kg/ha. of  $P_2O_5$  every alternate year,  $M_5=67.2$  Kg/ha. of  $P_2O_5$  every year,  $M_6=67.2$  Kg/ha. of  $P_2O_5$  every alternate year and  $M_7=67.2$  Kg/ha. of  $P_2O_5$  every third year.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 11.0 m.  $\times$  5.8 m. (b) 9.8 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory for 64(88), Normal for 65 (241). (ii) Slight attack of aphid and tikka. (iii) Pods yield. (iv) (a) 1964 to 1965. (b) Yes. (c) Nil. (v) and (vi) Nil. (vii) Errors are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

64(88)

(i) 265 Kg/ha. (ii) 107.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub> +M <sub>2</sub>	M <sub>3</sub> +M <sub>4</sub>	M <sub>5</sub> +M <sub>6</sub> +M <sub>7</sub>
Av. yield	210	275	280	268

65(241)

(i) 658 Kg/ha. (ii) 210 Kg/ha. (iii) Treatment differences are not significant. (iii) Av. yield of pods in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>	M <sub>7</sub>
Av. yield	653	518	734	586	633	807	586	743

Crop :- Groundnut (*Kharif*).

Ref :- Gj. 60(35), 61(202), 62(159).

Site :- Trial-cum-Demons. Farm, Kholwad.

Type :- 'M'.

Object :—To study the response of Groundnut to different doses of N and P.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat for 60 (35), 61 (202); Cotton for 62 (159). (c) 12.4 C.L./ha. of F.Y.M.+G.M. (*Sann*)+44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60 (35); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61 (202); N.A. for 62 (159). (ii) Medium black. (iii) 27.7.1960; 21.6.1961; 23.6.1962. (iv) (a) 2 ploughings +2 to 4 harrowings. (b) Drilling for 60 (35); Dibbling for others. (c) 90 Kg/ha. for 60 (35); 67 Kg/ha. for others. (d) 30 cm. between rows for 60 (35); 30 cm.×15 cm. for others. (e) —. (v) 12.4 C.L./ha. of F.Y.M. for 62 (159); Nil for others. (vi) AH-32. (vii) Unirrigated for 60 (35), 61 (202); Irrigated for 62 (159). (viii) 1 to 2 interculturings. (ix) 96 cm.; 145 cm.; 84 cm. (x) 8.11.1960; 14.10.1961; 1 to 6.11.1962.

## 2. TREATMENTS ;

All combinations of (1) and (2)

(1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=11.2 Kg/ha.(2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=22.4 and P<sub>2</sub>=44.8 Kg/ha.N and P<sub>2</sub>O<sub>5</sub> were applied by drilling.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 11.0 m.×7.3 m. (b) 9.1 m.×5.5 m. for 60(35); 9.8 m.×6.1 m. for others. (v) 91 cm.×91 cm. for 60 (35); 91 cm.×91 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Attack of aphids and tikka for 60 (35), 62 (159); No incidence for 61 (202). (iii) Yield of pods. (iv) (a) 1959-1962 (modified in 1960). (b) No. (c) Results of combined analysis are given under 5. (v) Kim and Thasra. (vi) Nil. (vii) Error variances are homogeneous and interaction is absent.

## 5. RESULTS :

(i) 2189 Kg/ha. (ii) 280.4 Kg/ha. (55 d.f. made up of pooled error and various components of Treatments×years. (iii) Main effect of P alone is significant. (iv) Av. yield of pod in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	Mean
N <sub>0</sub>	2114	2127	2368	2203
N <sub>1</sub>	2068	2195	2264	2176
Mean	2091	2161	2316	2189

C.D. for P marginal means=162.2 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 63(186), 64(120), 65(14).****Site :- Trial-cum-Demons. Farm, Kim.****Type :- 'M'.**Object :—To find out the suitable dose of  $P_2O_5$  for Groundnut.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M for 63(186), 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. for other. (ii) Medium black. (iii) 4.7.63, 21.7.64 and 6.7.65. (iv) (a) 2 to 3 harrowings. (b) Drilling. (c) 49.4 Kg/ha. for 65, 45 Kg/ha. for others. (d) 61 cm. between rows. (e) N.A. (v) 11.2 Kg/ha. of N+12.4 C.L./ha. of F.Y.M. (vi) Bochala. (vii) Irrigated. (viii) 2 to 4 interculturings. (ix) N.A. (x) 3.12.63, 30.11.64 and 25.11.65.

**2. TREATMENTS :**

4 levels of  $P_2O_5$  as Super :  $P_1=22.4$ ,  $P_2=44.8$ ,  $P_3=67.2$  and  $P_4=89.7$  Kg/ha.  
 $P_2O_5$  applied by line placement on 4.7.63.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 8.0 m. (b) 9.1 m. × 5.5 m. (v) 61 cm. × 122 cm. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory for 64, Normal for others. (ii) Attack of aphids and tikka, spraying of endrin and dusting of sulphur. (iii) Pods yield. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) Kholwad. (vi) N.A. (vii) As the error variances are heterogeneous and interaction is absent, the results of the individual experiments are given below.

**5. RESULTS :****63(186)**

(i) 2003 Kg/ha. (ii) 191.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$P_1$	$P_2$	$P_3$	$P_4$
Av. yield	1942	2135	1965	1969

**64(120)**

(i) 495 Kg/ha. (ii) 50.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$P_1$	$P_2$	$P_3$	$P_4$
Av. yield	511	490	493	487

**65(14)**

(i) 1663 Kg/ha. (ii) 266.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$P_1$	$P_2$	$P_3$	$P_4$
Av. yield	1545	1619	1744	1744

**Crop :- Groundnut (Kharif).****Ref :- Gj. 60(173), 61(203), 62(171).****Site :- Trial-cum-Demons. Farm, Kim.****Type :- 'M'.**Object :—To find out the requirements of  $P_2O_5$  with and without  $N_2$  for Groundnut.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 62(171), N.A. for others. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. for 62(171); N.A. for others. (ii) Medium black. (iii) 14.7.1960, 29.6.1961, 7.7.1962. (iv) (a) 2 to 3 harrowings. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) Nil. (v) Nil for 61(203), 12.4 C.L./ha. of F.Y.M. for others. (vi) AH-32. (vii) Irrigated. (viii) 1 interculturing and 1 to 2 weedings. (ix) 103 cm. for 60(173), N.A. for others. (x) 26.12.1960; 12.11.1961; 24.11.1962.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=11.2$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a)  $11.0\text{ m} \times 7.3\text{ m}$ . (b)  $9.1\text{ m} \times 5.5\text{ m}$ . (v)  $91\text{ cm.} \times 91\text{ cm.}$  (vi) Yes.

## 4. GENERAL :

(i) Good for 61(173), Normal for others. (ii) Attack of aphids and *tikka* for 60(173). Endrex was sprayed, Attack of *tikka* for 61(203). Spraying of fine sulphur. No incidence for 62(171) but spraying of basudin and dusting of sulphur was done. (iii) Yield of pods. (iv) (a) 1960-1962. (b) No. (c) Results of combined analysis are given under 5. (v) Kholwad and Thasra. (vi) Heavy rains after sowing affected the germination for 61(203). (vii) Error Variances are homogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

(i) 1059 Kg/ha. (ii) 152.2 Kg/ha. (55 d.f. made up of pooled error and various components of Treatments  $\times$  years interaction). (iii) Main effect of N is significant and that of P is highly significant. (iv) Av. yield of pod in Kg/ha.

	$P_0$	$P_1$	$P_2$	Mean
$N_0$	953	1018	1073	1015
$N_1$	991	1113	1207	1104
Mean	972	1066	1140	1059

C.D. for N marginal means = 72.0 Kg/ha.

C.D. for P marginal means = 88.2 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 61(30), 62(84), 64(204), 65(151)**

**Site :- Agri. Res. Stn., Kothara.**

**Type :- 'M'.**

Object :- To find out the optimum dose of N, P and K with F.Y.M. for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 61(30), *Jowar*, *Bajra* Groundnut for others. (b) *Bajra* for 61(30), *Jowar* for others. (c) 12.4 C.L./ha. of F.Y.M + 44.8 Kg/ha. of  $P_2O_5$  for 62(84), 11.2 Kg/ha. of N + 12.4 C.L./ha. of F.Y.M. for 65(151), Nil for others. (ii) Medium black. (iii) 3.7.61, 10.7.62, 16.6.64 and 20.7.65. (iv) (a) 2 ploughings and 2 harrowings. (b) Drilling. (c) 90 Kg/ha. for 61(30), 62(84) and 99 Kg/ha. for others. (d) 46 cm. (e) N.A. (v) N.A. (vi) AH-32. (vii) Unirrigated. (viii) 2 weedings. (ix) 87 cm. for 61(30), 28 cm. for 62(84), 73 cm. for 64(204) and 33 cm. for 65(151). (x) 9.12.61, 9.11.62, 5.10.64 and 30.10.65.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

(3) 3 levels of  $K_2O$  as Mur. Pot. :  $K_0=0$ ,  $K_1=22.4$  and  $K_2=44.8$  Kg/ha.

**Sub-plot treatments :**

2 levels of F.Y.M. :  $F_0=0$  and  $F_1=12.4$  C.L./ha.

## 3. DESIGN :

(i) Split-plot Confd. (ii) (a) 3 blocks/replication, 9 main-plots/block, 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a)  $11.0\text{ m} \times 6.4\text{ m}$ . (b)  $9.1\text{ cm} \times 4.6\text{ cm}$ . (v)  $91\text{ cm.} \times 91\text{ cm.}$  (vi) N.A.



## 4. GENERAL :

(i) Normal. (ii) Slight attack of tikka and aphids. (iii) Pods yield. (iv) (a) 1961 to 1965 (modified in 1965. Failed in 1963). (b) No. (c) N.A. (v) and (vi) N.A. (vii) Expt. in 1965 was modified to  $2 \times 3^3$  confd. in stead of split-plot confd. Hence the results of 65(151) are given separately. As the error variances are heterogeneous and interaction is absent, the results of the individual expts. are given below.

## 5. RESULTS :

## 61(30)

(i) 2105 Kg/ha. (ii) (a) 130.2 Kg/ha. (b) 169.3 Kg/ha. (iii) Main effect of P and interactions  $N \times P$ ,  $K \times F$  are highly significant. Main effect of N and interactions  $N \times K$ ,  $P \times K$  are significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	2093	2202	2012	1959	2081	2267	1992	2108	2207	2102
F <sub>1</sub>	2026	2202	2094	1957	2170	2195	2170	2146	2006	2107
Mean	2059	2202	2053	1958	2125	2231	2081	2127	2106	2105
K <sub>0</sub>	2166	2105	1971	1896	2246	2100				
K <sub>1</sub>	2113	2290	1979	2030	2002	2350				
K <sub>2</sub>	1899	2211	2208	1948	2127	2243				
P <sub>0</sub>	1719	2159	1996							
P <sub>1</sub>	2099	2173	2104							
P <sub>2</sub>	2360	2275	2058							

C.D. for P or N marginal means = 92.0 Kg/ha.

C.D. for  $N \times P$ ,  $N \times K$  or  $P \times K$  means = 112.8 Kg/ha.

C.D. for F means at the same level of K = 169.2 Kg/ha.

C.D. for K means at the same level of F = 167.65 Kg/ha.

## 62(84)

(i) 1250 Kg/ha. (ii) (a) 338.1 Kg/ha. (b) 232.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1307	1276	1167	1298	1322	1129	1172	1293	1285	1250
F <sub>1</sub>	1269	1351	1131	1201	1370	1180	1189	1269	1293	1250
Mean	1288	1313	1149	1250	1346	1155	1181	1281	1289	1250
K <sub>0</sub>	1194	1240	1108	1246	1222	1074				
K <sub>1</sub>	1419	1327	1096	1182	1433	1228				
K <sub>2</sub>	1252	1373	1242	1321	1383	1162				
P <sub>0</sub>	1319	1250	1180							
P <sub>1</sub>	1202	1474	1361							
P <sub>2</sub>	1343	1216	905							

## 64(204)

(i) 961 Kg/ha. (ii) (a) 180.6 Kg/ha. (b) 72.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	954	905	981	953	880	1007	1007	867	967	947
F <sub>1</sub>	935	957	1033	981	907	1037	1063	881	981	975
Mean	944	931	1007	967	893	1022	1035	874	974	961
K <sub>0</sub>	1010	1082	1013	997	1062	1046				
K <sub>1</sub>	782	830	1011	857	784	981				
K <sub>2</sub>	1041	882	998	1047	834	1040				
P <sub>0</sub>	968	919	1014							
P <sub>1</sub>	907	798	975							
P <sub>2</sub>	958	1076	1033							

65(151)

(i) 387 Kg/ha. (ii) 26.2 Kg/ha. (iii) None of the effects is significant. (iv) Av yield of pod in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	390	377	361	374	432	322	375	377	376
N <sub>1</sub>	397	357	367	389	355	377	387	361	374
N <sub>2</sub>	420	417	392	417	404	409	391	429	410
Mean	402	384	373	393	397	369	384	389	387
F <sub>0</sub>	387	389	376	392	370	390			
F <sub>1</sub>	418	378	371	395	424	348			
K <sub>0</sub>	386	397	397						
K <sub>1</sub>	445	355	391						
K <sub>2</sub>	376	399	333						

**Crop :- Groundnut (Kharif).****Ref :- Gj. 65(46).****Site :- Agri. Res. Stn., Talod.****Type :- 'M'.**

Object :- To study the effect of Di-ammonium Phosphate compound to Ammo. Sulphate Phosphate on Groundnut.

**1. BASAL CONDITIONS :**(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> + 67.2 Kg/ha. of N. (ii) Sandy. (iii) 6.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 148.2 Kg/ha. (d) 61 cm. × 5 cm. (e) 1. (v) Nil. (vi) Samarala-1 (medium) (vii) Unirrigated. (viii) 1 weeding, 1 interculturing. (ix) 38 cm. (x) 19.10.65.**2. TREATMENTS :**

4 Sources of N and P at 11.2 and 28.0 Kg/ha. respectively.

S<sub>0</sub>=No fertilizer, S<sub>1</sub>=Di-Ammo. Phos, S<sub>2</sub>=Ammo. Sul. Phos., and S<sub>3</sub>=A/S + Super.**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 10.4 m. × 6.1 m. (b) 9.1 m. × 4.9 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Root rot and collar rot attack. (iii) Pods and tops yield. (iv) (a) 1965-Contd. (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 1523 Kg/ha. (ii) 126.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	M <sub>0</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>
Av. yield	1534	1565	1501	1494

**Crop :- Groundnut (Kharif).**  
**Site :- Agri. Res. Stn., Talod.**

**Ref :- 65(47).**  
**Type :- 'M'.**

Object :—To find out the effect of Gypsum and Superphosphate on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of N.A. (ii) Sandy. (iii) 6.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 148.3 Kg/ha. (d) 61 cm. × 5 cm. (e) 1. (vi) Nil. (vii) Samarala-1 (medium). (viii) Unirrigated. (ix) 1 weeding, 1 interculturing. (x) 38 cm. (xi) 18.10.65.

## 2. TREATMENTS :

6 manurial treatments : M<sub>1</sub>=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>2</sub>=22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Triple Super, M<sub>3</sub>=Gypsum @ 95.3 Kg/ha., M<sub>4</sub>=Calcium Chloride @ 61.6 Kg/ha., M<sub>5</sub>=Cal. Chloride @ 61.6 Kg/ha.+Sulphur @ 17.9 Kg/ha. and M<sub>6</sub>=Sulphur at the rate 17.9 Kg/ha.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) 10.4 m. × 6.1 m. (v) 9.1 m. × 4.9 m. (vi) 61 cm. × 61 cm. (vii) Yes.

## 4. GENERAL :

(i) Satisfactory. (ii) Root rot and collar rot attack. (iii) Pods and tops yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) N.A. (vi) Development of pods was affected due to want of last rains. (vii) N.A.

## 5. RESULTS :

(i) 1530 Kg/ha. (ii) 212.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	M <sub>5</sub>	M <sub>6</sub>
Av. yield	1382	1420	1449	1496	1715	1717

**Crop :- Groundnut (Kharif).**  
**Site :- Agri. Res. Stn., Talod.**

**Ref :- Gj. 65(49).**  
**Type :- 'M'.**

Object :—To study the effect of N when applied as top dressing on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 67.2 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Sandy. (iii) 7.7.65. (iv) (a) 2 harrowings. (b) Dibbling. (c) 148.3 Kg/ha. (d) 61 cm. × 5 cm. (e) 1. (v) Nil. (vi) Samarala-1 (medium). (vii) Unirrigated. (viii) 1 weeding and 1 interculturing. (ix) 38 cm. (x) 18.10.65.

## 2. TREATMENTS :

6 manurial treatments :  $M_0$ =Control (no manure),  $M_1$ =11.2 Kg/ha. of N at sowing,  $M_2$ =Farmer's method (1) : 22.4 Kg/ha. of  $P_2O_5$  at sowing,  $M_3$ =Farming method, (2) : 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  at sowing,  $M_4$ =22.4 Kg/ha. of  $P_2O_5$  at sowing +11.2 Kg/ha. of N one month after sowing,  $M_5$ =11.2 Kg/ha. of N one month after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 13.7 cm.  $\times$  3.7 m. (b) 12.5 m  $\times$  2.4 m. (v) 61.0 cm.  $\times$  61.0 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of root rot and color rot. (iii) Pods yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) N.A. (vi) Development of pods was affected for want of last rains. (vii) Nil.

## 5. RESULTS :

(i) 949 Kg/ha. (ii) 259.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
Av. yield	914	1017	934	1007	975	847

**Crop :- Groundnut (Kharif).**

**Ref :- Agri. Res. Stn., Talod.**

**Ref :- Gj. 60(63).**

**Type :- 'M'.**

Object :- To find out the effect of N, P, K and F.Y.M. on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Bajri*. (c) 12.4 C.L./ha. of F.Y.M. (ii) Sandy. (iii) 22.6.60. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 34 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) Nil. (vi) A.H. 32. (vii) Unirrigated. (viii) 4 interculturings. (ix) 34 cm. (x) 14.10.60.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2) and (3)

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.
- (2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=56.0$  and  $P_2=112.1$  Kg/ha.
- (3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=112.1$  and  $K_2=224.2$  Kg/ha.

**Sub-plot treatments :**

2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5604.2$  Kg/ha.

F.Y.M. spreaded on 14.6.1960, N spreaded on 22.6.1960,  $P_2O_5$  applied on 16.6.1960 and  $K_2O$  applied on 8.8.1960.

## 3. DESIGN :

(i) Split-plot. confd. (ii) (a) 3 blocks/replication, 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of collar rot. (iii) Yield of pods. (iv) (a) 1957—1960. (b) No. (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1007 Kg/ha. (ii) (a) 275.7 Kg/ha. (b) 238.8 Kg/ha. (iii) Main effect of N alone is significant. (iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	Mean
F <sub>0</sub>	1021	898	1110	896	1089	1044	1102	1002	925	1010
F <sub>1</sub>	936	860	1215	1057	1026	928	1033	945	1033	1004
Mean	979	879	1162	976	1058	986	1068	973	979	1007
K <sub>0</sub>	958	1024	1221	1185	966	1052				
K <sub>1</sub>	1040	878	1001	818	1124	977				
K <sub>2</sub>	938	734	1265	924	1084	929				
P <sub>0</sub>	815	1020	1092							
P <sub>1</sub>	1028	896	1250							
P <sub>2</sub>	1093	721	1145							

C.D. for N marginal means=224.9 Kg/ha.

**Crop :- Groundnut (*Kharif*).**

**Ref :- Gj. 62(146).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'M'.**

Object :-To study the effect of N, Super and Digested bone meal on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar*. (c) Nil. (ii) Sandy loam. (iii) 12.7.62. (iv) (a) 2 ploughings and 1 harrowing. Dibbling. (c) 67 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) A.H.-32. (vii) Irrigated. (viii) 4 weedings and 4 interculturings. (ix) 67 cm. (x) 9.11.62.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 sources of P<sub>2</sub>O<sub>5</sub> at 22.4 Kg/ha. ; S<sub>1</sub>=Super and S<sub>2</sub>=Digested B.M.

(2) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.8 m.×11.0 m. (b) 9.1 m.×7.3 m. (v) 183 cm. ×183 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of aphids. Nicotin Sul. was sprayed. (iii) Pods yield. (iv) (a) and (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 833 Kg/ha. (ii) 58.7 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	Mean
S <sub>1</sub>	789	848	804	814
S <sub>2</sub>	817	861	882	853
Mean	803	854	843	833

**Crop :- Groundnut (Kharif).****Ref :- Gj. 60(146), 61(149), 62(145), 63(169).****Site :- Trial-cum-Demons. Farm, Thasra.****Type :- 'M'.**

Object :-To find out the optimum manurial dose for Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton+Groundnut ; N.A. *Jowar* ; Wheat. (c) N.A. for 60(146), 61(149) ; Nil for 62(145) ; 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 63(169). (ii) Sandy loam. (iii) 25.6.1960 ; 1.7.1961 ; 8.7.1962 ; 3.7.1963. (iv) (a) 1 ploughing+1 to 3 harrowings. (b) Drilling. (c) 99 Kg/ha. for 63(169) ; 67 Kg/ha. for others. (d) 30 cm. between rows for 60(146) ; 46 cm. between rows for others. (e) Nil. (v) Nil. (vi) AH-32. (vii) Unirrigated for 61(149) ; irrigated for others. (viii) 2 to 3 weedings+1 to 6 interculturings. (ix) N.A. ; 73 cm. ; 67 cm. ; 102 cm. (x) 27.10.1960 ; 23.10.1961 ; 11.11.1962 ; 6.11.1963.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=11.2$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4 (one replication vitiated for 60(146) completely). (iv) (a) 18.3 m.×3.7 m. for 60(146) ; 12.2 m.×5.5 m. for others. (b) 16.5 m.×2.4 m. for 60(146) ; 10.4 m.×3.7 m. for others. (v) 91 cm.×61 cm. for 60(146) ; 91 cm.×91 cm. for others. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of aphids and heavy attack of collar rot disease for 60(146). *Tobacco* dicoxion was sprayed ; attack of aphids and *tikka* for 61(149). *Tobacco* dicoxion was sprayed. Attack of aphids for 62(145). Nicotin sulphate sprayed. No incidence for 63(169). (iii) Yield of pods. (iv) (a) 1960—1963. (b) No. (c) Results of combined analysis given under 5. (v) *Kholwad* and Kim. (vi) Nil. (vii) Error variances are heterogeneous and (Treatments×years) interaction is present.

**5. RESULTS :**

(i) 851 Kg/ha. (ii) 57.3 Kg/ha. (15 d.f. made up of various components of Treatments×years interaction). (iii) Main effects of N and P are significant. (iv) Av. yield of pod in Kg/ha.

	$P_0$	$P_1$	$P_2$	Mean
$N_0$	594	312	856	754
$N_1$	823	968	1052	948
Mean	708	890	954	851

C.D. for N marginal mean = 49.7 Kg/ha.

C.D. for P marginal mean = 61.2 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 62(69), 63(74).****Site :- Irrigation-cum-Demons. Farm, Umrjala.****Type :- 'M'.**

Object :-To study the effect of different micronutrients on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 18.7.1962 ; 13.7.1965. (iv) (a) One ploughing+two harrowings. (b) Drilling. (c) 90 Kg/ha. for 62(69) ; 67 Kg/ha. for 63(74). (d) 46 cm. between rows. (e) Nil. (v) Nil. (vi) AH-32 for 62(69) ; Samarala-1 for 63(74). (vii) Unirrigated. (viii) Nil. (ix) 35 cm. ; 46 cm. (x) 15.11.1962 ; 7.11.1963.

## 2. TREATMENTS :

6 micronutrient treatments :  $M_0$ =Control,  $N_1$ =140 gm/ha. of Molybdenum as sodium molybdate,  $M_2$ =22.4 Kg/ha. of Boron as borax,  $M_3$ =9.0 Kg/ha. of Copper as C/S,  $M_4$ =3.4 Kg/ha. of Manganese as manganese sulphate and  $M_5$ =3.4 Kg/ha. of Zinc as zinc sulphate.

Micronutrients were applied in two sprayings : 1st spraying one month after sowing and 2nd two months after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 2. (iv) (a) and (b) 20.1 m.  $\times$  10.1 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Below normal for 62(69) ; Normal for 63(74). (ii) Attack of aphids. (iii) Yield of pods. (iv) (a) 1962—1963. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) As the error variances are heterogeneous and (Treatments  $\times$  years) interaction is absent, results of the individual years are presented below.

## 5. RESULTS :

## 62(69)

(i) 319 Kg/ha. (ii) 47.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
Av. yield	410	274	306	296	322	308

## 63(74)

(i) 629 Kg/ha. (ii) 114.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$M_0$	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$
Av. yield	692	581	568	667	712	556

**Crop :- Groundnut (Kharif).**

**Site :- M.A.E. Centre, Umralla.**

**Ref :- Gj. 62(MAE).**

**Type :- 'M'.**

Object :—Type IX—To compare the effects of nitrophosphates by ODDA and PEC process at different levels and different methods of application on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) As per treatments, (ii) Medium black. (iii) 16.7.1962. (iv) (a) to (e) N.A. (v) N.A. (vi) AH-32. (vii) to (ix) N.A. (x) 4.11.1962.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)+4 extra treatments.

(1) 3 types of phosphates :  $P_1$ =Super,  $P_2$ =ODDA and  $P_3$ =PEC.

(2) 3 levels of fertilizers :  $L_1$ =13.4 Kg/ha. of N+11.8 Kg/ha. of  $P_2O_5$ ,  $L_2$ =26.9 Kg/ha. of N+23.6 Kg/ha. of  $P_2O_5$  and  $L_3$ =53.8 Kg/ha. of N+47.1 Kg/ha. of  $P_2O_5$ .

(3) 3 methods of application :  $M_1$ =Broadcasting at puddling time,  $M_2$ =Dipping the seeds in mud slush mixed with fertilizers before transplanting and  $M_3$ =In the form of pellets to be placed near the roots.

## Extra treatments :

4 levels of N as A/S :  $N_0$ =0,  $N_1$ =13.4,  $N_2$ =26.9 and  $N_3$ =53.8 Kg/ha.

## 3. DESIGN :

(i)  $3^3+4$  Fact. confd. (ii) (a) 13 plots/block ; 3 blocks/replication. (b) N.A. (iii) 2. (iv) (a) 9.1 m.  $\times$  5.5 m. (b) 7.3m.  $\times$  3.7 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Satisfactory. (ii) Severe attack of aphids in the first fortnight of August and attack of tikka in Sept. (iii) Yield of pods. (iv) (a) to (c) No. (v) (a) N.A. (b) Nil. (vi) Due to scanty rains the condition of the crop was not good. (vii) Nil.

## 5. RESULTS :

- (i) 393 Kg/ha. (ii) 111.4 Kg/ha. (iii) Interaction P×L alone is highly significant. (iv) Av. yield of pod in Kg/ha.

$N_0=344, N_1=354, N_2=365, N_3=396$  Kg/ha.

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	Mean
P <sub>1</sub>	336	460	433	350	391	488	410
P <sub>2</sub>	507	379	316	417	409	376	401
P <sub>3</sub>	359	366	488	427	361	425	404
Mean	401	402	412	398	387	430	405
M <sub>1</sub>	404	436	354				
M <sub>2</sub>	410	359	391				
M <sub>3</sub>	387	410	493				

C.D. for body of P×L table=129.9 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 62, 63, 64, 65 (S.F.T.) for Rajkot and (65) S.F.T. for other centres.**

**Site :- Rajkot, Bhavnagar, Junagadh, Baroda, Surat,**

**Kaira and Mehsana (c. f.).**

**Type :- 'M'.**

**Object :-**Type A<sub>1</sub>—To study the response curve of important cereal, cash and oilseed crops to Nitrogen applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

- (i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar and Junagarh, deep black for Baroda and Surat; grey brown for Kaira and Mehsana. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

- O =Control (no manure).  
 N<sub>1</sub> =16.8 Kg/ha. of N.  
 N<sub>2</sub> =33.6 Kg/ha. of N.  
 P<sub>1</sub> =33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>1</sub> =16.8 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>1</sub> =33.6 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.

## 3. DESIGN :

- (i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conducts the trials in one revenue circle on thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 36 trials in a year, 9 on a Kharif cereal, 9 on a rabice real, 9 on cash crops 6 on an oilseed crop and 36 on a leguminous crop. One-third of the number of trials conducted (other than leguminous) are of type A<sub>1</sub> and another one-third are of type A<sub>2</sub> and the remaining one-third are of type A<sub>3</sub>. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per village. (iii) (a) 1/100 ha. (b) 1/200 ha. (iv) Yes.



## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1965 to 1966 for others, (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

**Rajkot****S.F.T. (62)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	-38	-12	51	58	101	143	150	36.6

Control mean=941 Kg/ha. ; No. of trials=13.

**S.F.T. (63)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	36	101	93	132	165	235	248	33.0

Control mean=563 Kg/ha. ; No. of trials=12.

**S.F.T. (64)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	72	200	68	182	296	368	416	40.5

Control mean=949 Kg/ha. ; No. of trials=11.

**S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	-443	-440	-447	-412	-381	-339	-289	47.3

Control mean=1069 Kg/ha. ; No. of trials=7.

**Bhavnagar****SFT (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	16	92	68	216	343	200	256	106.1

Control mean= 227 Kg/ha. No. of trials=5.

**Junagarh****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	137	280	225	350	272	397	494	48.3

Control mean=947 Kg/ha. ; No. of trials=8.

**Baroda****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	218	526	411	604	899	1125	1292	196.4

Control mean=1451 Kg/ha. ; No. of trials=5.

**Surat****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>1</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	85	121	106	151	206	216	282	28.2

Control mean=507 Kg/ha. ; No of trials=8

**Kaira****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>2</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	8	97	76	95	113	240	448	73.5

Control mean=323 Kg/ha. ; No. of trials=5

**Mehsana****S.F.T. (65)**

Treatment	N <sub>1</sub>	N <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>1</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	95	210	158	203	257	392	412	64.4

Control mean=826 Kg/ha ; No. of trials=8

**Crop :- Groundnut (*Kharif*). Ref :- Gj. S.F.T. (62), (63), (64), (65) for Rajkot and (65) (SFT) for other centres.**

**Site :- Rajkot, Bhavnagar, Junagadh, Baroda, Surat Kaira, and Mehsana (*c. f.*),**

**Type :- 'M'.**

Object :—Type A<sub>2</sub>—To study response curves of important cereal, cash and oilseed crops to phosphorus applied singly and in combination with other nutrients.

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Deltaic alluvium for Bhavnagar, Junagadh and Rajkot, Deep black for Baroda and Surat and grey brown for Kaira and Mehsana. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

O =Control (no manure)  
 N<sub>1</sub> =16.8 Kg/ha. of N  
 P<sub>1</sub> =33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 P<sub>2</sub> =67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>1</sub> =16.8 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>1</sub>P<sub>2</sub> =16.8 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.  
 N<sub>2</sub>P<sub>2</sub>K<sub>1</sub> =33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O.  
 N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

**3. DESIGN :**

Same as in Type A<sub>1</sub> on page 569.

**4. GENERAL :**

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1965 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

**5. RESULTS :****Rajkot****S.F.T. (62)**

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	—6	91	88	93	129	203	232	45.7

Control mean=949 Kg/ha. ; No. of trials=12

**S.F.T. (63)**

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	68	101	202	133	161	204	228	35.0

Control mean=560 Kg/ha ; No. of trials=11

**SFT (64)**

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	203	120	139	282	334	477	524	37.5

Control mean=1015 Kg/ha. ; No. of trials=12

**S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	51	45	115	114	122	203	227	35.9

Control mean=509 Kg/ha. ; No. of trials=6.

**Bhavnagar****S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	94	103	111	107	134	—12	143	77.5

Control mean=218 Kg/ha. ; No. of trials=5.

**Junagadh****S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	174	111	262	299	347	418	548	70.9

Control mean=912 Kg/ha. ; No. of trials=6.

**Baroda****S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	360	294	541	569	725	930	1112	100.4

Control mean=1473 Kg/ha. ; No. of trials=4.

**Kaira****S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	161	131	229	223	198	284	318	44.3

Control mean=249 Kg/ha. ; No. of trials=5.

**Mehsana****S.F.T. (65)**

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	160	162	248	115	341	322	361	93.4

Control mean=975 Kg/ha. ; No. of trials=7.

## Surat

## S.F.T. (65)

Treatment	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>1</sub> P <sub>2</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	11	29	83	109	145	167	302	43.1

Control mean=547 Kg/ha. ; No. trials=8.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 62(S.F.T).**

**Site :- Rajkot, (c.f.).**

**Type :- 'M'.**

Object :—Type A<sub>2</sub>—To study response curves of important cereal, cash and oilseed crops to Phosphorus applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O=Control (no manure).

N<sub>1</sub>=16.8 Kg/ha. of N

P<sub>1</sub>=33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

P<sub>2</sub>=67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>1</sub>P<sub>1</sub>=16.8 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>1</sub>P<sub>2</sub>=16.8 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>2</sub>P<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>

N<sub>2</sub>P<sub>1</sub>K<sub>2</sub>=33.6 Kg/ha. of N+67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+67.2 Kg/ha. of K<sub>2</sub>O

## 3. DESIGN :

Same as in Type A<sub>1</sub> on page 569.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 only. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Treatment :	N <sub>1</sub>	P <sub>1</sub>	P <sub>2</sub>	N <sub>1</sub> P <sub>1</sub>	N <sub>1</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>2</sub>	N <sub>2</sub> P <sub>1</sub> K <sub>2</sub>	S.E.
Av. response of Pods in Kg/ha.	188	164	197	256	306	392	458	63.2

Control mean=970 Kg/ha. ; No. of trials=9

**Crop :- Groundnut (Kharif). Ref :- Gj. S.F.T. (62), (63), (64), (65) for Rajkot, 65(S.F.T.)**

**Site :- Rajkot, Bhavnagar, Junagadh, Baroda, Surat,  
Kaira and Mehsana (c.f.).**

**for other Centres.  
Type :- 'M'.**

Object :—Type A<sub>3</sub>—To study the response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium for Rajkot, Bhavnagar, and Junagadh deep black for Baroda and Surat and grey brown for Kaira and Mehsana. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

## 2. TREATMENTS :

O	= Control (no manure)
N <sub>1</sub>	= 16.8 Kg/ha. of N
K <sub>1</sub>	= 22.4 Kg/ha. of K <sub>2</sub> O
K <sub>2</sub>	= 44.8 Kg/ha. of K <sub>2</sub> O
N <sub>1</sub> K <sub>1</sub>	= 16.8 Kg/ha. of N+22.4 Kg/ha. of K <sub>2</sub> O
N <sub>1</sub> K <sub>2</sub>	= 16.8 Kg/ha. of N+44.8 Kg/ha. of K <sub>2</sub> O
N <sub>2</sub> K <sub>2</sub>	= 33.6 Kg/ha. of N+44.8 Kg/ha. of K <sub>2</sub> O
N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	= 16.8 Kg/ha. of N+22.4 Kg/ha. of P <sub>2</sub> O <sub>5</sub> +22.4 Kg/ha. of K <sub>2</sub> O

N applied as A/S, P<sub>2</sub>O<sub>5</sub> as Super and K<sub>2</sub>O as Mur. Pot.

## 3. DESIGN :

Same as in type A<sub>1</sub> on page 569.

## 4. GENERAL :

(i) to (iii) N.A. (iv) (a) 1962 to 1966 for Rajkot and 1965 to 1966 for others. (b) and (c) N.A. (v) to (vii) N.A.

## 5. RESULTS :

Rajkot

## SFT (62)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	9	-90	-18	53	72	102	184	35.9

Control mean=983 Kg/ha. ; No. of trials=13

## S.F.T. (63)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	88	64	115	115	158	133	199	34.0

Control mean=554 Kg/ha. ; No. of trials=11

## S.F.T. (64)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	195	86	137	222	269	410	453	36.7

Control yield=1012 Kg/ha. ; No. of trials=12

## S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	146	90	74	148	154	1005	260	66.6

Control mean=412 Kg/ha. ; No. of trials=7

Bhavnagar

## S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	63	96	41	84	187	50	224	67.9

Control mean=227 Kg/ha. ; No. of trials=5

Junagarh

## S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	123	142	234	190	291	355	321	76.5

Control mean=975 Kg/ha. ; No. of trials=6

**Baroda**

S.F.T. (65)

Treatment :	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	312	209	356	867	780	606	927	256.4

Control mean=1324 Kg/ha., No. of trials=5

**Surat**

S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	-1	-8	66	102	127	186	224	30.4

Control mean=484 Kg/ha. ; No. of trials=8

**Raira**

S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	104	408	131	359	189	277	321	131.0

Control mean=316 Kg/ha. ; No. of trial=5.

**Mehsana**

S.F.T. (65)

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	137	135	247	210	348	347	412	45.6

Control mean=788 Kg/ha. ; No. of trials=8

**Crop :- Groundnut (Kharif).**  
**Site :- Rajkot (c.f.).**

**Ref :- Gj. 62(S.F.T.)**  
**Type :- 'M'.**

Object :-Type A<sub>3</sub>—To study the response curves of important cereal, cash and oilseed crops to Potash applied singly and in combination with other nutrients.

1. BASAL CONDITIONS :

(i) N.A. (ii) Deltaic alluvium. (iii) to (vi) N.A. (vii) Irrigated. (viii) to (x) N.A.

2. TREATMENTS :

O=Control (no manure)

N<sub>1</sub>=16.8 Kg/ha. of N.

K<sub>1</sub>= 33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

K<sub>2</sub>=67.2 Kg/ha. P<sub>2</sub>O<sub>5</sub>.

N<sub>1</sub>K<sub>1</sub>=16.8 Kg/ha. of N+33.6 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>K<sub>2</sub>=16.8 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.

N<sub>2</sub>K<sub>2</sub>= 33.6 Kg/ha. of N+67.2 Kg/ha. of K<sub>2</sub>O.

N<sub>1</sub>P<sub>1</sub>K<sub>1</sub>=16.8 Kg/ha. of N+33.6 Kg/ha. of P<sub>2</sub>O<sub>5</sub>+33.6 Kg/ha. of K<sub>2</sub>O.

3. DESIGN :

Same as in type A<sub>1</sub> on page

4. GENERAL :

(i) to (iii) N.A. (iv (a) 1962 —only. (b) and (c) N.A. (v) to (vii) N.A.

5. RESULTS :

Treatment	N <sub>1</sub>	K <sub>1</sub>	K <sub>2</sub>	N <sub>1</sub> K <sub>1</sub>	N <sub>1</sub> K <sub>2</sub>	N <sub>2</sub> K <sub>2</sub>	N <sub>1</sub> P <sub>1</sub> K <sub>1</sub>	S.E.
Av. response of Pods in Kg/ha.	-88	-21	-43	-21	-88	-88	-65	—

Control mean=379 Kg/ha. ;No. of trials=1.

**Crop :- Groundnut (Kharif).**  
**Site :- Rajkot (c.f.).**

**Ref :- Gj. 63(SFT).**  
**Type :- 'M'.**

**Object :-** Type C To study the response of Groundnut to different fertilizers of N P applied individually and in combination.

**1. BASAL CONDITIONS :**

(i) (a) to (c) N.A. (ii) Deltaie Alluvium. (iii) to (vi) N.A. (vii) Unirrigated. (viii) to (x) N.A.

**2. TREATMENTS :**

O=Contral (no manure).

$P_1=33.6$  Kg/ha. of  $P_2O_5$  as Super.

$P_1''=33.6$  Kg/ha. of  $P_2O_5$  as mono-ammonim. phos.

$N_1P_1=33.6$  Kg/ha. of  $P_2O_5$  as Super + 7.7 Kg/ha. of N as A/S.

$P_2''=67.2$  Kg/ha. of  $P_2O_5$  as Super.

$P_2=67.2$  Kg/ha. of  $P_2O_5$  as mono-ammonium phos.

$N_2P_2=67.2$  Kg/ha. of  $P_2O_5$  as Super + 15.4 Kg/ha. of N as A/S.

**3. DESIGN :**

(i) and (ii) The district has been divided into four agriculturally homogeneous zones and one field assistant has been posted in each zone. The field assistant conduct the trials in one revenue circle or thana in the zone and the circle/thana is changed once in two years within the same zone. Each field assistant is required to conduct 31 trails in a year, 8 on a Kharif cereal, 8 on Rabi cereal, 8 on cash crops, 4 on oil seed crop and 3 on a leguminous crop. Half the number of trials conducted are of type A and the other half of type B crops other than the legumes. The three trials on legumes are of type C. Residual effects of phosphate application are studied on type C trials in two out of the four zones in each district every year. The above experiments are laid out in randomly located fields in randomly selected villages in each of the 4 zones at the rate of one experiment per vil.az. (iii) (a) 1/98.8 ha. (b) 1/197.7 ha. (iv) Yes.

**4. GENERAL :**

(i) to (vii) N.A.

Treatment	$P_1$	$P_1''$	$N_1P_1$	$P_2$	$P_2''$	$N_2P_2$	S.E.
Av. response of pods in Kg/ha	173	169	316	285	234	328	73.4

Control mean=837 Kg/ha. ; no of trials=7

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 60(124), 61(128), 62(180), 64(127).**

**Site :- Dry Farming Res. Stn., Jam Khambalia.**

**Type :- 'MV'.**

**Object :-**To find out the optimum dose of N, P and K for different varieties of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Gram for 64 (127), Bajra for 65 (145), Jowar for others. (c) 12.4 C.L/ha. of F.Y.M. for 64 (127), 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  for 65 (145), Nil for others. (ii) Medium black. (iii) 8.7.60, 28.6.61, 10.7.62, 3.7.64 and 27.7.65. (iv) (a) 1 to 2 ploughings and 2 harrowings, (b) Dibbling. (c) 90 Kg/ha. for 60 (124), 56 Kg/ha. for 61 (128), 67 Kg/ha. for 62 (180) and (127) and 46 Kg/ha. for 65 (145). (d) 61 cm. for 60 (124), 91.5 cm, for othes. (e) N.A. (v) Nil. (vi) As per trzatment. (vii) Unirrigated. (viii) 2 interculturing. (ix) 69 cm. for 60 (124), 103.5m. for 61 (126), 55 cm. for 62 (180), 4.6 cm. for 64 (127), 29 cm. for 65 (145). (x) 10.10.60, 1.11.61, 1.11.62, 14.10.64 and 27.10.65.

**2. TREATMENTS :**

**Main-plot treatments**

All combinations of (1), (2) and (3)

(1) 3 varieties :  $V_1$ =Local,  $V_2$ =AK-12-24 and  $V_3$ =AH-32.

(2) 3 levels of N as A/S ;  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.

(3) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.

**Sub-plot treatments**

2 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$  and  $K_1=44.8$  Kg/ha. applied as top dressing and  $P_2O_5$  drilled at sowing.

## 3. DESIGN :

- (i) Split-plot. (ii) (a) 9 main-plots/block, 3 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 1,  
(iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm.

## 4. GENERAL :

- (i) Poor for 60 (124), 62 (180), 65 (145), Normal for other. (ii) Attack of aphids and tikka, Folidol sprayed.  
(iii) Pods yield. (iv) (a) 1960 to 1965, (b) No. (c) Nil. (v) and (vi) Nil. (vii) Sub-plot error variances  
are heterogeneous. Therefore results of individual years are presented under 5. Expt. for 1965 failed.

## 5. RESULTS :

## 60(124)

- (i) 224 Kg/ha. (ii) (a) 218.1 Kg/ha. (b) 107.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield  
Pods of in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	197	230	241	231	278	160	210	236	223
N <sub>1</sub>	196	229	166	146	216	229	196	198	196
N <sub>2</sub>	287	219	251	216	266	274	185	319	252
Mean	227	226	219	198	253	221	197	251	224
K <sub>0</sub>	161	196	234	161	229	201			
K <sub>1</sub>	293	156	204	235	277	241			
P <sub>0</sub>	232	219	143						
P <sub>1</sub>	257	177	325						
P <sub>2</sub>	192	282	189						

## 61(118)

- (i) 881.0 Kg/ha. (ii) (a) 262.2 Kg/ha. (b) 243.0 Kg/ha. (iii) None of the effects is significant. (iv) Av.  
yield of Pods in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	850	1004	768	692	832	1098	874	874	874
N <sub>1</sub>	891	642	891	927	565	932	835	781	808
N <sub>2</sub>	954	1121	809	877	1053	953	1007	915	961
Mean	898	922	823	832	817	994	905	857	881
K <sub>0</sub>	904	1028	783	862	853	1000			
K <sub>1</sub>	892	816	863	802	781	988			
P <sub>0</sub>	850	873	773						
P <sub>1</sub>	868	895	688						
P <sub>2</sub>	976	998	1008						

## 62(180)

- (i) 326 Kg/ha. (ii) (a) 120.3 Kg/ha. (b) 53.6 Kg/ha. (iii) Main effect of K is highly significant, and in-  
teraction N-P-K is significant. (iv) Av. yield of Pods in Kg/ha.



	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	315	393	387	351	355	389	332	398	365
N <sub>1</sub>	264	313	311	247	348	293	283	309	296
N <sub>2</sub>	300	320	328	284	323	341	270	362	316
Mean	293	342	342	294	342	341	295	356	326
K <sub>0</sub>	253	308	324	278	290	317			
K <sub>1</sub>	333	376	360	310	394	365			
P <sub>0</sub>	235	299	348						
P <sub>1</sub>	352	387	287						
P <sub>2</sub>	292	340	391						

C.D. for K marginal means=30.5 Kg/ha.

64(127)

(i) 599 Kg/ha. (ii) (a) 157.0 Kg/ha. (b) 77.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Pods in Kg/ha.

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	615	631	680	658	576	692	652	632	642
N <sub>1</sub>	586	555	569	600	530	580	582	558	570
N <sub>2</sub>	533	620	599	647	595	510	563	605	584
Mean	578	602	616	635	567	594	599	598	599
K <sub>0</sub>	598	597	602	644	574	579			
K <sub>1</sub>	558	607	630	626	600	609			
P <sub>0</sub>	678	568	659						
P <sub>1</sub>	512	576	613						
P <sub>2</sub>	544	662	576						

**Crop :- Groundnut (Kharif). Ref :- Gj. 60(116), 61(89), 62(190), 63(192), 64(139),**

**Site :- Dry Farming Res. Stn., Rajkot.**

**Type :- 'MV'.**

Object :- To study the response of N, P and K on different varieties of Groundnut.

1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra-Jowar or Cotton for 60 (116), 61 (89) and Groundnut Cotton for others. (b) Jowar for 60 (116), 65 (139), Cotton for others (c) 12.4 C.L. for 62 (190), 63 (192), Nil for others. (ii) Medium black. (iii) 26.6.60, 9.7.61, 15.7.62, 12.7.63 and 3.7.64. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 56 Kg/ha. for 60 (116), 61 (89), 61.8 Kg/ha. for 62 (190), 67 Kg/ha. for 63 (192) and 74 Kg/ha. for 65 (139). (d) 46 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 60 (116), 61 (89), 64 (139) and Nil for others. (vi) As per treatment. (vii) Unirrigated. (viii) 2 to 3 weedings. (ix) 47 cm. for 60(116), 56 cm. for 61(89), 40.5 and for 62 (190), 50.5 cm. for 63 (192) and 76.5 cm. for 64 (139). (x) 2nd fortnight of Oct.

## 2. TREATMENTS :

**Main-plot treatments**

All combinations of (1), (2) and (3)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=22.4$  and  $N_2=44.8$  Kg/ha.(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=22.4$  and  $P_2=44.8$  Kg/ha.(3) 3 Varieties of Groundnut .  $V_1=Local$ ,  $V_2=AK-12-24$ ,  $V_3=AH-32$ .**Sub-plot treatments**2 levels of Pot. Sul. :  $K_0=0$ ,  $K_1=44.8$  Kg/ha.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 3 blocks/replication, 9 main plots/block and 2 sub-plots/main-plot. (b) 38.4 m.  $\times$  32.9 cm. (iii) 1. (iv) (a) 11.0 m.  $\times$  6.4 m. (b) 9.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Good for 63 (192), 64 (139), below normal for others. (ii) Attack of aphids ; 10% B.H.C. was dusted. (iii) Pods yield. (iv) (a) 1960 to 1964. (b) No. (c) Nil. (v) Jamkhambalia. (vi) Nil. (vii) Error variances for sub-plots are heterogeneous.

## 5. RESULTS :

60(116)

(i) 423 Kg/ha. (ii) (a) 57.6 Kg/ha. (b) 11.8 Kg/ha. (iii) Main effect of K is highly significant and interaction  $V \times N$  is significant. (iv) Av. yield of pods in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$V_1$	$V_2$	$V_3$	Mean
$K_0$	418	392	438	411	426	412	443	394	411	416
$K_1$	434	413	443	404	445	440	435	436	420	430
Mean	426	403	440	408	435	426	439	415	415	423
$V_1$	449	419	449	435	467	415				
$V_2$	487	346	412	431	407	407				
$V_3$	341	445	460	359	431	456				
$P_0$	422	366	435							
$P_1$	448	418	440							
$P_2$	407	426	445							

C.D. for K marginal means = 6.7 Kg/ha.

C.D. for means in the body of  $V \times N$  table = 81.3 Kg/ha.

61(89)

(i) 763 Kg/ha. (ii) (a) 138.1 Kg/ha. (b) 65.8 Kg/ha. (iii) Main effects of N and P are highly significant while that of V is significant. (iv) Av. yield of pods in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$V_1$	$V_2$	$V_3$	Mean
$K_0$	632	787	893	647	782	884	668	777	868	771
$K_1$	623	746	898	611	781	876	665	742	860	756
Mean	627	767	896	629	781	880	667	760	864	763
$V_1$	518	680	802	526	722	752				
$V_2$	692	696	891	676	743	860				
$V_3$	672	924	995	686	879	1027				
$P_0$	573	641	674							
$P_1$	647	747	950							
$P_2$	663	912	1064							

C.D. for N, P or V marginal means = 112.6 Kg/ha.

62(190)

(i) 196 Kg/ha. (ii) (a) 62.0 Kg/ha. (b) 55.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
K <sub>0</sub>	189	218	179	212	188	186	215	166	205	195
K <sub>1</sub>	185	204	203	244	168	180	191	160	241	198
Mean	187	211	191	228	178	183	203	163	223	196
V <sub>1</sub>	177	212	220	230	192	186				
V <sub>2</sub>	170	196	123	185	171	133				
V <sub>3</sub>	214	225	230	268	171	230				
P <sub>0</sub>	218	243	223							
P <sub>1</sub>	178	189	167							
P <sub>2</sub>	165	201	183							

63(192)

(i) 1339 Kg/ha. (ii) (a) 230.1 Kg/ha. (b) 112.0 Kg/ha. (iii) Main effects of V and P are highly significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
K <sub>0</sub>	1191	1398	1433	1223	1353	1446	1446	1178	1398	1341
K <sub>1</sub>	1261	1352	1401	1191	1295	1528	1412	1190	1412	1338
Mean	1226	1375	1417	1207	1324	1487	1429	1184	1405	1339
V <sub>1</sub>	1319	1422	1546	1288	1478	1521				
V <sub>2</sub>	1092	1261	1199	997	1127	1428				
V <sub>3</sub>	1267	1442	1506	1336	1367	1512				
P <sub>0</sub>	1138	1173	1310							
P <sub>1</sub>	1287	1383	1302							
P <sub>2</sub>	1253	1569	1639							

C.D. for V or P marginal means=187.7 Kg/ha.

64(139)

(i) 1475 Kg/ha. (ii) (a) 132.2 Kg/ha. (b) 131.9 Kg/ha. (iii) Main effect of V and interaction V×N are highly significant. (iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	Mean
K <sub>0</sub>	1416	1478	1473	1404	1461	1502	1437	1583	1347	1456
K <sub>1</sub>	1558	1476	1451	1412	1553	1520	1513	1549	1423	1495
Mean	1487	1477	1462	1408	1507	1511	1475	1566	1385	1475
V <sub>1</sub>	1350	1616	1460	1353	1536	1536				
V <sub>2</sub>	1709	1531	1458	1578	1491	1629				
V <sub>3</sub>	1403	1284	1468	1293	1494	1368				
P <sub>0</sub>	1333	1430	1461							
P <sub>1</sub>	1574	1510	1437							
P <sub>2</sub>	1554	1491	1488							

C.D. for V marginal mean = 107.9 Kg/ha.

C.D. for means in the body of V x N table = 186.7 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 63(58), 64(10), 65(114).****Site :- Agri. Res. Stn., Amreli.****Type :- 'C'.**

Object :- To study the effect of different times of harvesting on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra*. (c) 22.4 Kg/ha. of N for 63 (58), 64 (10), 44.8 Kg/ha. of N for 65 (114) and 22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 6.7.63, 3.7.64 and 24.7.65. (iv) (a) 1 ploughing and 2 to 3 harrowings. (b) Drilling. (c) 67 Kg/ha. (d) 46 cm. x 5 cm. (e) N.A. for 63 (58), 64 (10) and 1 to 2 for 65 (114). (v) 11.2 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ , for 64 (10) 12.4 C.L./ha. of F.Y.M. also. (v) AH-32. (vii) Unirrigated. (viii) 2 to 3 interculturing. (ix) 56 cm. for 63 (58), 73 cm. for 64 (10) and 60 cm. for 65 (114). (x) As per treatments.

**2. TREATMENTS :**3 times of harvesting :  $T_1=90$ ,  $T_2=100$  and  $T_3=110$  days after sowing.**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) —. (iii) 2 for 63 (58), 4 for 64 (10), and 7 for 65 (114). (iv) (a) 10.1 m. x 10.1 m. for 63(58), 64 (10); 20.1 m. x 7.3 m. for 65(114)(b) 8.2 m. x 8.2 m. for 63(58), 64(10); 18.3 m. x 5.5 m. for 65(114) (v) 91 cm. x 91 cm.

**4. GENERAL :**

(i) Normal. (ii) Slight attack of aphids and tikka. (iii) Yield of Pods. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and (Treatments x years) interaction is absent.

**5. RESULTS :****63(58)**

(i) 1611 Kg/ha. (ii) 94.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	1495	1606	1733

**64(10)**

(i) 846 Kg/ha. (ii) 51 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	686	922	931

C.D. = 88.2 Kg/ha.

**65(114)**

(i) 312 Kg/ha. (ii) 91.1 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Pods in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	491	237	209

C.D. = 106.1 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 61(23), 63(4), 64(11)****Site :- Agri. Res. Stn., Amreli.****Type :- 'C'.**

Object :- To study the effect of different row spacings on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* for 61(23), 63(4) and *Bajra* for 64(11). (c) 12.4 C.L/ha. of F.Y.M. (ii) Medium black. (iii) 20.7.61, 11.7.63 and 1.7.64. (iv) (a) 1 ploughing and harrowing. (b) Drilling. (c) 90 Kg/ha. for 61(23), 67 Kg/ha. for 63(4) and 74 Kg/ha. for 64(11). (d) As per treatments. (e) N.A. (v) 12.4 C.L/ha. of F.Y.M. (vi) AH-32. (vii) Unirrigated. (viii) 3 to 4 interculturings. (ix) 33 cm. for 61(23), 56 cm. for 63(4), 73 cm. for 64(11). (x) 3rd week of Oct.

## 2. TREATMENTS :

3 row spacings :  $S_1=30$ ,  $S_2=38$  and  $S_3=46$  cm.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 11.0 m × 6.4 m. (b) 9.1 m × 4.6 m. (v) 91 cm × 91 cm.

## 4. GENERAL :

(i) Poor for 63(4), Normal for others. (ii) Attack of aphids and tikka, 10% B.H.C. was dusted. (iii) Pods yield. (iv) (a) 1961 to 64 (Expt. failed in 1962). (b) No. (v) and (vi) N.A. (vii) As the error variances are heterogeneous and (Treatments × years) interaction is absent, the results of the individual experiments are presented under 5.

## 5. RESULTS :

## 61(23)

(i) 775 Kg/ha. (ii) 67.1 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of pods in Kg/ha.

Treatment	$S_1$	$S_2$	$S_3$
Av. yield	752	807	767

## 63(4)

(i) 1302 Kg/ha. (ii) 196.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of pods in Kg/ha.

Treatment	$S_1$	$S_2$	$S_3$
Av. yield	1400	1254	1251

## 64(11)

(i) 909 Kg/ha. (ii) 152.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Average yield of pods in Kg/ha.

Treatment	$S_1$	$S_2$	$S_3$
Av. yield	1016	881	830

**Crop :- Groundnut (*Kharif*).**

**Site :- Agri. Res. Stn., Amreli.**

**Ref :- Gj. 65(113).**

**Type :- 'C'.**

Object : -To find out suitable spacing for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) 12.4 C.L/ha. of F.Y.M. (ii) Medium black. (iii) 24.7.65. (iv) (a) 1 harrowing. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. (vi) S.B. XI. (vii) Unirrigated. (viii) 4 interculturings. (ix) 60.2 cm. (x) 3.11.65.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 2 row spacings :  $R_1=45.7$  and  $R_2=61.0$  cm.

(2) 2 within row spacings :  $S_1=5.1$  and  $S_2=10.2$  cm.

(3) 2 types of rows :  $T_1$ =Paired and  $T_2$ =single row.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) Nil. (iii) 4. (iv) (a) 7.3 m. × 12.2 m. for  $R_1$  and 7.6 m. × 12.2 m. for  $R_2$ . (b) 6.1 m. × 10.4 m. (v) 60 cm. × 90 cm. and 75 cm. × 90 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Mild attack of aphids. (iii) Pods yield. (iv) (a) 1965—1967. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 680 Kg/ha. (ii) 175.4 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of Pods in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	Mean
R <sub>1</sub>	643	789	752	680	716
R <sub>2</sub>	691	597	640	648	644
Mean	667	693	696	664	680
T <sub>1</sub>	684	708			
T <sub>2</sub>	650	678			

**Crop :- Groundnut (*Kharif*).**

**Site :- Agri. Res. Stn., Amreli.**

**Ref :- Gj. 60(5).**

**Type :- 'C'.**

Object :—To find out the economic seed rate and spacing for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar*. (c) 12.4 C.L/ha. of F.Y.M. (ii) Medium black. (iii) 27.6.60. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) Nil. (vi) A.H. 32. (vii) Unirrigated. (viii) 3 interculturings. (ix) 40 cm. (x) 6.10.60.

## 2. TREATMENTS :

**Main-plot treatments :**

3 row spacings : S<sub>1</sub>=46, S<sub>2</sub>=61 and S<sub>3</sub>=76 cm.

**Sub-plot treatments :**

3 seed rates : R<sub>1</sub>=67, R<sub>2</sub>=90 and R<sub>3</sub>=112 Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 9.1 m. (b) 10.4 m. × 7.3 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Yield of Pods. (iv) (a) 1956-60. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1592 Kg/ha. (ii) (a) 192.7 Kg/ha. (b) 182.4 Kg/ha. (iii) None of the effects is significant. (iv) Average yield of Pods in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	1563	1466	1469	1499
R <sub>2</sub>	1679	1649	1458	1595
R <sub>3</sub>	1761	1593	1693	1682
Mean	1668	1569	1540	1592

**Crop :- Groundnut (Kharif). Ref :- 60(110), 61(38), 62(178), 64(129), 65(73).**

**Site :- Dry Farming Res. Stn., Jamkhambalia.**

**Type :- 'C'.**

Object :- To study the effect of different spacings and seed rates on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra* for 60(110), Gram for 64(129), *Jowar* for others. (c) 12.4 C.L/ha. of F.Y.M. for 64(129), 22.4 Kg/ha. for 65(73) and Nil for others. (ii) Medium black soil. (iii) 7.7.60, 16.7.61, 8.7.62, 3.7.64, 31.7.65. (iv) (a) 2 to 3 ploughings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 12.4 C.L/ha. F.Y.M. for 62(178), 12.4 C.L/ha. of F.Y.M. for 65(73) and Nil for others. (vi) A.K. 12-24. (vii) Un-irrigated. (viii) 2 to 3 interculturings. (ix) 69 cm. for 60(110), N.A. for 61(38), 54 cm. for 62(178) 4.8 cm. for 64(129), 29 cm. for 65(73). (x) 10.11.60, 3.11.61, 27.10.62, 14.10.64, 29.10.65.

**2. TREATMENTS :**

**Main-plot treatments :**

3 row spacings :  $S_1=30$ ,  $S_2=61$  and  $S_3=91$  cm.

**Sub-plot treatments :**

3 seed rates :  $R_1=34$ ,  $R_2=45$  and  $R_3=56$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 13.7 m.  $\times$  9.1 m. (b) 12.0 m.  $\times$  7.3 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Not satisfactory for 60(110) and 65(73), Normal for others. (ii) Attack of aphids and tikka. Folial was dusted. (iii) Yield of Pods. (iv) (a) 1960 to 1965. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Sub-plot error variances are heterogeneous.

**5. RESULTS :**

**60(110)**

(i) 267 Kg/ha. (ii) (a) 111.5 Kg/ha. (b) 99.4 Kg/ha. (iii) Main effect of S alone is significant. (iv) Average yield of Pods in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	205	315	242	254
$R_2$	254	372	253	293
$R_3$	225	300	234	253
Mean	228	329	243	267

C.D. for S marginal mean=82.8 Kg/ha.

**61(38)**

(i) 296 Kg/ha. (ii) (a) 28.8 Kg/ha. (b) 23.6 Kg/ha. (iii) Main effect of S is highly significant. Main effect of R and interaction  $S \times R$  are significant. (iv) Average yield of Pods in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	356	261	269	295
$R_2$	350	243	264	286
$R_3$	370	299	252	307
Mean	359	268	262	296

C.D. for R marginal means =16.1 Kg/ha.

C.D. for S marginal means =21.4 Kg/ha.

C.D. for S means at the same level of R=31.1 Kg/ha.

C.D. for R means at the same level of S=27.9 Kg/ha.

**62(178)**

(i) 568 Kg/ha. (ii) (a) 178 Kg/ha. (b) 131 Kg/ha. (iii) Main effect of S and interaction  $S \times R$  are highly significant. (iv) Average yield of Pods in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	787	741	505	678
S <sub>2</sub>	486	376	401	421
S <sub>3</sub>	567	577	675	606
Mean	613	565	527	568

C.D. for S marginal means = 132.2 Kg/ha.

C.D. for S means at the same level of R = 182.4 Kg/ha.

C.D. for R means at the same level of S = 75.6 Kg/ha.

64(129)

(i) 813 Kg/ha. (ii) (a) 188 Kg/ha. (b) 96 Kg/ha. (iii) Main effect of R is highly significant and that of S is significant. (iv) Average yield of Pods in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	Mean
S <sub>1</sub>	821	910	995	909
S <sub>2</sub>	771	813	822	802
S <sub>3</sub>	688	698	801	729
Mean	760	807	873	813

C.D. for S marginal means = 139.6 Kg/ha.

C.D. for R marginal means = 65.3 Kg/ha.

65(73)

(i) 278 Kg/ha. (ii) (a) 96 Kg/ha. (b) 89 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	310	302	261	291
R <sub>2</sub>	350	285	261	299
R <sub>3</sub>	229	236	269	245
Mean	296	274	264	278

**Crop :- Groundnut (Kharif). Ref :- Gj. 60(109), 61(40), 62(179), 64(128), 65(74).**

**Site :- Dry Farming Res. Stn., Jamkhambalia.**

**Type :- 'C'.**

**Object :-** To study the effect of different intercultural on Groundnut.

### 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Gram for 64(128), *Bajra* for 65(74), *Jowar* for others. (c) 12.4 C.L/ha. of F.Y.M. for 64(128), 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(74). Nil for others. (ii) Medium black. (iii) 6.7.60, 26.6.61, 10.7.62, 5.7.64 and 25.7.65 (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 90 Kg/ha. for 60(109), 45 Kg/ha. for 61(40), 74 Kg/ha. for 62(179), 17 Kg/ha. for 64(128) and 49 Kg/ha. for 65(74). (d) 61 cm. between row. (e) N.A. (v) 12.4 C.L/ha. of F.Y.M. for 62(179), 64(128), 65(74) and Nil for others. (vi) A.K. 12-24. (vii) Unirrigated. (viii) As per treatments. (ix) 69 cm. for 60(109), N.A. for 61(40), 54 cm. for 62(179), 48 cm. for 64(128) and 29 cm. for 65(74). (x) 11.10.60 ; 1.11.61 ; 30.10.62 ; 19.10.64 and 27.10.65.

### 2. TREATMENTS :

4 cultural treatments : C<sub>0</sub>=Control, C<sub>1</sub>=1 interculture 6 weeks after sowing, C<sub>2</sub>=2 intercultural 4 and 6 weeks after sowing and C<sub>3</sub>=3 intercultural 4 and 6 weeks after sowing.

### 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.



## 4. GENERAL :

(i) Not satisfactory for 62(179), 65(74) and normal for others. (ii) Attack of aphids and *tikka* was observed. (iii) Pods yield. (iv) (a) 1960 to 65. (b) No. (c) Nil. (v) Rajkot. (vi) Nil. (vii) Scanty rains for 62(179), 64(128), N.A. for others. Error variances are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

## 60(109)

(i) 417 Kg/ha. (ii) 138.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	420	411	396	439

## 61(40)

(i) 731 Kg/ha. (ii) 210 Kg/ha. (iii) Treatment differences are not significant. (iv) Av yield of pod in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	805	626	805	687

## 62(179)

(i) 295 Kg/ha. (ii) 21.5 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of pod in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	270	293	316	302

C.D. = 26.48 Kg/ha.

## 64(128)

(i) 1117 Kg/ha. (ii) 101 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	1105	1113	1124	1127

## 65(74)

(i) 394 Kg/ha. (ii) 109 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	449	416	360	351

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 62(68), 63(70), 64(14).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'C'.**

**Object :-** To see the effect of rhizobium culture on the yield of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 63(70), Cotton-Groundnut for others. (b) Groundnut for 63(70), Cotton for others. (c) 22.4 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 62(68), 12.4 C.L./ha. of F.Y.M. + 67.2 Kg/ha. of N + 89.7 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 63(70), Nil for 64(14). (ii) Medium black. (iii) 14.7.1962, 5.6.1963, 5.7.1964. (iv) (a) 1 to 2 ploughings + 2 to 3 harrowings. (b) Dibbling. (c) 90 Kg/ha. for 62(68), 67 Kg/ha. for others. (d) 61 cm.  $\times$  5 cm. for 62(68), 61 cm.  $\times$  10 cm. for others. (e) Nil. (v) 12.4 C.L./ha. of F.Y.M. for 62(68), Nil for 63(70), 11.2 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 64(14). (vi) S.B. XI (Bunch type) for 64(14), AK-12-24 for others. (vii) Unirrigated. (viii) 8 weedings for 62(68), 2 to 4 interculturings for others. (ix) 60 cm., 57 cm., 137 cm. (x) 12.10.1962, 30.10.1963, 13.10.1964.

## 2. TREATMENTS :

2 seed treatments : T<sub>0</sub> = Untreated seed (Control) and T<sub>1</sub> = Seeds treated with rhizobium culture.

## 3. DESIGN :

(i) Paired plot. (ii) (a) 2. (b) N.A. (iii) 12. (iv) (a) and (b) 13.7 m.  $\times$  3.7 m. (v) Nil. (vi) Yes.

## 4. GENEKAL :

(i) Normal for 63(70), Unsatisfactory for others. (ii) Attack of aphids, *utkka*, color rot and root rot for 64(14), 22.4 to 33.6 Kg/ha. of B.H.C. dusted, Attack of aphids and *tikka* for others. (iii) Yield of pods. (iv) (a) 1962-1964. (b) No. (c) Nil. (v) Thasra. (vi) Shortage of rains affected the crop for 62(68), Heavy and continuous rains affected the crop for 64(14). (vii) As the variances are heterogeneous and interaction of Treatments and years is absent, results of the individual years are presented below.

## 5. RESULTS :

## 62(68)

(i) 524 Kg/ha. (ii) 90.0 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>
Av. yield	511	538

## 63(70)

(i) 1553 Kg/ha. (ii) 119.5 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>
Av. yield	1514	1592

## 64(14)

(i) 245 Kg/ha. (ii) 34.3 Kg/ha. (iii) Treatment difference is significant. (iv) Average yield of pods in Kg/ha.

Treatment	T <sub>0</sub>	T <sub>1</sub>
Av. yield	264	226

C.D.=30.8 Kg/ha.

**Crop :- Groundnut (*Kharif*).**  
**Site :- Central Exptl. Stn., Junagadh.**

**Ref :- Gj. 60(67), 61(20).**  
**Type :- 'C'.**

Object :-To find out the best spacing for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 30.6.1960, 1.7.1961. (iv) (a) One ploughing. (b) Dibbling. (c) N.A. (d) As per treatments. (e) Nil. (v) 12.4 C.L/ha. of F.Y.M. for 60(67), Nil for 61(20). (vi) Punjab-1 (spreading type). (vii) Unirrigated. (viii) 2 to 3 interculturings+1 to 3 weedings. (ix) 82 cm., 154 cm. (x) 26.10.1960, 22.10.1961.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 4 row spacings : R<sub>1</sub>=30, R<sub>2</sub>=46, R<sub>3</sub>=61 and R<sub>4</sub>=91 cm.

(2) 3 plant spacings : P<sub>1</sub>=5, P<sub>2</sub>=10 and P<sub>3</sub>=15 cm.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 12. (b) 43.9 m.×27.4 m. (iii) 4. (iv) (a) 13.7 m.×3.7 m. (b) 13.7 m.×1.8 m. (v) 91 cm. on either side. (vi) Yes.

## 4. GENERAL :

(i) Normal for 60(67), Unsatisfactory for 61(20). (ii) Attack of *tikka*. (iii) Yield of pods. (iv) (a) 1951-1961 (modified in 1957). (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Heavy rains throughout the season affected the growth for 61(20). (vii) Results of combined analysis include the results of expts. numbers 57(48), 58(38) and 59(87). Errors are homogeneous and interaction is present.

## 5. RESULTS :

(i) 842 Kg/ha. (ii) 154.4 Kg/ha. (44 d.f. made up of various components of Treatments×years interaction). (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
P <sub>1</sub>	812	848	883	840	846
P <sub>2</sub>	758	873	895	836	841
P <sub>3</sub>	814	795	922	822	838
Mean	795	839	900	833	842

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 60(66), 61(21).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'C'.**

Object :- To find out the best spacing for Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) Nil for 60(66), N.A. for 61(121). (ii) Medium black. (iii) 25.6.1960, 2.7.1961. (iv) (a) 1 ploughing. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 2. (v) 12.4 C.L./ha. of F.Y.M. for 60(66), Nil for 61(121). (vi) A.K.—12-24 (Bunch type). (vii) Unirrigated. (viii) 3 interculturings and 2 weedings. (ix) 82 cm., 154 cm. (x) 9.10.1960, 6.10.1961.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 4 row spacings : R<sub>1</sub>=30, R<sub>2</sub>=46, R<sub>3</sub>=61 and R<sub>4</sub>=91 cm.

(2) 3 plant spacings : P<sub>1</sub>=5, P<sub>2</sub>=10 and P<sub>3</sub>=15 cm.

**3. DESIGN :**

(i) Fact. in R.B.D. (ii) (a) 12. (b) 43.9 m. × 19.2 m. for 60(66), 43.9 m. × 27.4 m. for 61(21). (iii) 4. (iv) (a) 19.2 m. × 3.7 m. for 60(66); 13.7 m. × 3.7 m. for 61(21). (b) 18.3 m. × 1.8 m. for 60(66), 13.7 m. × 1.8 m. for 61(21). (v) 46 cm. × 91 cm. for 60(66), 91 cm. on either side for 61(21). (vi) Yes.

**4. GENERAL:**

(i) Good for 60(66), Unsatisfactory for 61(21). (ii) Moderate attack of *tikka*. (iii) Yield of pods. (iv) (a) 1955-1961 (modified in 1957). (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Heavy rains throughout the season affected the crop for 61(21). (vii) Expts. numbers 57(49), 58(39), 59(86) have also been included for giving combined results. Errors are homogeneous and Treatments × years interaction is present.

**5. RESULTS :**

(i) 971 Kg/ha. (ii) 145.6 Kg/ha. (44 d.f. made up of various components of Treatments × years interaction). (iii) None of the effect is significant. (iv) Av. yield of Pod in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	Mean
P <sub>1</sub>	876	1036	1059	937	977
P <sub>2</sub>	978	987	1020	898	971
P <sub>3</sub>	968	1027	968	899	966
Mean	941	1017	1016	911	971

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(210).**

**Site :- Oilseeds Res. Farm, Junagadh.**

**Type :- 'C'.**

Object :- To study the proper time of harvesting for Groundnut (spreading type).

## 1. BASAL CONDITIONS :

- (i) (a) Groundnut-Cotton (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ .  
 (ii) Medium black. (iii) 23.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.3 Kg/ha.  
 (d) 91.5 cm.  $\times$  5.1 cm. (e) 1 seed/dibble. (v) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) Gondal 221-31.  
 (vii) Unirrigated. (viii) 3 interculturings. (ix) 59 cm. (x) As per treatments.

## 2. TREATMENTS :

3 times of harvesting :  $H_1=110$ ,  $H_2=120$  and  $H_3=130$  days after sowing.

Treatments  $H_2$  and  $H_3$  were harvested on 20.11.65 only because there was scarcity of rains in Aug., Sept., October and as such there was no scope for getting more yield for it.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 7. (iv) (a) 17.7 m.  $\times$  7.3 m. (b) 15.9 m.  $\times$  5.5 m. (v) 91.5 cm.  $\times$  91.5 cm. (vi) Yes.

## 4. GENERAL :

- (i) Very poor due to shortage of rains in Aug., Sept. and October. (ii) Attack of aphids and tikka.  
 (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) Nil. (c) N.A. (v) N.A. (vi) Scanty rains. (vii) N.A.

## 5. RESULTS :

- (i) 189 Kg/ha. (ii) 12.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$H_1$	$(H_1+H_2)$
Av. yield	194	186

**Crop :- Groundnut (Kharif).**

**Site :- Central Exptl. Stn., Junagadh.**

**Ref :- Gj. 63(68).**

**Type :- 'C'.**

Object :- To find out the proper time of harvesting for Groundnut.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M.+67.2 Kg/ha. of N+89.7 Kg/ha. of  $P_2O_5$ .  
 (ii) Medium black. (iii) 30.6.63. (iv) (a) 2 harrowings. (b) Dibbling. (c) 90 Kg/ha. (d) 61 cm.  $\times$  10 cm.  
 (e) N.A. (v) Nil. (vi) S.B. XI-(bunch type). (vii) Unirrigated. (viii) 4 interculturings. (ix) 57 cm. (x) As per treatments.

## 2. TREATMENTS :

3 times of harvesting :  $T_1=90$ ,  $T_2=100$  and  $T_3=110$  days after sowing.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 2. (iv) (a) and (b) 13.4 m.  $\times$  7.3 m. (v) Nil. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Attack of aphids and tikka. Dusting of Gammoxine and Sulphur. (iii) Pods and tops yield.  
 (iv) (a) 1963-only. (b) No. (c) Nil. (v) Amreli. (vi) and (vii) Nil.

## 5. RESULTS :

- (i) 1655 Kg/ha. (ii) 196.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	1647	2034	1283

**Crop :- Groundnut (Kharif).**

**Site :- Oilseeds Research Farm, Junagadh.**

**Ref :- Gj. 65(212).**

**Type :- 'C'.**

Object :- To ascertain the potentiality on yield with maximum plant stand.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 24.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha. (d) As per treatments. (e) 1. (v) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) Gondal 221-31. (vii) Unirrigated. (viii) 2 interculturings, 3 weedings. (iv) 59 cm. (x) 1.11.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 spacings :  $S_1=61.0$  cm.  $\times$  10.2 cm.,  $S_2=91.5$  cm.  $\times$  10.2 cm. and  $S_3=91.5$  cm.  $\times$  5.1 cm.

(2) 2 types of rows :  $R_1=$ Single and  $R_2=$ Paired row.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 7.6 m.  $\times$  10.4 m. for  $S_1$  and 8.5 m.  $\times$  10.4 m. for  $S_2$  and  $S_3$ . (b) 6.1 m.  $\times$  9.1 m. for  $S_1$  and 6.4 m.  $\times$  9.1 m. for  $S_2$  and  $S_3$ . (v) 76.5 cm.  $\times$  61.0 cm. for  $S_1$ ; 106.7 cm.  $\times$  61.03 cm. for  $S_2$  and  $S_3$ . (vi) Yes.

## 4. GENERAL :

(i) Below normal. (ii) Nil. (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) No. (c) N.A. (v) N.A. (vi) Shortage of rains in September affected the yield. (vii) N.A.

## 5. RESULTS :

(i) 658 Kg/ha. (ii) 405.4 Kg/ha. (iii) Main effect of S alone is significant. (iv) Av. yield of pod in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	133	1197	1079	803
$R_2$	269	501	769	513
Mean	201	849	924	658

C.D. for S marginal means = 411.8 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(209).**

**Site :- Oilseeds Res. Farm, Junagadh.**

**Type :- 'C'.**

Object :- To find out the proper time of harvesting for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 28.7.65. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 89.7 Kg/ha. (d) 61.0 cm.  $\times$  5.1 cm. (e) 1. (v) 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (vi) S.B. XI. (vii) Unirrigated. (viii) 3 interculturings. (ix) 59 cm. (x) As per treatments.

## 2. TREATMENTS :

3 dates of harvesting :  $H_1=$ Harvesting after 90 days of sowing,  $H_2=$ Harvesting after 100 days of sowing,  $H_3=$ Harvesting after 110 days of sowing.

Treatment  $H_1$  harvested on 21.10.65. Treatment ' $H_3$ ' was harvested at the same time as treatment  $H_2$  (31.10.65) because there was scarcity of rains in Aug., Sept. and October. due to which there was no further scope of growth for C.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 7. (iv) (a) 20.1 m.  $\times$  7.3 m. (b) 18.3 m.  $\times$  5.5 m. (v) 91.5 cm.  $\times$  91.5 cm. (vi) Yes.

## 4. GENERAL :

(i) Due to shortage of rains the crop suffered very much. (ii) Attack of aphids and tikka. (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) No. (c) Nil. (v) N.A. (vi) Scanty rains. (vii) N.A.

## 5. RESULTS :

(i) 635 Kg/ha. (ii) 51.0 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	H <sub>1</sub>	(H <sub>2</sub> +H <sub>3</sub> )
Av. yield	638	633

**Crop :- Groundnut (Kharif). Ref :- Gj. 60(98), 61(77), 62(105), 63(110), 64(41).**

**Site :- Dry Farming Res. Stn., Rajkot.**

**Type :- 'C'.**

Object :- To study the effects of interculturing on the yield of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra-Jowar or Cotton. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 26.6.1960, 8.7.61, 15.7.62, 8.7.63 and 2.7.64. (iv) (a) 1 to 2 ploughings and harrowing. (b) Drilling. (c) 56 Kg/ha. (d) 61 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 60(98), 61(77), 63(110). Nil for others. (vi) AK-12-24. (vii) Unirrigated. (viii) 2 to 3 weedings. (ix) 47 cm. for 60(98), 56 cm. for 61(77), 40 cm. for 62(105). (x) 2nd fortnight of Oct. 50 cm. for 63(110) and 76 cm. for 64(41).

## 2. TREATMENTS :

4 cultural treatments : C<sub>0</sub>=Control (no interculture), C<sub>1</sub>=1 interculture 6 weeks after sowing, C<sub>2</sub>=2 intercultures 4 and 6 weeks after sowing and C<sub>3</sub>=3 intercultures. 4, 6 and 8 weeks after sowing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) 29.3 m. × 9.1 m. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal for 60(98), 63(110), 64(41), not satisfactory for others. (ii) Attack of aphids and 10% B.H.C. was dusted for 60(98), 61(77), 62(105), nil for others. (iii) Pods yield. (iv) (a) 1960 to 1964. (b) No. (c) Results of combined analysis are given under 5. (v) Jam Khambalia. (vi) Nil. (vii) Errors variances are homogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 840 Kg/ha. (ii) 136.3 Kg/ha. [12 d.f. made up of Treatments × years interaction]. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	865	830	830	836

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 60(97), 61(90), 62(104), 63(109).**

**Site :- Dry Farming Res. Stn., Rajkot.**

**Type :- 'C'.**

Object :- To study the optimum spacing and seed rate for [Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra-Jowar or Cotton. (b) Cotton. (c) Nil. (ii) Medium black. (iii) 26.6.1960, 7.7.61, 15.7.62 and 8.7.63. (iv) (a) 1 to 2 ploughings and harrowings. (b) Drilling. (c) and (d) As per treatments. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) AK-12-24. (vii) Unirrigated. (viii) 2 weedings. (ix) 47 cm. for 60 (97), 56 cm. for 61 (90), 40 cm. for 62 (104) and 50 cm. for 63 (109). (x) 2nd fortnight of Oct.

## 2. TREATMENTS :

## Main-plot treatments :

3 row spacings :  $S_1=30$ ,  $S_2=61$  and  $S_3=91$  cm.

## Sub-plot treatments:

3 seed rates :  $R_1=34$ ,  $R_2=45$  and  $R_3=56$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 13.7 m.  $\times$  9.1 m. (b) 11.0 m.  $\times$  7.3 m. (v) 137 cm.  $\times$  91 cm. (vi) Yes.

## 4. GENERAL :

(i) Below normal for 60 (97), 61 (90), 62 (104); normal for 63 (109). (ii) Attack of aphids. (iii) Pods yield. (iv) (a) 1960 to 1963. (b) No. (c) Nil. (v) Jam Khambalia. (vi) Nil. (vii) As the sub-plot error variances are heterogeneous and interaction is absent, the results of individual experiments are given below.

## 5. RESULTS :

## 60(97)

(i) 599 Kg/ha. (ii) (a) 107.4 Kg/ha. (b) 59.9 Kg/ha. (iii) Main effect of S and interaction  $S \times R$  are highly significant while main effect of R is significant. (iv) Av. yield of pod in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	685	594	426	568
$R_2$	620	652	520	597
$R_3$	677	615	600	631
Mean	661	620	515	599

C.D. for S marginal means = 79.8 Kg/ha.

C.D. for R marginal means = 40.8 Kg/ha.

C.D. for R means at the same level of S = 70.7 Kg/ha.

C.D. for S means at the same level of R = 98.4 Kg/ha.

## 61(90)

(i) 499 Kg/ha. (ii) (a) 65.4 Kg/ha. (b) 75.4 Kg/ha. (iii) Main effects of S and R are highly significant. (iv) Av. yield of pod in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	539	355	474	456
$R_2$	597	441	430	489
$R_3$	636	482	536	551
Mean	591	426	480	499

C.D. for S marginal means = 48.6 Kg/ha.

C.D. for R marginal means = 51.2 Kg/ha.

## 62(104)

(i) 184 Kg/ha. (ii) (a) 26.4 Kg/ha. (b) 37.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	$S_1$	$S_2$	$S_3$	Mean
$R_1$	179	193	182	185
$R_2$	198	204	162	188
$R_3$	144	197	197	179
Mean	174	198	180	184

63(109)

- (i) 1231 Kg/ha. (ii) (a) 126.7 Kg/ha. (b) 81.5 Kg/ha. (iii) Main effects of S and R is highly significant.  
 (iv) Av. yield of pod in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	1343	1123	1027	1164
R <sub>2</sub>	1416	1187	1099	1234
R <sub>3</sub>	1461	1248	1173	1294
Mean	1407	1186	1100	1231

C.D. for S marginal means=94.0 Kg/ha.

C.D. for R marginal means=55.5 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(48).**

**Site :- Agri. Res. Stn., Talod.**

**Type :- 'C'.**

Object :- To study the effect of different spacings on Groundnut.

**1. BASAL CONDITIONS :**

- (i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N. (ii) Sandy. (iii) 21.7.65. (iv) (a) 2 harrowings (b) Dibbling.  
 (c) N.A. (d) As per treatment. (e) 1. (v) Nil. (vi) Samarala-1 (medium). (vii) Unirrigated. (viii) 3  
 weeding, 1 interculturing. (ix) 38 cm. (x) 16.11.65.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 3 spacings : S<sub>1</sub>=61.0 cm. × 10.2 cm. S<sub>2</sub>=91.5 cm. × 5.1 cm. and S<sub>3</sub>=61.0 cm. × 5.1 cm.

(2) 2 types of dibbling : R<sub>1</sub>=Single row and R<sub>2</sub>=Paired (double) row [Distance between paired row  
 being 15.2 cm.]

**3. DESIGN :**

- (i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) S<sub>1</sub>R<sub>1</sub> × S<sub>2</sub>R<sub>1</sub> 7.3 m. × 12.2 m. ; S<sub>1</sub>R<sub>2</sub> × S<sub>2</sub>R<sub>2</sub> 7.6 m.  
 × 12.2 m. ; S<sub>2</sub>R<sub>1</sub> 8.2 m. × 12.2 m. S<sub>3</sub> × R<sub>2</sub> 8.5 × 12.2 (b) 6.1 m. × 10.4 m. (v) —. (vi) Yes.

**4. GENERAL :**

- (i) Normal. (ii) Root rot and collar rot. (iii) Pods and tops yield. (iv) (a) 1965-contd. (b) No. (c) Nil.  
 (v) N.A. (vi) Development of pod was affected for want of 1st rains. (vii) —.

**5. RESULTS :**

- (i) 506 Kg/ha. (ii) 71.9 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of pod  
 in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
R <sub>1</sub>	515	583	423	507
R <sub>2</sub>	479	583	454	505
Mean	497	583	438	506

C.D. for S marginal means=76.6 Kg/ha.



**Crop :- Groundnut (Kharif).**

**Ref :- Gj. :- 62(147), 63(170).**

**Site :- Trial-cum-Demons. Farm, Thasra.**

**Type :- 'C'.**

**Object :-**To study the effect of Rhizobium culture on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar for 62 (147); Cotton for 63 (170). (c) Nil for 62 (147); 44.8 Kg/ha. of N as A/S + 22.4 Kg/ha. of  $P_2O_5$  as Super for 63 (170). (ii) Sandy loam. (iii) 8.7.1962; 1.7.1963. (iv) (a) 2 ploughings + 1 harrowing for 62 (147); 3 harrowings for 63 (170). (b) Drilling. (c) 99 Kg/ha. (d) 61 cm. between rows. (e) —. (v) 22.4 Kg/ha. of  $P_2O_5$  + 11.2 Kg/ha. of N for 62 (147); 12.4 C.L./ha. of F.Y.M. + 11.2 Kg/ha. of N as A/S + 22.4 Kg/ha. of  $P_2O_5$  as Super for 63 (170). (vi) Bochala. (vii) Irrigated. (viii) 2 to 4 weedings + 2 to 3 interculturings. (ix) 67 cm. : 102 cm. (x) 21.11.1962; 16.11.1963.

**2. TREATMENTS :**

2 seed treatments :  $T_0$  = Untreated seed (control) and  $T_1$  = Seeds treated with Rhizobium culture.

**3. DESIGN :**

(i) Paired plot. (ii) (a) 2. (b) N.A. (iii) 12. (iv) 9.1 m. × 5.5 m. (b) 7.9 m. × 4.3 m. (v) 61 cm. × 61 cm (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of aphids for 62 (147). Nicotin sulphate was sprayed. No incidence for 68 (170). (iii) Yield of pods. (iv) (a) 1962-1963. (b) No. (c) Results of combined analysis are given under 5. (v) Junagadh. (vi) Nil. (vii) Error variances are homogeneous and Treatments × years interaction is absent.

**5. RESULTS :**

(i) 892 Kg/ha. (ii) 91.1 Kg/ha. (23 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment difference is not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$T_0$	$T_1$
Av. yield	878	905

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(196).**

**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Type :- 'C'.**

**Object :-**To study the effect of different interculturings on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 11.2 Kg/ha. of N. (ii) Medium black. (iii) 18.7.65. (iv) (a) Nil. (b) Drilling. (c) 98.8 Kg/ha. (d) 45.7 cm. row to row. (e) —. (v) 12.4 C.L./ha. of F.Y.M. + 11.2 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (vi) S.B. XI (Junagadh XI). (vii) Unirrigated. (viii) As per treatment. (ix) 40 cm. (x) 13.10.65.

**2. TREATMENTS :**

4 cultural treatments :  $C_0$  = No interculturings and no weeding (control).  $C_1$  = No interculturings but hand weeding as and when required.  $C_2$  = One interculturings but no weeding.  $C_3$  = One interculturings and two weedings.

**(1) DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 9.1 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 91.5 cm. × 91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Below normal (Poor). (ii) Nil. (iii) Pod and tops yield. (iv) (a) 1965 contd. (b) No. (c) Nil. (v) N.A. (vi) Yield was very much affected due to absense of 1st rain. (vii) Nil.

**5. RESULTS :**

(i) 267 Kg/ha. (ii) 81.4 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of pods in Kg/ha.

Treatment	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>
Av. yield	116	252	245	403

C.D.=95.4 Kg/ha.

**Crop :- Groundnut (Kharif).**  
**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Ref :- Gj. 65(195).**  
**Type :- 'C'.**

Object :- To study the response of different cultural practices on Groundnut.

1. BASAL CONDITIONS :

(i) (a) Groundnut-Groundnut. (b) Groundnut. (c) As per treatments. (ii) Medium black. (iii) 17.7.65.  
 (iv) (a) As per treatments. (b) Drilling. (c) 98.8 Kg/ha. (d) 91.5 cm. row to row. (e) N.A. (v) 12.4 C.L/  
 ha. of F.Y.M. (vi) Punjab-1. (vii) Unirrigated. (viii) 4 interculturings, 3 weedings. (ix) 40 cm. (x)  
 30.10.65.

2. TREATMENTS :

**Main-plot treatments :**

7 cultural practices : C<sub>1</sub>=Continuous shallow ploughing in January every year, C<sub>2</sub>=Continuous shallow  
 ploughing in January in alternative years, C<sub>3</sub>=Continuous shallow ploughing in  
 January in every third year, C<sub>4</sub>=Shallow ploughing in January followed by one  
 harrowing in May, C<sub>5</sub>=One harrowing in January, C<sub>6</sub>=Two harrowings : 1st  
 in January, 2nd in May, C<sub>7</sub>=Three harrowings ; 1st in January, 2nd in February and  
 3rd in May.

**Sub-plot treatments :**

12.4 C.L/ha. of F.Y.M.

M<sub>1</sub>=Application in furrows. M<sub>2</sub>=Broadcast application.

3. DESIGN :

(i) Split-plot. (ii) (a) 7 main plots/replication. (b) 2 sub-plots/main-plot. (iii) 4. (iv) (a) 14.6 m. × 7.3 m.  
 (b) 12.2 m. × 5.5 m. (v) 122.0 cm. × 91.5 cm. (vi) Yes.

4. GENERAL :

(i) Below normal. (ii) Nil. (iii) Pod and tops yield. (iv) (a) 1961-contd. (b) Yes. (c) Nil. (v) (a) N.A.  
 (b) Nil. (vi) Shortage of last rains. (vii) Nil.

5. RESULTS :

(i) 126.0 Kg/ha. (ii) (a) 52.5 Kg/ha. (b) 43.2 Kg/ha. (iii) None of the effects is significant. (iv) Av.  
 yield of pod in Kg/ha.

Mean Table

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
M <sub>1</sub>	142	170	163	123	93	128	120	135
M <sub>2</sub>	122	116	169	123	91	82	114	117
Mean	132	143	166	123	92	105	117	126

**Crop :- Groundnut (Kharif).**  
**Site :- Agri. Res. Stn., Amreli.**

**Ref :- Gj. 60(23), 61(22).**  
**Type :- 'CM'.**

Object :- To find out the optimum spacing along with manurial dose for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut-Bajra for 60(23), Nil for 62(22). (b) Bajra for 61(23), Jowar for 61(22). (c) 100.9 Kg/ha. of manure mixture for 60(23), Nil for 61(22). (ii) Medium black. (iii) 5.7.1960, 21.7.1961. (iv) (a) One ploughing for 60(23), one harrowing for 61(22). (b) Dibbling. (c) 90 Kg/ha. (d) As per treatments. (e) 1. (v) 12.4 C.L/ha. of F.Y.M. for 60(23); Nil for 61(22). (vi) A.H-32. (vii) Unirrigated. (viii) 4 inter-culturings for 60(23), 1 weeding + 1 interculturing for 61(22). (ix) 40 cm., 33 cm. (x) 30.10.1960, 20.10.1961.

## 2. TREATMENTS :

## Main-plot treatments :

All combinations of (1) and (2)

(1) 2 plant spacings :  $S_1=5$  and  $S_2=10$  cm.

(2) 3 row spacings :  $R_1=46$ ,  $R_2=61$  and  $R_3=91$  cm.

## Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of  $K_2O$  :  $K_0=0$  and  $K_1=30.3$  Kg/ha.

(2) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=30.3$  and  $P_2=60.5$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 11.0 m.  $\times$  3.7 m. (b) 10.0 m.  $\times$  2.7 m. (v) 46 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory. (ii) Attack of aphids and *tikka* for 61(22). No incidence for 60(23). (iii) Yield of pods. (iv) (a) 1961-1961. (b) No. (c) Nil. (v) (a) Halwad and Umrata. (b) Nil. (vi) Due to dry condition immediately after sowing for 60(23) and due to shortage of rains for 61(22) the growth was affected. (vii) Expt. numbers 68(79) and 59(65) have also been included for giving combined results. As the sub-plot variances are heterogeneous, results of individual years are presented below.

## 5. RESULTS :

## 60(23)

(i) 472 Kg/ha. (ii) (a) 178.1 Kg/ha. (b) 123.6 Kg/ha. (iii) Main effect of R alone is highly significant. (iv) (a) Av. yield of pod in Kg/ha.

	$R_1$	$R_2$	$R_3$	$S_1$	$S_2$	$K_0$	$K_1$	Mean
$P_0$	538	460	334	470	418	489	400	444
$P_1$	620	530	358	545	461	529	477	503
$P_2$	573	495	340	486	452	470	468	469
Mean	577	495	344	500	444	496	448	472
$K_0$	637	490	360	516	476			
$K_1$	517	500	328	485	411			
$S_1$	631	539	331					
$S_2$	523	451	358					

C.D. for R marginal means = 93.6 Kg/ha.

## 61(22)

(i) 446 Kg/ha. (ii) (a) 74.3 Kg/ha. (b) 71.4 Kg/ha. (iii) Main effect of R, S and P are highly significant. (iv) Average yield of pod in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	542	373	240	430	340	398	372	385
P <sub>1</sub>	678	464	292	526	431	470	486	478
P <sub>2</sub>	658	465	302	536	414	469	481	475
Mean	626	434	278	497	395	446	446	446
K <sub>0</sub>	614	446	277	503	388			
K <sub>1</sub>	638	423	278	491	402			
S <sub>1</sub>	681	493	317					
S <sub>2</sub>	570	375	239					

C.D. for S marginal means = 31.9 Kg/ha.

C.D. for R marginal means = 39.0 Kg/ha.

C.D. for P marginal means = 33.6 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Site :- Agri. Res. Farm, Halvad.**

**Ref :- Gj. 60(43), 61(11), 62(96).**

**Type :- 'CM'.**

Object :- To assess the best spacing between plants and rows with suitable fertilizer dose for Groundnut.

#### 1. BASAL CONDITIONS :

(i) (a) Legume; Cereal-Cotton for 60(43), Nil for 61(11), Groundnut-Cotton for 62(96). (b) Wheat for 60(43) Jowar for 61(11), Cotton for 62(96). (c) Nil. (ii) Medium black. (iii) 24, 25.6.1960, 27, 28.6.1961, 15.7.1962. (iv) (a) 1 ploughing + 1 to 2 harrowings. (b) Dibbling. (c) N.A. for 60(43) and 61(11), 134 Kg/ha. for 62(96). (d) As per treatments. (e) 1. (v) Nil. (vi) A.K-12-24. (vii) Irrigated for 60(43), Unirrigated for others. (viii) 2 to 3 interculturings. (ix) 21 cm., 51 cm., 35 cm. (x) 13.10.1960, 11.10.1961, 2.11.1962.

#### 2. TREATMENTS :

##### Main-plot treatments :

All combinations of (1) and (2)

(1) 2 plant spacings : S<sub>1</sub>=5 and S<sub>2</sub>=10 cm.

(2) 3 row spacings : R<sub>2</sub>=46, R<sub>2</sub>=61 and R<sub>3</sub>=91 cm.

##### Sub-plot treatments :

All combinations of (1) and (2)

(1) 2 levels of K<sub>2</sub>O : K<sub>0</sub>=0 and K<sub>1</sub>=30.3 Kg/ha.

(2) 3 levels of P<sub>2</sub>O<sub>5</sub> : P<sub>0</sub>=0, P<sub>1</sub>=30.3 and P<sub>2</sub>=60.5 Kg/ha.

#### 3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/replication, 6 sub-plots/main-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m. × 3.7 m. (b) 11.0 m. × 1.8 m. (v) 61 cm. × 91 cm. (vi) Yes.

#### 4. GENERAL :

(i) Normal for 61(11), Unsatisfactory of others. (ii) Attack of *tikka* for 60(43), Severe attack of aphids *tikka* and leaf catter pillers for 61(11). Nicotin sprayed. Attack of aphids for 62(96). (iii) Yield of pods. (iv) (a) 1958-1962. (b) No. (c) Nil. (v) Amreli and Umrala. (b) Nil. (vi) Late rains and heavy stress of moisture at the time of flowering and thereafter affected the growth for 62(96). (vii) Results of expt. numbers 58(77) and 59(68) have also been included for giving combined results. As the sub-plot variances are heterogeneous, the results of individual years are presented below.

#### 5. RESULTS :

##### 60(43)

(i) 569 Kg/ha. (ii) (a) 324.6 Kg/ha. (b) 71.0 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	598	600	538	523	635	589	568	579
P <sub>1</sub>	548	562	592	521	613	539	595	567
P <sub>2</sub>	589	533	562	484	639	572	551	561
Mean	578	565	564	509	629	567	571	569
K <sub>0</sub>	578	560	562	509	625			
K <sub>1</sub>	578	570	566	510	633			
S <sub>1</sub>	515	511	502					
S <sub>2</sub>	642	619	626					

61(11)

(i) 2052 Kg/ha. (ii) (a) 571.9 Kg/ha. (b) 157.7 Kg/ha. (iii) Main effect of R alone is significant. (iv) Av. yield of pod in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	2070	2203	1828	2102	1966	2039	2030	2034
P <sub>1</sub>	2112	2216	1856	2080	2042	2042	2080	2061
P <sub>2</sub>	2160	2210	1812	2065	2057	2104	2017	2061
Mean	2114	2210	1832	2082	2022	2062	2042	2052
K <sub>0</sub>	2108	2214	1863	2084	2039			
K <sub>1</sub>	2120	2206	1801	2080	2005			
S <sub>1</sub>	2145	2214	1888					
S <sub>2</sub>	2083	2206	1776					

C.D. for R marginal means = 300.3 Kg/ha.

62(96)

(i) 385 Kg/ha. (ii) (a) 108.1 Kg/ha. (b) 54.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	372	359	376	372	366	369	369	369
P <sub>1</sub>	425	375	390	413	381	392	401	397
P <sub>2</sub>	432	355	382	380	400	383	397	390
Mean	410	363	383	388	382	381	389	385
K <sub>0</sub>	404	359	381	389	373			
K <sub>1</sub>	416	367	384	387	391			
S <sub>1</sub>	394	380	391					
S <sub>2</sub>	426	346	375					

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 62(181), 64(126), 65(75).**

**Site :- Dry Farming Res. Stn., Jamkhambalia. Type :- 'CM'.**

Object :- To study the effect of different cultural practices on Groundnut.

1. **BASAL CONDITIONS :**

(i) (a) Groundnut-Groundnut. (b) Groundnut. (c) 12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 14.7.62, 13.7.64 and 22.7.65. (iv) (a) As per treatments. (b) Drilling. (c) 67.3 Kg/ha. (d) 61 cm. row to row. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) A.K. 12-24. (vii) Unirrigated. (viii) 2 interculturations. (ix) 53.3 cm. for 62(181), 48 cm. for 64(126), 28.9 cm. for 65(75). (x) 3.11.62, 20.10.64 and 18.10.65.

2. **TREATMENTS :**

7 **Main-plot treatments :**

C<sub>1</sub>=Continuous shallow ploughing in January every year, C<sub>2</sub>=Continuous shallow ploughing in January alternate year, C<sub>3</sub>=Continuous shallow ploughing in January every third year, C<sub>4</sub>=Shallow ploughing in furrows in January followed by one harrowing in May, C<sub>5</sub>=One harrowing in January, C<sub>6</sub>=Two harrowings : 1st in January, 2nd in May, C<sub>7</sub>=Three harrowing : 1st in January, 2nd in February and 3rd in May.

**Sub-plot treatments :**

(a) 12.4 C.L./ha. of F.Y.M. in furrows.  
(b) 12.4 C.L./ha. of F Y.M. broadcasted.

3. **DESIGN :**

(i) Split-plot. (ii) (a) 7 main-plots/replication. 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14.6 m. × 7.3 m. (b) 12.2 m. × 5.5 m. (v) 122.0 cm. × 91.5 cm. (vi) Yes.

4. **GENERAL :**

(i) Not satisfactory. (ii) Attack of aphids and tikka, Folidol and B.H.C. dusted. (iii) Yield of Pods. (iv) (a) 1962 to 1965. (b) Yes. (c) Nil. (v) and (vi) N.A. (vii) Sub-plot error variances are heterogeneous, therefore individual years results are presented below.

5. **RESULTS :**

**62(181)**

(i) 566 Kg/ha. (ii) (a) 157.6 Kg/ha. (b) 157.5 Kg/ha. (iii) Main effect of C alone is significant. (iv) Av. yield of pod in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
F <sub>1</sub>	590	560	571	526	747	679	433	587
F <sub>2</sub>	612	717	392	306	653	620	515	645
Mean	601	638	482	416	700	650	474	566

C.D. for C marginal means=195.9

**64(126)**

(i) 533 Kg/ha. (ii) (a) 186.5 Kg/ha. (b) 60.6 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of Pods in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
F <sub>1</sub>	621	504	456	645	562	554	498	549
F <sub>2</sub>	623	412	497	535	576	476	504	517
Mean	622	458	476	590	569	515	501	533

**65(75)**

(i) 521 Kg/ha. (ii) (a) 234 Kg/ha. (b) 65.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	Mean
F <sub>1</sub>	587	596	462	567	518	524	415	524
F <sub>2</sub>	589	633	494	457	618	448	395	519
Mean	588	614	478	512	568	486	405	533

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 62(211), 64(186).**

**Site :- Agri. Res. Stn., Jamnagar.**

**Type :- 'CM'.**

**Object :-**To study the effect of different manures and spacings on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar + Bajra* for 62(211); *Sesamum* for 64(186). (c) Nil. (ii) Medium black. (iii) 13 to 20.7.1962; 8 to 12.7.1964. (iv) (a) 2 harrowings. (b) Dibbling. (c) 148 Kg/ha. (d) As per treatments. (e) 1. (v) Nil. (vi) Punjab-1. (vii) Un-Irrigated. (viii) Nil for 62(211); 3 weedings+3 interculturings for 64(186). (ix) 28 cm; 57 cm. (x) 2 to 10.11.1962; 22 to 25.10.1964.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2), (3) and (4)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=28.0$  and  $P_2=56.0$  Kg/ha.

(3) 3 levels of  $K_2O$  as Pot. Sul. ;  $K_0=0$ ,  $K_1=28.0$  and  $K_2=56.0$  Kg/ha.

(4) 3 spacing :  $S_1=61$  cm.  $\times$  5 cm.,  $S_2=91$  cm.  $\times$  5 cm. and  $S_3=61$  cm.  $\times$  10 cm.

**Sub-plot treatments :**

2 levels of F.Y.M :  $F_0=0$  and  $F_1=24.7$  C.L./ha. of F.Y.M.

N applied as broadcast, P and K applied as drilling.

**3. DESIGN :**

(i) Split-plot confd. (ii) (a) 9 blocks/replication ; 9 main-plots/block ; 2 sub-plots/main plots. (b) N.A. (iii) 1. (iv) (a) 11.0 m.  $\times$  7.3 m. (b) 9.1 m.  $\times$  5.5 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Below normal for 62(211); Normal for 64(186). (ii) Nil. (iii) Yield of pods. (iv) (a) 1962—1964. (b) No. (c) Nil. (v) N.A. (vi) Inadequate rains affected the crop for 62(211). Expt. was not conducted in 1963 due to shortage of rains. (vii) As the sub-plot variances are heterogeneous, the results of the individual years are presented below.

**5. RESULTS :**

**62(211)**

(i) 587 Kg/ha. (ii) (a) 159.5 Kg/ha. (b) 73.5 Kg/ha. (iii) Main effects of S and F are highly significant. (iv) Av. yield of pod in Kg/ha.

	$N_0$	$N_1$	$N_2$	$K_0$	$K_1$	$K_2$	$S_1$	$S_2$	$S_3$	$F_0$	$F_1$	Mean
$P_0$	475	553	639	552	541	574	698	463	507	526	586	556
$P_1$	570	584	636	605	617	568	651	559	579	582	611	597
$P_2$	607	644	574	585	622	617	668	538	619	589	628	608
Mean	551	594	616	581	593	587	672	520	568	566	608	587
$F_0$	531	576	590	571	563	563	647	504	546			
$F_1$	571	612	643	591	624	611	698	536	591			
$S_1$	584	722	711	658	656	704						
$S_2$	509	467	583	536	513	510						
$S_3$	558	592	553	549	611	545						
$K_0$	542	580	621									
$K_1$	575	595	610									
$K_2$	535	607	618									

C.D. for S marginal means=65.1 Kg/ha.

C.D. for F marginal means=23.8 Kg/ha.

64(186)

(i) 1231 Kg/ha. (ii) (a) 161.7 Kg/ha. (b) 135.0 Kg/ha. (iii) Main effects of N and F are highly significant. P effect is significant. Interactions N×K and N×S are highly significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
P <sub>0</sub>	1146	1213	1231	1157	1197	1236	1240	1167	1182	1164	1229	1196
P <sub>1</sub>	1149	1248	1263	1183	1226	1252	1208	1230	1224	1172	1269	1221
P <sub>2</sub>	1220	1248	1364	1313	1265	1254	1376	1229	1226	1251	1304	1277
Mean	1172	1237	1287	1218	1229	1247	1275	1209	1211	1196	1267	1231
F <sub>0</sub>	1123	1211	1253	1175	1200	1212	1206	1180	1200			
F <sub>1</sub>	1220	1262	1320	1261	1258	1283	1344	1237	1221			
S <sub>1</sub>	1091	1298	1436	1232	1277	1316						
S <sub>2</sub>	1200	1214	1213	1230	1189	1207						
S <sub>3</sub>	1224	1197	1211	1191	1221	1220						
K <sub>0</sub>	1225	1174	1254									
K <sub>1</sub>	1095	1327	1266									
K <sub>2</sub>	1194	1208	1340									

C.D. for N or P marginal means = 66.0 Kg/ha.

C.D. for F marginal means = 43.8 Kg/ha.

C.D. for body N×K, or N×S table = 114.3 Kg/ha.

**Crop :- Groundnut (Khari f).**

**Site :- Oilseeds Res. Farm, Junagadh.**

**Ref :- Gj. 65(207).**

**Type :- 'GM'.**

**Object :-** To study the effect of morhum sulphur, sand, CaO and P<sub>2</sub>O<sub>5</sub> on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Cotton—Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black soil. (iii) 23.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha. (d) 91.5 cm. × 5.1 cm. (e) 1. (v) Nil. (vi) Gondal 221-31. (vii) Unirrigated. (viii) 3 interculturings. (ix) 59 cm. (x) 31.10.65.

**2. TREATMENTS :**

8 manurial treatments : M<sub>0</sub> = Control, M<sub>1</sub> = CaO at 5.0 tonnes/ha. M<sub>2</sub> = 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super, M<sub>3</sub> = 49.4 C.L./ha. of morhum, M<sub>4</sub> = M<sub>2</sub> + M<sub>3</sub>, M<sub>5</sub> = 6.0 tonnes/ha. of gypsum, M<sub>6</sub> = 49.4 C.L./ha. of sand and M<sub>7</sub> = 2.2 Kg/ha. of Super.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) —. (iii) 4 (iv) (a) 10.4 m. × 5.5 m. (b) 8.5 m. × 3.7 m. (v) 92 cm. × 92 cm. (vi) Yes.

**4. GENERAL :**

(i) Very poor due to scanty rains in Aug. Sept. and October. (ii) Attack of aphids and tikka. (iii) Pod and tops yield. (iv) (a) 1963-Contd. (b) No. (c) N.A. (v) N.A. (vi) Scanty rains. (vii) Due to scanty and un-even rains the yields are very poor. Neither raw data nor S.E. is available.

**5. RESULTS :**

(i) 186 Kg/ha. (ii) and (iii) N.A. (iv) Av. yield of pod in Kg/ha.





C.D. for S marginal means = 81.4 Kg/ha.

C.D. for body of P × K table = 140.9 Kg/ha.

61(180)

(i) 1124 Kg/ha. (ii) (a) 175.2 Kg/ha. (b) 113.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	1152	1111	1083	1082	1145	1119	1100	1116	1130	1075	1152	1119	1115
F <sub>1</sub>	1134	1142	1125	1117	1137	1147	1092	1176	1133	1113	1160	1128	1134
Mean	1143	1126	1104	1099	1141	1133	1096	1146	1131	1094	1156	1123	1124
S <sub>1</sub>	1116	1080	1086	1074	1075	1133	1063	1127	1091				
S <sub>2</sub>	1166	1136	1165	1153	1183	1131	1105	1162	1200				
S <sub>3</sub>	1147	1162	1061	1071	1164	1135	1119	1149	1102				
K <sub>0</sub>	1102	1100	1086	1081	1103	1104							
K <sub>1</sub>	1128	1196	1115	1132	1156	1150							
K <sub>2</sub>	1200	1083	1111	1085	1164	1145							
P <sub>0</sub>	1131	1101	1066										
P <sub>1</sub>	1124	1182	1116										
P <sub>2</sub>	1174	1095	1130										

62(173)

(i) 1134 Kg/ha. (ii) (a) 184.4 Kg/ha. (b) 158.5 Kg/ha. (iii) Main effects of S and interaction N × K are highly significant while interactions F × P and F × N × S are significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	1148	1132	1108	1041	1172	1174	1120	1155	1112	1299	1169	919	1129
F <sub>1</sub>	1136	1122	1160	1139	1160	1118	1176	1150	1092	1251	1229	937	1139
Mean	1142	1127	1134	1090	1166	1146	1148	1153	1102	1275	1199	928	1134
S <sub>1</sub>	1311	1208	1307	1170	1334	1321	1314	1305	1207				
S <sub>2</sub>	1158	1257	1183	1190	1221	1186	1215	1244	1130				
S <sub>3</sub>	957	916	912	910	943	931	915	910	960				
K <sub>0</sub>	1210	1052	1182	1042	1214	1187							
K <sub>1</sub>	1011	1233	1215	1084	1175	1200							
K <sub>2</sub>	1205	1096	1005	1144	1109	1052							
P <sub>0</sub>	1031	1078	1162										
P <sub>1</sub>	1207	1158	1133										
P <sub>2</sub>	1188	1144	1107										

C.D. for S marginal means = 75.3 Kg/ha.

C.D. for body of N × K table = 130.4 Kg/ha.

C.D. for two F means at the same level of P = 86.8 Kg/ha.

C.D. for P means at the same level of F = 101.94 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 65(150).**

**Site :- Agri. Res. Stn., Kothara.**

**Type :- 'CM'.**

**Object :-**To study the effect of local V/S departmental method of cultivation on Groundnut after Groundnut (Permanent plot expt.) and groundnut after Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Groundnut—Groundnut and Groundnut—Cotton. (b) *Bajra*. (c) 11.2 Kg/ha. of N+12.4 C.L./ha. of F.Y.M. (ii) Sandy loam. (iii) 19.7.65. (iv) (a) 2 ploughings, 2 harrowings. (b) Drilling. (c) 11.0 Kg/ha. (d) 45.7 cm. between rows. (e) —. (v) Nil. (vi) SBXI—(Early). (vii) Un-irrigated. (viii) 2 weedings, 2 interculturings. (ix) 33 cm. (x) 29.10.65.

**2. TREATMENTS :**

All combinations of (1) and (2)

(1) 2 crop rotation :  $R_1$ =Groundnut followed by Cotton and  $R_2$ =Groundnut after Groundnut.

(2) 2 methods of cultivation :  $C_1$ =Local method (12.4 C.L./ha. of F.Y.M.) and  $C_2$ =Dept. method (11.2 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 2. (iv) (a) 11.0 m.×36.9 m. (b) 9.1 m.×35.0 m. (v) 91.5 cm.×91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Pod of tops yield. (iv) (a) 1965—contd. (b) Yes. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 395 Kg/ha. (ii) 29.0 Kg/ha. (iv) None of the effects is significant. (iv) Av. yield of pod in Kg/ha.

	$R_1$	$R_2$	Mean
$C_1$	384	392	388
$C_2$	436	370	403
Mean	410	381	395

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 62(225).**

**Site :- Irrigational Demons. Farm, Kukda.**

**Type :- 'CM'.**

**Object :-**To find out the optimum requirements of spacing and N, P, K and F.Y.M. for Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar*. (c) Nil. (ii) Medium black. (iii) 11, 12.7.62. (iv) (a) 1 ploughing and 2 harrowings. (b) Dibbling. (c) 67 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) AK 12-24. (vii) Unirrigated. (viii) Nil. (ix) 16 cm. (x) 18, 19.10.62.

**2. TREATMENTS :**

**Main-plot treatments :**

All combinations of (1), (2), (3) and (4)

(1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.

(2) 3 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=28.0$  and  $P_2=56.0$  Kg/ha.

(3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=28.0$  and  $K_2=56.0$  Kg/ha.

(4) 3 spacings :  $S_1=61$  cm.×5 cm.,  $S_2=46$  cm.×10 cm. and  $S_3=61$  cm.×10 cm.

N broadcasted on 12.8.62. and 31.8.62. P and K broadcasted on 11.7.62 and 12.7.62.

**Sub-plot treatments :**

2 levels of F.Y.M. :  $F_0=0$  and  $F_1=24.7$  C.L./ha. of F.Y.M.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block ; 9 blocks/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) One. (iv) (a) 10.4 m. × 7.3 m. (b) 9.1 m. × 5.5 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of aphids. (iii) Pods yield. (iv) (a) 1962 only, (b) No. (c) Nil. (v) to (vii) Nil.

## 5. RESULTS :

(i) 700 Kg/ha. (ii) (a) 186.8 Kg/ha. (b) 93.3 Kg/ha. (iii) Main effect of F alone is highly significant. (iv) Av. yield of pods in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
P <sub>0</sub>	768	742	629	674	739	726	749	710	680	695	732	713
P <sub>1</sub>	694	704	692	690	702	698	718	672	700	662	731	697
P <sub>2</sub>	696	617	758	634	717	720	697	730	644	670	711	690
Mean	719	688	693	666	719	715	721	704	675	676	725	700
F <sub>0</sub>	687	671	669	642	693	692	713	665	649			
F <sub>1</sub>	752	705	717	691	745	738	729	744	701			
S <sub>1</sub>	761	707	696	704	689	771						
S <sub>2</sub>	710	727	675	662	764	686						
S <sub>3</sub>	687	629	708	632	705	687						
K <sub>0</sub>	708	590	700									
K <sub>1</sub>	758	710	690									
K <sub>2</sub>	692	763	689									

C.D. for F marginal means=29.0 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 60(118), 61(127).**

**Site :- Agri. Res. Stn., Talod.**

**Type :- 'GM'.**

Object :—To find out the optimum fertilizer dose with suitable spacing for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton + Jowar for 60(118) ; Castor + Bajra for 61(127). (c) Nil for 60(118) ; 12.4 C.L./ha. of F.Y.M. for 61(127). (ii) Sandy soil. (iii) 24.6.60 ; 20.6.61. (iv) (a) 1 ploughing + 2 to 3 harrowings. (b) Drilling. (c) 67 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) Samrala-1 (Punjab). (vii) Un-irrigated. (viii) 2 to 5 interculturings. (ix) 33 cm., 82 cm. (x) 7, 8.11.60 ; 29 to 31.10.61.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations (1), (2), (3) and (4)

- (1) 3 levels of N as A/S : N<sub>0</sub>=0, N<sub>1</sub>=11.2 and N<sub>2</sub>=22.4 Kg/ha.
- (2) 3 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0, P<sub>1</sub>=28.0 and P<sub>2</sub>=56.0 Kg/ha.
- (3) 3 levels of K<sub>2</sub>O as Pot. Sul. : K<sub>0</sub>=0, K<sub>1</sub>=28.0 and K<sub>2</sub>=56.0 Kg/ha.
- (4) 3 row spacings : S<sub>1</sub>=46, S<sub>2</sub>=61 and S<sub>3</sub>=76 cm.

**Sub-plot treatments :**

2 levels of F.Y.M. : F<sub>0</sub>=0 and F<sub>1</sub>=5604 Kg/ha.

Fertilizers were applied by spreading in rows.

## 3. DESIGN :

(i) Split-plot confd. (ii) (a) 9 main-plots/block, 9 blocks/replication and 2 sub-plots/main-plot. (b) N.A. (iii) 1. (iv) (a) 11.0 m. × 6.4 m. for S<sub>1</sub> and S<sub>2</sub>; 10.7 m. × 6.4 m. for S<sub>3</sub>. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. for S<sub>1</sub> and S<sub>2</sub>; 76 cm. × 91 cm. for S<sub>3</sub>. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory for 60(118), Normal for 61(127). (ii) Attack of foot and collar rot for 60(118). Attack of collar rot for 61(127). (iii) Yield of pods. (iv) (a) 1959-1961. (b) No. (c) Results of combined analysis are given under 5. (v) Junagadh. (vi) Nil. (vii) Results of expt. No. 59(83) have also been included for giving combined results. Errors are homogeneous and interaction is present.

## 5. RESULTS :

(i) 811 Kg/ha. (ii) (a) 344.7 Kg/ha. (based on 64 d.f. made up of various components of Treatments × years interaction). (b) 221.9 Kg/ha. 18 d.f. made up of various components of Treatments × years interaction. (iii) Main effects of K and S are highly significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	787	775	804	763	814	829	727	831	848	739	863	804	802
F <sub>1</sub>	813	843	804	803	854	803	745	847	868	701	889	870	820
Mean	800	809	824	783	834	816	736	839	858	720	876	837	811
S <sub>1</sub>	664	714	782	635	750	775	645	706	809				
S <sub>2</sub>	903	883	842	844	913	871	824	891	913				
S <sub>3</sub>	833	830	848	870	839	802	739	920	852				
K <sub>0</sub>	699	774	735	647	785	776							
K <sub>1</sub>	828	836	853	859	793	865							
K <sub>2</sub>	873	817	884	843	924	807							
P <sub>0</sub>	771	793	785										
P <sub>1</sub>	822	800	880										
P <sub>2</sub>	807	834	807										

C.D. for K or S marginal means = 76.6 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 60(118), 62(127), 62(239).**

**Site :- Agri. Res. Stn., Talod.**

**Type :- 'CM'.**

**Object :-** To find out the optimum fertilizer dose with suitable spacing for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton + Jowar for 60(118); Castor + Bajra for 61(127) and Bajra for 62(239). (c) Nil for 60(118), 62(239); 12.4 C.L./ha. of F.Y.M. for 61(127). (ii) Sandy soil. (iii) 24.6.1960; 26.6.1961; 11.7.1962. (iv) (a) 1 ploughing + 2 to 3 harrowings. (b) Drilling. (c) 67 Kg/ha. for 60(118), 61(127) and 74 Kg/ha. for 62(239). (d) As per treatments. (e) —. (v) Nil. (vi) Samrala-1 (Punjab). (vii) Unirrigated. (viii) 2 to 5 interculturings for all and 2 weedings for 62(239) also. (ix) 34 cm., 82 cm., 66 cm. (x) 7, 8.11.1960; 29 to 31.10.1961; 16.11.1962.

## 2. TREATMENTS :

**Main-plot treatments :**

All combinations of (1), (2), (3) and (4)

- (1) 3 levels of N as A/S :  $N_0=0$ ,  $N_1=11.2$  and  $N_2=22.4$  Kg/ha.  
 (2) 3 levels of  $P_2O_5$  as Sulp.  $P_0=0$ ,  $P_1=28.0$  and  $P_2=56.0$  Kg/ha.  
 (3) 3 levels of  $K_2O$  as Pot. Sul. :  $K_0=0$ ,  $K_1=28.0$  and  $K_2=56.0$  Kg/ha.  
 (4) 3 row spacings :  $S_1=46$ ,  $S_2=61$  and  $S_3=76$  cm.

**Sub-plot treatments :**2 levels of F.Y.M. :  $F_0=0$  and  $F_1=5604$  Kg/ha.

Fertilizers were applied by spreading in rows.

## 3. DESIGN :

- (i) Split-plot confd. (ii) (a) 9 main-plots/block ; 9 blocks/replication and 2 sub-plots/main-plot. (b) N.A.  
 (iii) 1. (iv) (a)  $11.0$  m.  $\times$   $6.4$  m. for  $S_1$  and  $S_2$  ;  $10.7$  m.  $\times$   $6.4$  m. for  $S_3$ . (b)  $9.1$  m.  $\times$   $4.6$  m. (v)  $91$  cm.  $\times$   $91$  cm. for  $S_1$  and  $S_2$  ;  $76$  cm.  $\times$   $91$  cm. for  $S_3$ . (vi) Yes.

## 4. GENERAL :

- (i) Unsatisfactory for 60(118) ; Normal for 61(127) ; Satisfactory for 62(239). (ii) Attack of foot and collar rot for 60(118), 62(239) ; attack of collar rot for 61(127). (iii) Yield of pod. (iv) (a) 1959—1962. (b) No.  
 (c) Since the main and sub-plot error variances found to be heterogenous, pooling could not be done.  
 (v) Junagadh. (vi) Nil. (vii) Results of expt. no. 59(83) has also been included for testing the heterogeneity or homogeneity. Sub-plot error variances are heterogeneous.

## 5. RESULTS :

**60(118)**

- (i) 187 Kg/ha. (ii) (a) 143.8 Kg/ha. (b) 75.3 Kg/ha. (iii) Main effect of S alone is highly significant. (iv) Av. yield of pods in Kg/ha.

	$N_0$	$N_1$	$N_2$	$P_0$	$P_1$	$P_2$	$K_0$	$K_1$	$K_2$	$S_1$	$S_2$	$S_3$	Mean
$F_0$	200	198	168	220	174	174	188	174	204	135	206	226	189
$F_1$	204	185	163	202	202	149	176	157	219	129	214	210	184
Mean	202	192	166	211	188	161	182	166	212	132	210	218	187
$S_1$	131	132	132	126	154	115	131	114	150				
$S_2$	233	217	179	268	185	177	239	173	219				
$S_3$	241	226	186	238	224	192	176	211	266				
$K_0$	195	188	164	243	163	141							
$K_1$	173	177	148	177	191	130							
$K_2$	239	210	186	212	211	212							
$P_0$	225	203	204										
$P_1$	203	193	168										
$P_2$	178	180	125										

C.D. for S marginal means = 58.7 Kg/ha.

**61(127)**

- (i) 1199 Kg/ha. (ii) (a) 358.1 Kg/ha. (b) 203.9 Kg/ha. (iii) Main effect of S and interactions  $P \times K$ ,  $N \times F$  are highly significant. Interaction  $S \times F$  is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	1085	1141	1320	1097	1221	1228	1163	1128	1255	1121	1321	1105	1182
F <sub>1</sub>	1181	1283	1182	1188	1280	1177	1203	1220	1223	1047	1356	1243	1215
Mean	1133	1212	1251	1143	1251	1202	1183	1174	1239	1084	1338	1174	1199
S <sub>1</sub>	980	1046	1225	962	1127	1162	1070	957	1225				
S <sub>2</sub>	1300	1394	1321	1295	1417	1303	1338	1323	1354				
S <sub>3</sub>	1120	1196	1207	1172	1208	1142	1142	1242	1138				
K <sub>0</sub>	1090	1226	1233	968	1301	1281							
K <sub>1</sub>	1098	1187	1236	1250	1029	1243							
K <sub>2</sub>	1211	1222	1284	1210	1423	1083							
P <sub>0</sub>	1087	1197	1145										
P <sub>1</sub>	1167	1175	1411										
P <sub>2</sub>	1146	1264	1197										

C.D. for S marginal means = 146.1 Kg/ha.  
 C.D. for F means at the same level of N or S = 112.2 Kg/ha.  
 C.D. for N, or S means at the same level of F = 166.2 Kg/ha.  
 C.D. for body of P × K table = 253.1 Kg/ha.

62(239)

(i) 1055 Kg/ha. (ii) (a) 326.8 Kg/ha. (b) 169.4 Kg/ha. (iii) Interaction N × P alone is significant. (iv) Av. yield of pod in Kg/ha.

	N <sub>0</sub>	N <sub>1</sub>	N <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
F <sub>0</sub>	1017	1041	1072	1038	980	1112	989	1060	1081	1010	1121	998	1043
F <sub>1</sub>	1058	1046	1098	1066	1070	1066	1027	1060	1115	1062	1125	1015	1067
Mean	1037	1044	1085	1052	1025	1089	1008	1060	1098	1036	1123	1006	1055
S <sub>1</sub>	911	1092	1106	1135	975	999	939	1043	1127				
S <sub>2</sub>	1133	1164	1072	1131	1101	1137	1128	1102	1139				
S <sub>3</sub>	1068	875	1078	890	1000	1131	958	1034	1028				
K <sub>0</sub>	935	1049	1041	1006	924	1095							
K <sub>1</sub>	1098	1054	1027	1104	975	1101							
K <sub>2</sub>	1078	1027	1189	1045	1176	1072							
P <sub>0</sub>	978	955	1223										
P <sub>1</sub>	923	1147	1005										
P <sub>2</sub>	1210	1029	1028										

C.D. for body of N × P table = 230.9 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 65(167).****Site :- Irrigation-cum-Demons. Farm, Umralla.****Type :- 'CM'.**

Object :—To study the effect of local V/S Departmental method of Groundnut after Groundnut and Groundnut after Cotton.

**1. BASAL CONDITIONS :**

(i) (a) As per treatments. (b) Cotton. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 20.7.65. (iv) (a) 1 ploughing, 1 harrowing. (b) Hand sowing. (c) 98.8 Kg/ha. (d) 91.5 cm. between rows. (e) 1—2. (v) Nil. (vi) Punjab-1. (vii) Unirrigated. (viii) 2 weedings, 3 interculturings. (ix) 32 cm. (x) 10.11.65.

**2. TREATMENTS :**

$T_1$  = Groundnut local method : 12.4 C.L./ha. of F.Y.M. and no fertilizer to rotational crop Cotton in next year.

$T_2$  = Groundnut-Departmental method : 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  and next year Cotton with 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$ .

$T_3$  = Groundnut every year : Local method 12.4 C.L./ha. of F.Y.M.

$T_4$  = Groundnut every year : Departmental method 11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ .

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 2. (iv) (a) 36.9 m.×11.0 m. (b) 35.0 m.×9.1 m. (v) 91 cm.×91 cm. (vi) Yes.

**4. GENERAL :**

(i) Below normal. Due to shortage of moisture the yield is affected. (ii) Attack of aphids which damaged the crop heavily. (iii) Pods and tops yield. (iv) (a) 1965—contd. (b) Yes. (c) Nil. (v) to (vii) N.A.

**5. RESULTS :**

(i) 126.4 Kg/ha. (ii) 78.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$
Av. yield	111.6	69.4	206.0	118.6

**Crop :- Groundnut (Kharif).****Ref :- Gj. 60(103).****Site :- Irrigation-cum-Demons. Farm, Umralla.****Type :- 'CM'.**

Object :—To find out the optimum dose of fertilizer and suitable spacing for Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Jowar. (c) Nil. (ii) Medium black. (iii) 26 and 27.6.1960. (iv) (a) N.A. (b) Hand drilling. (c) 45 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) AK. 12-24. (vii) Unirrigated. (viii) Nil. (ix) N.A. (x) 6.10.60.

**2. TREATMENTS :****Main-plot treatments :**

3 row spacings :  $R_1=46$ ,  $R_2=61$ ,  $R_3=91$  cm.

**Sub-plot treatments :**

2 plant spacings :  $S_1=5$  and  $S_2=10$  cm.

**Sub-sub-plot treatments**

All combinations of (1) and (2)

(1) 3 levels of  $P_2O_5$  :  $P_0=0$ ,  $P_1=30.3$  and  $P_2=60.5$  Kg/ha.

(2) 2 levels of  $K_2O$  :  $K_0=0$  and  $K_1=30.3$  Kg/ha.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication, 2 sub-plots/main-plot and 6 sub-sub-plots/sub-plot. (b) N.A. (iii) 3. (iv) (a) 12.2 m.×3.7 m. (b) 10.4 m.×1.8 m. (v) 91 cm.×91 cm. (vi) Yes.



## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Pod yield. (iv) (a) 1958-1960. (b) No. (c) Nil. (v) (a) Amreli and Halvad. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1376 Kg/ha. (ii) (a) 437.3 Kg/ha. (b) 254.9 Kg/ha. (c) 213.0 Kg/ha. (iii) Main effect of R is highly significant. Main effect of S and interaction R×S are significant. (iv) Av. yield of pods in Kg/ha.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
P <sub>0</sub>	1462	1447	1079	1401	1258	1329	1329	1329
P <sub>1</sub>	1527	1513	1103	1432	1329	1390	1372	1381
P <sub>2</sub>	1625	1515	1110	1531	1303	1447	1387	1417
Mean	1538	1492	1097	1455	1297	1389	1363	1376
K <sub>0</sub>	1558	1492	1116	1459	1319			
K <sub>1</sub>	1519	1492	1078	1452	1274			
S <sub>1</sub>	1555	1577	1233					
S <sub>2</sub>	1522	1407	962					

C.D. for R marginal means = 286.2 Kg/ha.  
 C.D. for S marginal means = 120.1 Kg/ha.  
 C.D. for R means at the same level of S = 320.9 Kg/ha.  
 C.D. for S means at the same level of R = 208.6 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 61(200), 62(48), 63(45), 64(5).**

**Site :- Dry Farming Res. Stn., Vallabhipur.**

**Type :- 'CM'.**

**Object :-**To study the effect of different cultural practices and method of application of F.Y.M. on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) Nil for 61 (200) ; 12.4 C.L./ha. of F.Y.M. for others. (ii) Medium black. (iii) 5.7.1961 ; 12.7.1962 ; 8.7.1963 ; 12.7.64. (iv) (a) As per treatments. (b) Drilling. (c) 45 Kg/ha. for 61 (200), 62 (48) ; 99 Kg/ha. for others. (d) 91 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Samrala-1 for 61 (200) ; Punjab-1 for others. (vii) Unirrigated. (viii) 2 to 3 interculturings for 61 (200) ; 62 (48) ; 2 to 3 interculturings and 4 weedings for others. (ix) 60 cm. ; 53 cm. 60 cm. ; 83 cm. (x) 22.10.61 ; 8.11.1962 ; 7.11.1963 ; 17.11.1964.

## 2. TREATMENTS :

**Main-plot treatments :**

7 cultural practices : C<sub>0</sub>=Shallow ploughing in January followed by one harrowing by one harrowing in May (control), C<sub>1</sub>=Continuous shallow ploughing in January every year, C<sub>2</sub>=Continuous shallow ploughing in January every alternate year, C<sub>3</sub>=Continuous shallow ploughing in January every third year, C<sub>4</sub>=One harrowing in January, C<sub>5</sub>=2 harrowings in January and May and C<sub>6</sub>=3 harrowings in January, February and May.

**Sub-plot treatments :**

2 methods of application of F.Y.M. at 12.4 C.L./ha. : M<sub>1</sub>=Applied in furrows and M<sub>2</sub>=Broadcast.  
 Note :- Treatments C<sub>2</sub> and C<sub>3</sub> to be applied in 62 and 63 respectively.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 7 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14.6 m. × 7.3 m. (b) 12.2 m. × 5.5 m. (v) 122 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of tikka for 61(200); attack of aphids controlled by spraying 20% endrine for 62(48); Nil for others. (iii) Pods and tops yield. (iv) (a) 1961-contd. (b) Yes. (c) Nil. (v) N.A. (vi) Crop was affected due to untimely rains for 61 (200); 62 (48); Nil for others. (vii) Nil.

## 5. RESULTS :

## 61(200)

(i) 844 Kg/ha. (ii) (a) 260.6 Kg/ha. (b) 94.5 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	C <sub>0</sub>	C <sub>1</sub>	(C <sub>2</sub> +C <sub>3</sub> )	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>1</sub>	828	817	938	831	852	947	869
M <sub>2</sub>	770	805	918	704	923	800	820
Mean	799	811	928	767	887	873	844

## 62(48)

(i) 312 Kg/ha. (ii) (a) 64.6 Kg/ha. (b) 76.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>1</sub>	297	287	384	290	314	320	331	318
M <sub>2</sub>	312	312	286	353	303	253	318	305
Mean	305	300	335	322	309	287	325	312

## 63(45)

(i) 889 Kg/ha. (ii) (a) 207.6 Kg/ha. (b) 105.4 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>1</sub>	893	931	1012	1031	781	863	827	905
M <sub>2</sub>	900	1000	855	979	760	728	886	873
Mean	897	966	934	1005	771	796	857	889

## 64(5)

(i) 845 Kg/ha. (ii) (a) 118.4 Kg/ha. (b) 124.5 Kg/ha. (iii) Main effect of C alone is significant. (iv) Av. yield of pods in Kg/ha.

	C <sub>0</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	Mean
M <sub>1</sub>	769	875	1037	901	907	760	777	861
M <sub>2</sub>	687	936	890	970	761	732	829	829
Mean	728	905	963	935	834	746	803	845

C.D. for C marginal means = 124.4 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 65(208).****Site :- Oil seeds Res. Farm, Junagadh.****Type :- 'P'**

Object :—To study the effect of different irrigations on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Cotton-Groundnut. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N + 11.2 Kg/ha. of  $P_2O_5$ .  
(ii) Medium black. (iii) 23.7.65. (iv) (a) 2 harrowings. (b) Drilling. (c) 67.2 Kg/ha. (d) 92 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of N + 44.8 Kg/ha. of  $P_2O_5$ . (vi) AH-324 (spraying type). (vii) As per treatments. (viii) 3 interculturings. (ix) 59 cm. (x) 8.11.65 to 12.11.65.

**2. TREATMENTS :**

5 irrigational treatments :  $I_1$  = Irrigated at 60% available moisture @ 3 irrigation on 10.9.65, 28.9.65, 9.10.65,  $I_2$  = Irrigated at 40% available moisture @ 2 irrigations on 23.9.65 and 10.10.65,  $I_3$  = Irrigated at 20% available moisture @ 1 irrigation on 28.9.65,  $I_4$  = Irrigation at maximum peg formation (23.9.65), and  $I_5$  = Control (no irrigation).

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 12.2 m. × 14.6 m. (b) 9.1 m. × 11.0 m. (v) 152.5 cm. × 183.0 cm. (vi) Yes.

**4. GENERAL :**

(i) Crop suffered due to inadequate and uneven rains (very poor in control plot). (ii) Attack of aphids and tikka. (iii) Pods and tops yield. (iv) (a) 1965-67. (b) No. (c) Nil. (v) N.A. (vi) Acute shortage of rains at the time of pod formation. (vii) N.A.

**5. RESULTS :**

(i) 991 Kg/ha. (ii) 136.7 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$
Av. yield	1640	1521	668	891	233

C.D. = 210.6 Kg/ha.

**Crop :- Groundnut (Kharif).****Ref :- Gj. 63(212), 64(185), 65(83).****Site :- Irrigation-cum-Demons. Farm, Jamnagar.****Type :- 'IM'.**

Object :—To study the effects of different fertilizers and irrigation on the yield of Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 22.4 Kg/ha. of  $P_2O_5$  for 63 (212), 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  for others. (ii) Medium black. (iii) 16.7.63, 4.7.64, and 19.7.65. (iv) (a) 2 ploughing and 2 harrowings. (b) Dibbling. (c) 112 Kg/ha. for 63 (212), 74 Kg/ha. for others. (d) 61 cm. × 5 cm. (e) N.A. (v) Nil. (vi) Punjab-1. (vii) As per treatments. (viii) 2 interculturings and 2 weedings. (ix) 29 cm. for 63(212), 57 cm. for 64 (185) and 34.4 cm. for 65 (83). (x) 15.11.63, 7.11.64, 29.10.65.

**2. TREATMENTS :****Main-plot treatments :**

3 irrigational treatments :  $I_0$  = No irrigation,  $I_1$  = 1 and  $I_2$  = 2 irrigations.

**Sub-plot treatments :**

2 levels of treatments :  $F_1$  = 11.2 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$  and  $F_2$  = 22.4 Kg/ha. of N + 44.8 Kg/ha. of  $P_2O_5$ .

N applied as A/S by broadcast one week before sowing and  $P_2O_5$  drilled as Super 3 weeks before sowing. Details of irrigations N.A.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 3 main-plots/replication ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 5.8 m. (b) 9.1 m. × 4.6 m. (v) 61 cm. × 61 cm. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory for 65 (83), Good for others. (ii) Attack of aphids and tikka. (iii) Pods yield. (iv) (a) 1963 to 1965. (b) No. (c) Nil. (v) and (vi) N.A. (vii) Sub-plot error variances are heterogeneous.

## 5. RESULTS :

63(212)

(i) 1003 Kg/ha. (ii) (a) 397.1 Kg/ha. (b) 350.2 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of pods in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
F <sub>1</sub>	670	822	1438	977
F <sub>2</sub>	643	1038	1405	1029
Mean	656	930	1422	1003

C.D. for I marginal means = 485.7 Kg/ha.

64(185)

(i) 1966 Kg/ha. (ii) (a) 347.8 Kg/ha. (b) 141.6 Kg/ha. (iii) Interaction I × F is highly significant. (iv) Av. yield of pods in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
F <sub>1</sub>	1585	1950	2284	1940
F <sub>2</sub>	2249	1674	2057	1993
Mean	1917	1812	2170	1966

C.D. for F means at the same level of I = 239.3 Kg/ha.

C.D. for I means at the same level of F = 457.5 Kg/ha.

65(83)

(i) 387 Kg/ha. (ii) (a) 95.6 Kg/ha. (b) 60.3 Kg/ha. (iii) Main effect of I alone is highly significant. (iv) Av. yield of pods in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
F <sub>1</sub>	269	281	640	397
F <sub>2</sub>	248	257	628	378
Mean	259	269	634	387

C.D. for I marginal means = 118.2 Kg/ha.

Crop :- Groundnut (*Kharif*).

Site :- Trial-cum-Demons. Farm, Kim.

Ref :- Gj. 65(15).

Type :- 'IM'.

Object :- Irrigation-cum-fertilizer trial on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ +12.4 C.L./ha. of F.Y.M. (ii) Medium black. (iii) 6.7.65. (iv) (a) Nil. (b) Drilling. (c) 49.4 Kg/ha. (d) 61 cm. row to row. (e) —, (v) 12.4 C.L./ha. of F.Y.M. (vi) Punjab—1. (vii) As per treatments. (viii) 2 interculturings. (ix) N.A. (x) 25.11.65.

## 2. TREATMENTS :

## Main-plot treatments :

$I_0$ =No irrigation.  $I_1$ =One irrigation (2 acre inches) on 20.9.65.  $I_2$ =Two irrigations (2 acre inches) on 20.9.65, 6.10.65.

## Sub-plot treatments :

$F_1$ =22.4 Kg/ha. of N as Urea+22.4 Kg/ha. of  $P_2O_5$  as Super,  $F_2$ =22.4 Kg/ha. of N as Urea+44.8 Kg/ha. of  $P_2O_5$  as Super.

## 3. DESIGN :

(i) Split plot. (ii) (a) 3 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 10.4 m.  $\times$  5.8 m. (b) 9.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Pods yield. (iv) (a) 1965—contd. (b) No. (c) Nil. (v) to (vii) N.A.

## 5. RESULTS :

(i) 1009 Kg/ha. (ii) (a) 401.9 Kg/ha. (b) 313.6 Kg/ha. (iii) Main effects of I alone is highly significant. (iv) Av. yield of pods in Kg/ha.

	$I_0$	$I_1$	$I_2$	Mean
$F_1$	563	1205	1342	1037
$F_2$	684	903	1360	982
Mean	623	1054	1351	1009

C.D. for marginal means I = 365.6 Kg/ha.

**Crop Groundnut (Kharif).**

**Site :- Trial-cum-Demons. Farm, Kholwad.**

**Ref :- Gj. 65(239).**

**Type :- 'IM'.**

Object :—To find out the irrigational and fertilizer requirements of Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Groundnut—Groundnut. (b) Groundnut. (c) Nil. (ii) Black. (iii) 9.7.65. (iv) (a) 1 ploughing, 2 harrowings. (b) Dibbling. (c) 98.8 Kg/ha. (d) 61 cm. row to row and 10.2 cm. plant to plant. (e) 1. (v) 12.4 C.L./ha. of F.Y.M. (vi) Punjab—1. (vii) Irrigated as per treatments. (viii) 3 interculturings and 2 weedings. (ix) 99 cm. (x) 8.11.65.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of irrigations :  $I_0$ =No irrigation,  $I_1$ =One irrigation on (14.9.65), and  $I_2$ =Two irrigation on 14.9.65 and 1.10.65

(2) 2 Doses of fertilizers :  $M_1$ =11.2 Kg/ha. of N+11.2 Kg/ha.  $P_2O_5$  and  $M_2$ =11.2 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ .

N as A/S and  $P_2O_5$  as Super on 9.7.65.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 10.4 m.  $\times$  5.8 m. (b) 9.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Pods and tops yield. (iv) (a) 1965—contd. (b) No. (c) N.A. (v) to (vii) Nil.

## 5. RESULTS :

(i) 949 Kg/ha. (ii) 181.3 Kg/ha. (iii) Main effect of I alone is significant. (iv) Av. yield of pods in Kg/ha.

Mean Table

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
M <sub>1</sub>	832	983	1233	1016
M <sub>2</sub>	804	843	999	882
Mean	818	913	1116	949

C.D. for I marginal means = 193.2 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 64(228), 65(18).**

**Site :- Irrigational Demons. Farm, Kukda.**

**Type :- 'IM'.**

Object :—To find out the optimum irrigation and fertilizers requirements for Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Cotton. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 65(18), Nil for 64(228). (ii) Medium black. (iii) 9.7.64 and 7.7.65. (iv) (a) 1 to 2 ploughings and harrowing. (b) Dibbling. (c) 62 Kg/ha. (d) 61 cm. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. for 65(18), Nil for other. (vi) Punjab—1. (vii) Irrigated. (viii) Nil. (ix) 36 cm. for 64(228), 37 cm. for 65 (18). (x) 8.11.64 and 7.11.65.

## 2. TREATMENTS :

**Main-plot treatments :**

3 irrigations : I<sub>0</sub>=No irrigation, I<sub>1</sub>=One irrigation and I<sub>2</sub>=Two irrigations.

**Sub-plot treatments :**

2 levels of fertilizers : F<sub>1</sub>=11.2 Kg/ha. of N+22.4 Kg/ha of P<sub>2</sub>O<sub>5</sub> and F<sub>2</sub>=2F<sub>1</sub>.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 3 main-plots/replication, 2 sub-plots/main plot. (b) N.A. (iii) 4. (iv) (a) 10.4 m. × 5.8 m. (b) 9.1 m. × 4.6 m. (v) 61 cm. × 61cm. (iv) Yes.

## 4. GENERAL :

(i) Good for 64(228), Not satisfactory for 65(18). (ii) Nil. (iii) Pods yield. (iv) (a) 1964 to 1965. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Error variances are homogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 1824 Kg/ha. (ii) (a) 445.0 Kg/ha. (with 2 d.f. made up of interaction of I with years). (b) 462.8 Kg/ha. (with 3 d.f. made up of interaction of years with F and F × I). (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
F <sub>1</sub>	1622	1867	1866	1785
F <sub>2</sub>	1927	1764	1902	1864
Mean	1774	1815	1884	1824

**Crop :- Groundnut (Kharif).****Ref :- Gj. 63(73), 64(15), 65(168).****Site :- Irrigation-cum-Demons. Farm, Umrالا.****Type :- '1M'.**

Object :-To study the effect of irrigation and fertilizers on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 63(73), Wheat for 64(15), Fennel for 65(168). (c) 22.4 Kg/ha. of N+11.2 Kg/ha. for 65(73) and 65(168), 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$  for 64(15). (ii) Medium black. (iii) Mid of July. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 90 Kg/ha. for 63(73), 64(15), 99 Kg/ha. for 65(168). (d) 61 cm. for 63(73), 64(15) and 91 cm. for 65(168). (e) 1 to 2. (v) 12.4 C.L./ha. of F.Y.M. (vi) Samrala-1 for 63(73), Punjab-1 for others. (vii) As per treatments. (viii) 1 to 3 weedings and interculturing. (ix) 46 cm. for 63(73), 95 cm. for 64(15). 32 cm. for 65(168). (x) 1.11.63, 23.10.64 and 7.11.65.

**2. TREATMENTS :****Main-plot treatments :**3 levels of irrigation :  $I_0$ =No irrigation,  $I_1$ =1 and  $I_2$ =2 irrigations.**Sub-plot treatments :**2 manurial treatments :  $M_1$ =11.2 Kg/ha. of N as A/S+22.4 Kg/ha. of  $P_2O_5$  as Super and  $M_2$ =22.4 Kg/ha. of N as A/S+44.8 Kg/ha. of  $P_2O_5$  as Super.**3. DESIGN :**

(i) Split plot. (ii) (a) 3 main-plots/replication, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 10.4 m.  $\times$  5.8 m. (b) 9.1 m.  $\times$  4.6 m. (v) 61 cm.  $\times$  61 cm. (iv) Yes.

**4. GENERAL :**

(i) Normal. (ii) Mild attack of aphids, controlled by spray of 10% B.H.C. for 65(168), Nil for others. (iii) Pods yield. (iv) (a) 1963 to 1969. (b) No. (c) N.A. (v) and (vi) N.A. (vii) Main-plot variances are heterogeneous and interaction is absent.

**5. RESULTS :****63(73)**

(i) 1059 Kg/ha. (ii) (a) 141.6 Kg/ha. (b) 164.1 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	$I_0$	$I_1$	$I_2$	Mean
$M_1$	909	1094	1026	1010
$M_2$	1046	1064	1214	1108
Mean	978	1079	1120	1059

**64(15)**

(i) 1363 Kg/ha. (ii) (a) 139.4 Kg/ha. (b) 169.8 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of pods in Kg/ha.

	$I_0$	$I_1$	$I_2$	Mean
$M_1$	1286	1327	1307	1307
$M_2$	1393	1417	1447	1419
Mean	1340	1372	1377	1363

**65(168)**

(i) 1904 Kg/ha. (ii) (a) 423.2 Kg/ha. (b) 159.0 Kg/ha. (iii) Interaction  $I \times M$  is significant. (iv) Av. yield of pods in Kg/ha.

	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	Mean
M <sub>1</sub>	1762	2029	2062	1951
M <sub>2</sub>	1386	1831	2352	1856
Mean	1574	1930	2207	1904

C.D. for M means at the same level of I=254.4 Kg/ha.  
C.D. for I means at the same level of M=612.0 Kg/ha.

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 61(4).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'D'.**

Object :—To study the effect of sulphur in control of tikka disease on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 27.6.60.  
(iv) (a) 1 ploughing and two harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 46 cm. between rows. (e) N.A.  
(v) 12.4 C.L./ha. of F.Y.M. (vi) A.H.-32. (vii) Un-irrigated. (viii) Two interculturings. (ix) 40 cm.  
(x) 4.10.60.

**2. TREATMENTS :**

3 applications of sulphur : S<sub>0</sub>=Control, S<sub>1</sub>=50.4 Kg/ha. as manuring ; 1½ month after sowing and S<sub>2</sub>=50.4 Kg/ha. as dusting in 3 equal doses ; 1½, 2 and 2½ month after sowing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 8. (iv) (a) 6.1 m. × 5.5 m. (b) 5.2 m. × 4.6 m. (v) 46 cm. × 46 cm.  
(vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Nil. (iii) Yield of pods. (iv) (a) 1960-63 (modified from 1961). (b) No. (c) Nil.  
(v) and (vi) N.A. (vii) Combined results for 1961, 62 and 63 are presented separately.

**5. RESULTS :**

(i) 1606 Kg/ha. (ii) 97.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	S <sub>0</sub>	S <sub>1</sub>	S <sub>2</sub>
Av. yield	1630	1564	1623

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 61(24), 62(57), 63(59).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'D'.**

Object :—To study the effect of sulphur in control of tikka disease on Groundnut.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra* for 61(24) Cotton for 62(57), *Jowar* for 63(59). (c) Nil for 62(24) ; 12.4 C.L./ha. of F.Y.M. for others. (ii) Medium black. (iii) 19.7.1961 ; 14.7.1962 ; 10.7.1963. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 67 Kg/ha. for 63(59) ; 90 Kg/ha. for others. (d) 46 cm. between rows. (e) —. (v) 12.4 C.L./ha. of F.Y.M. (vi) A.H.-32. (vii) Unirrigated. (viii) 1 weeding + 1, 2 interculturings. (ix) 33 cm., 29 cm., 56 cm. (x) 17.10.1961 ; 31.10.1962 ; 20.10.1963.



## 2. TREATMENTS :

4 applications of Sulphur :  $S_0$ =Control,  $S_1$ =50.4 Kg/ha. as manuring,  $S_2$ =50.4 Kg/ha. as dusting and  $S_3$ =6.6 Kg/ha. as wettable sulphur spraying.

$S_1$ ,  $S_2$  and  $S_3$  were applied in 3 equal doses at 1½, 2 and 2½ months after sowing. 50 gallons of water to be used for each spray in  $S_3$ .

## 3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) 13.7 m. × 4.1 m. (b) 12.5 m. × 2.3 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Unsatisfactory for 62(57) ; Normal for others. (ii) No incidence for 61(24) ; attack of aphids and *tikka* for others. (iii) Yield of pods. (iv) (a) 1960 to 1963 (modified in 1961). (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Shortage of rains affected the crop for 62(57). (vii) Nil.

## 5. RESULTS :

(i) 916 Kg/ha. (ii) 132.5 Kg/ha. (33 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	$S_0$	$S_1$	$S_2$	$S_3$
Av. yield	944	912	915	891

**Crop :- Groundnut (Kharif).**

**Ref :- Gj. 64(212).**

**Site :- Trial-cum-Demons. Farm, Pilwai.**

**Type :- 'D'.**

Object :—To study the effect of different insecticides against white grubs on Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Wheat-Groundnut. (b) Wheat. (c) 44.8 Kg/ha. of N + 22.4 Kg/ha. of  $P_2O_5$ . (ii) Sandy loam. (iii) 29.6.64. (iv) (a) 2 ploughings and 5 harrowings. (b) Drilling. (c) 148 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Samrala-1. (vii) Unirrigated. (viii) 4 weedings and 5 inter-cultings. (ix) 47 cm. (x) 10.11.64.

## 2. TREATMENTS :

All combinations of (1), (2)+control (3 plots)

(1) 3 insecticidal treatments :  $I_1$ =B.H.C 10% dust,  $I_2$ =Chlorad 50% dust and  $I_3$ =Heptachlor 60% dust.

(2) 3 levels of insecticides :  $D_1$ =44.8,  $D_2$ =67.2 and  $D_3$ =89.7 Kg/ha. of dust.

Time of application N.A.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.1 m. × 10.1 m. (b) 6.1 m. × 7.6 m. (v) 193 cm. × 122 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Pods and tops yield. (iv) (a) 1954—contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 822 Kg/ha. (ii) 458.3 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield pods in Kg/ha.

Control=604 Kg/ha.

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	Mean
I <sub>1</sub>	673	1130	1092	965
I <sub>2</sub>	689	694	1087	823
I <sub>3</sub>	1168	942	976	895
Mean	843	922	918	894

**Crop :- Groundnut (Kharif).****Ref :- Gj. 62(70).****Site :- Irrigation-cum-Demons. Farm, Umrالا.****Type :- 'D'.**

Object :—To study the effect of different insecticides in controlling white grubs in soil attacking Groundnut crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 19.7.62. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 67 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Samrala-1. (vii) Unirrigated. (viii) Nil. (ix) 35 cm. (x) 22.11.62.

**2. TREATMENTS :**

6 insecticides : I<sub>0</sub>=Control, I<sub>1</sub>=22.4 Kg/ha. of B.H.C. 5% dust, I<sub>2</sub>=22.4 Kg/ha. of B.H.C. 10% dust, I<sub>3</sub>=11.2 Kg/ha. of Aldrin 5% dust, I<sub>4</sub>=22.4 Kg/ha. of Aldrin 5% dust and I<sub>5</sub>=22.4 Kg/ha. of Chlordane 5% dust.

Insecticides were applied before sowing in furrows by hand.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 10.1 m.×10.1 m. (b) 7.3 m.×6.1 m. (v) 137 cm.×198 cm. (vi) Yes.

**4. GENERAL :**

(i) Crop failed. (ii) Attack of aphids. (iii) Pods yield. (iv) (a) 1962—1964. (b) No. (c) Nil. (v) N.A. (vi) Scanty rains. (vii) Nil.

**5. RESULTS :**

(i) 150 Kg/ha. (ii) 35.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	I <sub>4</sub>	I <sub>5</sub>
Av. yield	138	178	191	138	120	138

**Crop :- Groundnut (Kharif).****Ref :- Gj.63(75).****Site :- Irrigation-cum-Demons. Farm, Umrالا.****Type :- 'D'.**

Object :—To study the effect of different insecticides in controlling white grubs in soil for Groundnut crop.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton. (c) 22.4 Kg/ha. of N+11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 12.7.63. (iv) (a) 1 ploughing and 2 harrowings. (b) Dibbling. (c) 67 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (vi) Samrala-1. (vii) Unirrigated. (viii) Nil. (ix) 46 cm. (x) 17.11.63.

## 2. TREATMENTS :

8 insecticides :  $I_0$ =Control,  $I_1$ =22.4 Kg/ha. of B.H.C. 5% dust,  $I_2$ =22.4 Kg/ha. of B.H.C. 10% dust,  $I_3$ =11.2 Kg/ha. of Aldrin 5% dust,  $I_4$ =22.4 Kg/ha. of Aldrin 5% dust,  $I_5$ =22.4 Kg/ha. of Chlordane 5% dust,  $I_6$ =22.4 Kg/ha. of Chlordane 10% dust and  $I_7$ =22.4 Kg/ha. of Heptachlore 6% dust.

Insecticides were applied before sowing in furrows by hand.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 4. (iv) (a) 8.5 m. × 7.3 m. (b) 7.3 m. × 5.5 m. (v) 61 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Pods yield. (iv) (a) 1962—1964 (modified in 1963). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1240 Kg/ha. (ii) 361.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$I_7$
Av. yield	1258	1433	1065	1240	1557	959	997	1408

**Crop :** Groundnut (*Kharif*).

**Ref :-** Gj. 64(16).

**Site :-** Irrigation-cum-Demons. Farm, Umrala.

**Type :-** 'D'.

**Object :-** To study the effect of different insecticides for controlling white grubs in soil attacking Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Wheat. (c) 44.8 Kg/ha. of N+22.4 Kg/ha. of  $P_2O_5$ . (ii) Medium black. (iii) 10.7.64. (iv) (a) 1 ploughing and 2 harrowings. (b) Drilling. (c) 90 Kg/ha. (d) 91 cm. between rows. (e) N.A. (v) 44.8 Kg/ha. of  $P_2O_5$ . (vi) Punjab-1. (vii) Unirrigated. (viii) Nil. (ix) 95 cm. (x) 12.11.64.

## 2. TREATMENTS :

10 insecticides :  $I_0$ =Control (3 plots),  $I_1$ =44.8,  $I_2$ =67.2,  $I_3$ =89.7 Kg/ha. of B.H.C. 10%,  $I_4$ =44.8,  $I_5$ =67.2,  $I_6$ =89.7 Kg/ha. of Chlordane 5%,  $I_7$ =28.0,  $I_8$ =55.0 and  $I_9$ =84.1 Kg/ha. of Telodrin 1%.

Insecticides were applied before sowing in furrows by hand.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) 10.1 m. × 10.1 m. (b) 7.6 m. × 6.1 m. (v) 122 cm. × 198 cm. (vi) Yes.

## 4. GENERAL :

(i) Good. (ii) Nil. (iii) Pods yield. (iv) (a) 1962 - 64 (modified in 1963 and 1964). (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

(i) 1284 Kg/ha. (ii) 149.8 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	$I_0$	$I_1$	$I_2$	$I_3$	$I_4$	$I_5$	$I_6$	$I_7$	$I_8$	$I_9$
Av. yield	1305	1294	1216	1273	1251	1313	1405	1399	1195	1145



C.D. for F marginal means = 8.05 Kg/ha.  
 C.D. for means in the body of N×K or P×K table = 147.3 Kg/ha.

64(4)

(i) 394 Kg/ha. (ii) (a) 190.9 Kg/ha. (b) 73.2 Kg/ha. (iii) Main effect of S is highly significant and that of P is significant. (iv) Av. yield of seed in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	429	395	486	485	420	405	530	286	494	437	437	437
N <sub>1</sub>	315	375	444	397	358	378	422	365	357	363	392	378
N <sub>2</sub>	299	380	422	350	384	368	449	294	359	351	384	367
Mean	348	383	451	411	387	384	467	312	403	384	404	394
F <sub>0</sub>	343	376	432	400	382	369	460	295	396			
F <sub>1</sub>	352	391	470	421	393	398	473	329	410			
S <sub>1</sub>	430	456	514	460	453	488						
S <sub>2</sub>	269	298	368	338	337	260						
S <sub>3</sub>	344	395	470	435	372	403						
K <sub>0</sub>	330	419	483									
K <sub>1</sub>	371	372	419									
K <sub>2</sub>	342	358	451									

C.D. for two S or P marginal means = 84.6 Kg/ha.

65(104)

(i) 413 Kg/ha. (ii) (a) 215.3 Kg/ha. (b) 89.7 Kg/ha. (iii) Interaction N×K alone is significant. (iv) Av. yield of seed in Kg/ha.

	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	K <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	F <sub>0</sub>	F <sub>1</sub>	Mean
N <sub>0</sub>	349	440	447	395	421	419	417	407	411	431	393	412
N <sub>1</sub>	370	406	434	444	309	457	410	459	340	397	410	404
N <sub>2</sub>	434	377	460	428	508	335	426	449	397	407	441	424
Mean	384	408	447	422	413	404	418	438	383	412	415	413
F <sub>0</sub>	381	398	456	442	397	395	412	437	385			
F <sub>1</sub>	388	417	439	403	429	412	424	439	381			
S <sub>1</sub>	385	446	422	458	426	369						
S <sub>2</sub>	411	422	482	393	499	423						
S <sub>3</sub>	357	354	437	417	314	418						
K <sub>0</sub>	355	428	484									
K <sub>1</sub>	352	394	492									
K <sub>2</sub>	446	400	365									

C.D. for means in the body of N×K table = 165.3 Kg/ha.

**Crop :- Lang (Rabi).****Ref :- Gj. 61(53), 62(126), 63(133).****Site :- Agri. Res. Stn., Tancha.****Type :- 'M'.**Object :-To study the effect of different carriers of  $P_2O_5$  on the yield of Lang.**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) N.A. for 63(133), Wheat for others. (c) N.A. for 63(133), Nil for others. (ii) Black soil. (iii) 5.11.1961, 11.10.1962, 9.10.1963. (iv) (a) 1 ploughing and 1 to 4 harrowings. (b) Drilling. (c) 45 Kg/ha. (d) 46 cm. between rows. (e) Nil. (v) 22.4 Kg/ha. of N as A/S. (vi) T-2-12. (vii) Unirrigated. (viii) Nil. (ix) Nil for 61(53), 52 cm., 95 cm. for respective years. (x) 7.3.1962, 10.1.1963, 25.1.1964.

**2. TREATMENTS :**

5 sources of  $P_2O_5$  at 44.8 Kg/ha. :  $S_0$ =Control (No  $P_2O_5$ ),  $S_1$ =Triple Super,  $S_2$ =Mono. Ammo. Phos.,  $S_3$ =Diammo. Phos. and  $S_4$ =Ammoniated triple Super.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) 32.0 m.  $\times$  7.9 m. (iii) 8. (iv) (a) 7.9 m.  $\times$  6.4 m. (b) 6.1 m.  $\times$  4.6 m. (v) 91 cm.  $\times$  91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Heavy attack of leaf eating caterpillars and jassides for 61(53), 50% B.H.C. was applied. No incidence for others but 5% B.H.C. was dusted for 63(133). (iii) Yield of grain. (iv) (a) 1961-1963. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Due to heavy attack of jassides the crop dried before maturity for 61(53), Crop stand reduced to some extent by damping off due to heavy rains for 62(126). (vii) Error variances are heterogeneous and Treatments  $\times$  years interaction is absent.

**5. RESULTS :****61(53)**

(i) 579 Kg/ha. (ii) 110.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$S_0$	$S_1$	$S_2$	$S_3$	$S_4$
Av. yield	557	569	605	602	562

**62(126)**

(i) 715 Kg/ha. (ii) 146.4 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$S_0$	$S_1$	$S_2$	$S_3$	$S_4$
Av. yield	655	648	727	741	804

**63(133)**

(i) 484 Kg/ha. (ii) 62.83 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$S_0$	$S_1$	$S_2$	$S_3$	$S_4$
Av. yield	460	469	486	526	479

**Crop :- Castor (Kharif).****Ref :- Gj. 63(39).****Site :- Oilseed Res. Stn., Manund.****Type :- 'C'.**

Object :-To find out the optimum spacing and time of sowing for Castor.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Mustard. (c) Nil. (ii) Sandy loam. (iii) As per treatments. (iv) (a) 2 ploughings and 3 harrowings. (b) Hand dibbling. (c) 6 Kg/ha. (d) As per treatments. (e) N.A. (v) Nil. (vi) S-20. (vii) 3 interculturings. (viii) N.A. (ix) 76 cm. (x) 20.12.63 to 15.2.64.

## 2. TREATMENTS :

## Main-plot treatments :

4 dates of sowing :  $D_1=20$ th July,  $D_2=5$ th August,  $D_3=20$ th August and  $D_4=5$ th Sept.

## Sub-plot treatments :

3 spacings :  $S_1=91$  cm.  $\times$  61 cm.,  $S_2=114$  cm.  $\times$  61 cm. and  $S_3=152$  cm.  $\times$  61 cm.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication, 3 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12.2 m.  $\times$  6.1 m. (b) 9.1 m.  $\times$  6.1 m. (v) 152 cm. on either side. (vi) Yes.

## 4. GENERAL :

(i) Soon after sowing there was heavy shower of rains to stiffen the soil as a result, the germination was uneven. Gaps were filled twice. (ii) Nil. (iii) Yield of seeds. (iv) (a) 1963. (b) No. (c) Nil. (v) (a) N.A. (b) Nil. (vi) Due to long break of rains and absence of soil moisture, the sowing on 20th July was dropped from the experiment. (vii) Due to adverse climatic conditions and salty irrigation water during previous two years the soil got hard like stone to retard crop growth and yield.

## 5. RESULTS :

(i) 222 Kg/ha. (ii) (a) 108.4 Kg/ha. (b) 58.5 Kg/ha. (iii) Main effect of S and interaction  $D \times S$  are highly significant. (iv) Av. yield of seed in Kg/ha.

	$D_1$	$D_2$	$D_3$	Mean
$S_1$	158	293	191	214
$S_2$	298	342	174	271
$S_3$	196	157	192	182
Mean	217	264	186	222

C.D. for S marginal means = 49.3 Kg/ha.  
C.D. for S means at the same level of D = 85.4 Kg/ha.  
C.D. for D means at the same level of S = 121.9 Kg/ha.

**Crop :- Castor (*Kharif*).**

**Ref :- Gj. 63(38), 65(105).**

**Site :- Oilseed Res. Stn., Manund.**

**Type :- 'CM'.**

Objec: t—To find out the optimum spacing and fertilizer requirements of Castor.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Mustard, *Bajri*. (c) Nil. (ii) Sandy loam. (iii) 22.8.63, 6.8.65. (iv) (a) 1 ploughing and 3 harrowings, 3 ploughings and 2 harrowings. (b) Dibbling. (c) 6 Kg/ha. (d) As per treatments. (e) Nil. (v) Nil. (vi) S-20 (medium). (vii) Unirrigated for 63(38), irrigated for 65(105). (viii) 3 interculturings, 3 weedings and 3 interculturings. (ix) 76 cm., 29 cm. (x) 20.12.63 to 15.2.64, Dec. 1965 to March 66.

## 2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 spacings :  $S_1=91$  cm.  $\times$  61 cm.,  $S_2=114$  cm.  $\times$  61 cm. and  $S_3=152$  cm.  $\times$  61 cm.

(2) 2 manurial treatments :  $M_0$ =Control (No manure) and  $M_1=11.2$  Kg/ha. of N as A/S + 22.4 Kg/ha. of  $P_2O_5$  as Super.

## 3. DESIGN :

(i) Fact. in R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 10.1 m.  $\times$  5.5 m., 7.3 m.  $\times$  10.1 m. (b) 9.1 m.  $\times$  5.5 m., 6.1 m.  $\times$  9.1 m. (v) 46 cm.  $\times$  46 cm., 61 cm.  $\times$  46 cm. (vi) Yes.

## 4. GENERAL :

(i) Poor, Normal. (ii) N.A. (iii) Yield of castor seed. (iv) (a) 1963 to 1965 (not conducted in 1964). (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) As the error variances are heterogenous and Treatments  $\times$  years interaction is absent, the results of the individual experiments are presented below.

## 5. RESULTS :

63(38)

(i) 136 Kg/ha. (ii) 46.2 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of castor seed in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	87	139	132	119
M <sub>1</sub>	149	158	154	154
Mean	118	148	143	136

65(105)

(i) 1029 Kg/ha. (ii) 374.9 Kg/ha. (iii) None of the effects is significant. (iv) Av. yield of castor seed in Kg/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	Mean
M <sub>0</sub>	1233	929	821	994
M <sub>1</sub>	1129	1152	910	1064
Mean	1181	1040	865	1029

**Crop :- Jowar fodder (Kharif).**

**Ref :- Gj. 60(163-a).**

**Site :- Soil Cons. Res. Demons. and Training Centre, Vasad. Type :- 'M'.**

Object :- To find out the effective dose of P<sub>2</sub>O<sub>5</sub> for mung crop and its residual effect on succeeding Jowar crop.

## 1. BASAL CONDITIONS :

(i) (a) *Mung-Jowar*. (b) *Mung*. (c) As per treatments. (ii) Sandy loam to loam (alluvial in nature). (iii) 18.9.1960. (iv) (a) 1 ploughing and 1 harrowing. (b) Drilling. (c) 45 Kg/ha. (d) 30 cm. between rows. (e) N.A. (v) Nil. (vi) Sundhia S-1049. (vii) Un-irrigated. (viii) 3 interculturings. (ix) 42 cm. (x) 13.11.1960.

## 2. TREATMENTS :

3 levels of P<sub>2</sub>O<sub>5</sub> as Saper : P<sub>0</sub>=0, P<sub>1</sub>=33.6 and P<sub>2</sub>=67.2 Kg/ha.

These treatments were applied to previous mung crop on 22.6.1960.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 9.1 m.  $\times$  7.3 m. (b) 8.5 m.  $\times$  6.7 m. (v) 30 cm.  $\times$  30 cm. (vi) Yes.

## 4. GENERAL :

(i) Not good. (ii) Nil. (iii) Grain and fodder yield. (iv) 1957-1960. (b) Yes. (c) Nil. (v) N.A. (vi) Shortage of rains affected the crop. (vi) Nil.

## 5. RESULTS :

(i) 677 Kg/ha. (ii) 230.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of fodder in Kg/ha.



Treatment	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Av. yield	651	664	717

**Crop :- Legumes (Kharif).**

**Ref :- Gj. 60(161).**

**Site :- Soil Cons. Res. Demons. and Training Centre, Vasad. Type :- 'M'.**

Object :—To study the response of cultivated Legumes likely to serve as cover crops to the application of Boron and Manganese.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) and (c) As per treatments. (ii) Sandy loam to loam (iii) 24.6.60 and 2.7.60. (iv) (a) 1 ploughing and 1 harrowing. (b) Dibbling (c) N.A. (d) 30 cm. × 30 cm. (e) 1. (v) 67.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub> at sowing. (vi) Improved strains. (vii) Unirrigated. (viii) 2 interculturings. (ix) 42 cm. (x) 2.10.60 to 13.12.60.

**2. TREATMENTS :**

**Main-plot treatments :**

4 legumes : L<sub>1</sub>=Cowpea, L<sub>2</sub>=Guar, L<sub>3</sub>=Mung and L<sub>4</sub>=Moth.

**Sub-plot treatments :**

4 combinations of Boron and Manganese : O<sub>0</sub>=No B or Mn, B<sub>1</sub>=5.6 Kg/ha. of Boron, M<sub>2</sub>=5.6 Kg/ha. of Manganese and BM<sub>3</sub>=5.6 Kg/ha. of Boron + 5.6 Kg/ha. of Mn.

**3. DESIGN :**

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 7.3 m. × 2.7m. (b) 7.0 m. × 2.4 m. (v) 15 cm. × 15 cm. (vi) Yes.

**4. GENERAL :**

(i) N.A. (ii) Nil. (iii) Legumes yield. (iv) (a) 1958-1960. (b) Yes. (c) Nil. (v) N.A. (vi) Nil. (vii) The experiment is analysed as R.B.D. for different legumes.

**5. RESULTS :**

(i) and (ii) As below. (iii) The treatment differences are not significant. (iv) Av. yield of legumes in Kg/ha.

	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>
O	78	124	651	60
B	91	249	562	109
M	71	141	578	39
BM	82	202	561	89
Mean	80	179	588	74
S.E./plot	22.4	84.9	138.4	52.5

**Crop :- Lucern (Rabi).**

**Ref :- Gj. 60(37), 61(179), 62(175).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'CM'.**

Object :—To find out the suitable spacing and optimum dose of fertilizers for Lucern.

## 1. BASAL CONDITIONS :

(i) (a) Nil for 60 (37); Lucern-*Bajra* for others. (b) Cotton for 60 (37); *Bajra* for others. (c) Nil for 60(37); 12.4 C.L./ha. of F.Y.M. for 61 (179); 22.4 Kg/ha. of N+11.2 Kg/ha. of  $P_2O_5$  for 62 (175). (ii) Medium black. (iii) 2.11.1960, 27.11.1961, 24.11.1962. (iv) (a) 1 to 2 ploughings+2 harrowings. (b) Hand sowing. (c) 22 Kg/ha. (d) As per treatments. (e) —. (v) Nil, (vi) Local. (vii) Irrigated. (viii) Nil. (ix) 5 cm. for 62 (175); Nil for others. (x) 3.1.1961 to 20.5.1961 (6 cuttings); 20.1.1962 to 20.5.1962 (5 cuttings); 26.1.1963 to 26.5.1963 (5 cuttings).

## 2. TREATMENTS :

## Main-plot treatments :

4 spacings :  $S_1$ =Broadcasting,  $S_2$ =15 cm. between rows,  $S_3$ =30 cm. between rows and  $S_4$ = 30 cm. in ridges and furrows.

## Sub-plot treatments :

4 levels of  $P_2O_5$  as Super :  $P_0=0$ ,  $P_1=56.0$ ,  $P_2=112.1$  and  $P_3= 168.1$  Kg/ha.

## Sub-sub-plot treatments

2 levels of N as A/S :  $N_0=0$  and  $N_1=22.4$  Kg/ha.

## 3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/replication ; 4 sub-plots/main-plot and 2 sub-sub-plots/sub-plot. (b) N.A. (iii) 2 for 60 (37) ; 4 for others. (iv) (a) 7.3 m.  $\times$  5.5 m. for 60 (37) ; 3.7 m.  $\times$  5.5 m. for others. (b) 6.1 m.  $\times$  4.3 m. for 60 (37) ; 2.4 m.  $\times$  4.9 m. for others. (v) 61 cm.  $\times$  61 cm. for 60 (37) ; 61 cm.  $\times$  30 cm. for others. (vi) Yes.

## 4. GENERAL :

(i) Normal for 62 (175) ; Good for others. (ii) Attack of aphids for 62 (175) ; No incidence for others. (iii) Yield of green fodder. (iv) (a) 1959-1962. (b) No. (c) Nil. (v) N.A. (vi) Nil. (vii) Error variances are heterogeneous.

## 5. RESULTS :

## 60(37)

(i) 479.0 Q/ha. (ii) (a) 108.7 Q/ha. (b) 47.2 Q/ha. (c) 40.4 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of green fodder in Q/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$P_0$	$P_1$	$P_2$	$P_3$	Mean
$N_0$	522.7	459.0	442.6	455.7	450.2	489.8	478.0	462.0	470.0
$N_1$	531.3	462.0	497.6	461.0	472.4	490.8	491.8	497.0	488.0
Mean	527.0	460.5	470.1	458.3	461.3	490.3	484.9	479.5	479.0
$P_0$	518.2	447.7	447.9	431.4					
$P_1$	545.3	464.2	477.3	474.4					
$P_2$	514.2	469.2	486.3	469.9					
$P_3$	530.5	461.0	469.0	457.7					

## 61(179)

(i) 542.5 Q/ha. (ii) (a) 213.1 Q/ha. (b) 87.7 Q/ha. (c) 47.1 Q/ha. (iii) None of the effects is significant. (iv) Av. yield of green fodder in Q/ha.

	$S_1$	$S_2$	$S_3$	$S_4$	$P_0$	$P_1$	$P_2$	$P_3$	Mean
$N_0$	594.8	539.4	524.8	515.8	518.4	517.1	557.1	582.2	543.7
$N_1$	592.2	510.8	526.0	536.2	520.8	543.1	553.5	547.8	541.3
Mean	593.5	525.1	525.4	526.0	519.6	530.1	555.3	565.0	542.5
$P_0$	602.7	575.4	497.7	502.6					
$P_1$	559.7	525.4	544.4	490.9					
$P_2$	604.4	552.4	526.2	538.2					
$P_3$	607.2	547.2	533.3	572.3					

62(175)

- (i) 217.3 Q/ha. (ii) (a) 33.8 Q/ha. (b) 90.0 Q/ha. (c) 30.1 Q/ha. (iii) Main effect of S alone is significant.  
 (iv) Av. yield of green fodder in Q/ha.

	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>	S <sub>4</sub>	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	P <sub>3</sub>	Mean
N <sub>0</sub>	202.0	235.5	219.3	207.1	234.8	213.8	202.9	212.4	216.0
N <sub>1</sub>	201.7	230.3	235.7	206.8	223.8	217.6	204.4	228.7	218.6
Mean	201.9	232.9	227.5	206.9	229.3	215.7	203.7	220.6	217.3
P <sub>0</sub>	204.1	271.5	236.7	205.0					
P <sub>1</sub>	195.9	220.1	231.7	214.9					
P <sub>2</sub>	201.5	202.3	212.2	198.6					
P <sub>3</sub>	205.9	237.8	229.5	209.2					

C.D. for S marginal means=4.8 Q/ha.

**Crop :- Sann (Kharif).**

**Ref :- Gj. 63(189).**

**Site :- Agri. Res. Stn., Dohad.**

**Type :- 'D'.**

**Object :-** To study the effect of different insecticides in controlling the attack of Gujarat hairy catter pillars.

**1. BASAL CONDITIONS :**

- (i) (a) Sann-Paddy-Wheat. (b) Wheat. (c) 33.6 Kg/ha. of N+16.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 3rd week of June, 63. (iv) (a) 3 ploughings. (b) Hand sowing (broadcasting). (c) 44.8 Kg/ha. (d) N.A. (e) N.A. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil. (ix) 66.5 cm. (x) Nil.

**2. TREATMENTS :**

- 6 insecticidal treatments : T<sub>0</sub>=Control (no insecticide), T<sub>1</sub>=BHC 10% @16.8 Kg/ha., T<sub>2</sub>=BHC 50% @0.3 Kg/ha., T<sub>3</sub>=D.D.T. 50% W<sub>1</sub>W @ 0.3 Kg/ha., T<sub>4</sub>=Methyl Parathion 2% dust @ 16.8 Kg/ha., and T<sub>5</sub>=Endrin 20% E.C. @ 0.3 Kg/ha.

**3. DESIGN :**

- (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 10.1 m.×10.1 m. (b) 7.6 m.×6.1 m. (v) 122 cm.×198 cm. (vi) Yes.

**4. GENERAL :**

- (i) Good. (ii) Attack of Gujarat hairy catter pillars. (iii) No. of dead and alive catter pillars from each plot for seven days after spraying of insecticides. (iv) (a) 1963 only. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Yield data not recorded.

**5. RESULTS :**

- (i) 16.7 degrees/ha. (ii) 11.4 degrees/ha. (iii) Treatment differences are significant. (iv) Mean infestation in degrees.

Treatment	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. infestation in degrees	9.6	11.4	8.4	9.8	29.5	31.3

C.D.=17.2 degrees.

**Crop :- Sann (for green manuring) (Kharif).****Ref :- Gj. 64(28), 65(101).****Site :- Agri. Res. Stn., Dohad.****Type :- 'D'.**

Object :—To study the effect of different insecticides for control of Gujarat hairy catter pillars.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Oats and Peas for 64. Wheat for 65. (c) 22.4 Kg/ha. of N+16.8 Kg/ha. of  $P_2O_5$  for 64. 67.2 Kg/ha. of N+33.6 Kg/ha. of  $P_2O_5$  for 65. (ii) Medium black. (iii) 27.6.64, 5.9.65. (iv) (a) Nil. (b) Broadcasting. (c) 74 Kg/ha. (d) Irregular. (e) Nil. (v) Nil. (vi) Local. (vii) Unirrigated. (viii) Nil. (ix) 49 cm., 34 cm. (x) Nil.

**2. TREATMENTS :**

6 insecticidal treatments :  $T_0$ =Control,  $T_1$ =B.H.C. 10% at 16.8 Kg/ha.,  $T_2$ =B.H.C. 50% at 28.0 Kg/ha.,  $T_3$ =D.D.T. 50% at 0.3 Kg/ha.,  $T_4$ =Methyl Parathion 2% dust at 16.8 Kg/ha. and  $T_5$ =Endrin 20% at 0.3 Kg/ha.

Seventh treatment :  $T_6$  for 65 is Telodrin at 0.035% at 0.4 Kg/ha.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6 for 64 and 7 for 65. (b) N.A. (iii) 4. (iv) (a) 10.1 m.×10.1 m. (b) 6.1 m.×7.6 m. (v) 198 cm.×122 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of Gujarat hairy catter pillars. (iii) Count of dead and alive catter pillars. (iv) (a) 1964-1965. (b) No. (c) N.A. (v) N.A. (vi) Scanty and uneven rains. (vii) No yield date recorded. Error variances are heterogeneous and Treatments×years interaction is absent.

**5. RESULTS :****64(28)**

(i) 28.60. (ii) 4.40. (iii) Treatment differences are significant. (iv) Av. values of death percentage in angular units (in 7 days).

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
Angular values in degrees	27.4	28.1	28.1	28.4	23.1	36.4

C.D.=6.5 degrees.

**65(101)**

(i) 13.5 degrees. (ii) 2.7 degrees. (iii) Treatment differences are significant. (iv) Av. values of death percentage in angular units (in 7 days).

Treatment	$T_0$	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Angular values in degrees	8.3	12.2	14.0	11.2	10.7	18.3	20.1

C.D.=4.1 degrees.

**Crop :- Coconut.****Ref :- Gj. 64(302), 65(274).****Site :- Govt. Plantation, Mahuva.****Type :- 'M'.**

Object :—To find out suitable manurial dose for the adult Coconut trees under Mahuva conditions (the place of the Sea Coast with a few rainfall).

**1. BASAL CONDITIONS :**

(i) N.A. (ii) Sandy loam. (iii) Planting the seedlings in pits. (iv) West coast tall variety. (v) Old existing plantation. 7.6 m.×7.6 m. (vi) N.A. (vii) Nil. (viii) One ploughing in a year. (ix) Arecanut. (x) Irrigated. (xi) 65 cm., 56 cm. (xii) Plucking of Coconuts throughout the year as and when ready.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)+2 extra treatments

(1) 2 levels of N as A/S :  $N_1=3$  Kg. and  $N_2=7$  of Kg. N/tree.

(2) 2 levels of  $P_2O_5$  as Super :  $P_1=0.2$  Kg. and  $P_2=0.5$  Kg. of  $P_2O_5$ /tree.

(3) 2 levels of  $K_2O$  as Pot. Sul. :  $K_1=0.7$  Kg. and  $K_2=1.4$  Kg. of  $K_2O$ /tree.

$T_1=0.4$  Kg. of N+0.4 Kg. of  $P_2O_5$ +0.4 Kg. of  $K_2O$ /tree and  $T_2=1.4$  Kg. of lime/tree.

## 3. DESIGN :

(i)  $2^3+2$  Factorial in R.B.D. (ii) (a) 10. (b) Nil. (iii) 2. (iv) (a) Nil. (b) 6 trees per treatment. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) No. of Coconuts (Fruits)/tree. (iv) (a) 1964—contd. (b) Nil. (v) (a) N.A. (b) Nil. (v) and (vi) Nil.

## 5. RESULTS :

64(302)

(i) 407 Kg/6 trees. (ii) 72.4 Kg/6 trees. (iii) None of the effects is significant. (iv) Av. yield of Coconut in Kg/6 trees.

$T_1=425$  Kg/6 trees,  $T_2=411$  Kg/6 trees.

	$P_1$	$P_2$	$K_1$	$K_2$	Mean
$N_1$	395	396	406	385	396
$N_2$	412	416	418	410	414
Mean	403	406	412	398	405
$K_1$	411	413			
$K_2$	396	399			

65(274)

(i) 409 Kg/6 trees. (ii) 88.9 Kg/6 trees. (iii) None of the effects is significant. (iv) Av. yield of Coconut in Kg/6 trees.

$T_1=463$  Kg/6 trees,  $T_2=403$  Kg/6 trees.

	$P_1$	$P_2$	$K_1$	$K_2$	Mean
$N_1$	437	410	441	406	424
$N_2$	353	415	368	401	384
Mean	395	413	405	404	404
$K_1$	387	422			
$K_2$	404	403			

Crop :- Coconut.

Site :- Govt. Plantation, Mahuva.

Ref :- Gj. 64(301), 65(273).

Type :- 'M'.

Object :- To study the suitable manurial dose for the adult Coconut trees under Mahuva conditions.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Sandy loam soil. (iii) Planting the seedlings in pits. (iv) West coast tall variety. (v) Old existing plantation 7.6 m. × 7.6 m. (vi) N.A. (vii) Nil. (viii) One ploughing in every year. (ix) Arecanut. (x) Irrigated. (xi) 65 cm., 56 cm. (xii) Plucking of Coconut fruits throughout the year as and when ripe.

## 2. TREATMENTS :

14 manurial treatment :  $M_1=N_1P_1K_1$ ,  $M_2=N_1P_1K_2$ ,  $M_3=N_1P_2K_1$ ,  $M_4=N_1P_2K_2$ ,  $M_5=N_2P_1K_1$ ,  $M_6=N_2P_1K_2$ ,  $M_7=N_2P_2K_1$ ,  $M_8=N_2P_2K_2$ ,  $M_9=N_1P_1K_3$ ,  $M_{10}=N_1P_2K_3$ ,  $M_{11}=N_2P_1K_3$ ,  $M_{12}=N_2P_2K_3$ ,  $M_{13}=N_3P_2K_3$  and  $M_{14}$ =Control (Local dose @ 0.4 Kg/tree of N+0.4 Kg/tree of  $P_2O_5$ +0.4 Kg/tree of  $K_2O$ .)

Where  $N_1=1.0$  Kg/tree of N as A/S,  $N_2=1.4$  Kg/tree of N as A/S  $P_1=0.7$  Kg/tree of  $P_2O_5$  as Super,  $P_2=0.9$  Kg/tree of  $P_2O_5$  as Super,  $P_3=1.1$  Kg/tree of  $P_2O_5$  as Super,  $K_1=2.0$  Kg/tree of  $K_2O$  as Pot. Sul.,  $K_2=2.4$  Kg/tree of  $K_2O$  as Pot. Sul. and  $K_3=2.7$  Kg/tree of  $K_2O$  as Pot. Sul.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) Nil. (iii) 2. (iv) (a) Nil. (b) 6 trees per treatment. (v) Nil. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Number of Coconut fruits/tree. (iv) (a) 1964-contd. (b) Nil. (v) (a) N.A. (b) Nil. (vi) Nil. (vii) As the experiment is continued beyond 1965, the individual results are given below.

## 5. RESULTS :

## 64(301)

(i) 635 Kg/6 trees. (ii) 80.2 Kg/6 trees. (iii) Treatment differences are not significant. (iv) Av. yield of coconut in Kg/6 trees.

Treatment :	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	551	698	555	552	657	699	665
	$M_8$	$M_9$	$M_{10}$	$M_{11}$	$M_{12}$	$M_{13}$	$M_{14}$
	588	724	687	638	655	581	640

## 65(273)

(i) 595 Kg/6 trees. (ii) 108.1 Kg/6 trees. (iii) Treatment differences are not significant. (iv) Av. yield of coconut in Kg/6 trees.

Treatment	$M_1$	$M_2$	$M_3$	$M_4$	$M_5$	$M_6$	$M_7$
Av. yield	650	613	486	519	459	628	584
	$M_8$	$M_9$	$M_{10}$	$M_{11}$	$M_{12}$	$M_{13}$	$M_{14}$
	630	796	593	625	572	519	650

**Crop :- Mango.**

**Ref :- Gj. 61(152), 62(242), 63(277), 64(299), 65(231).**

**Site :- Fruit Res. Stn., Gandevi.**

**Type :- 'M'.**

Object :—To see the manurial effect with regard to growth and yield of Mango.

## 1. BASAL CONDITIONS :

(i) N.A. (ii) Medium black. (iii) Grafting. (iv) Alphonso. (v) Planted in 1942 with spacing 4.6 m. × 4.6 m. (vi) 1 to 2 years old. (vii) Nil. (viii) Ploughings. (ix) Nil. (x) Irrigated. (xi) 166 cm., 120 cm., 203 cm., 165 cm., 157 cm. (xii) May to July.

## 2. TREATMENTS :

All combinations of (1), (2) and (3)

(1) 2 levels of N as A/S :  $N_0=0$  and  $N_1=.7$  Kg/tree.

(2) 2 levels of  $P_2O_5$  as Super :  $P_0=0$  and  $P_1=.7$  Kg/tree.

(3) 2 levels of  $P_2O_5$  as Pot. Sul. :  $K_0=0$  and  $K_1=.5$  Kg/tree.

Manures applied in January, 1962.

## 3. DESIGN :

(i) 2<sup>3</sup> fact. in R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 4. (v) One ring round the block. (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory in 61, Good for other years. (ii) N.A. (iii) Mango weight. (iv) 1944 to 1965. (v) to (vii) Nil. (viii) As the error variances are heterogeneous and Treatments  $\times$  years interaction is absent, the results of the individual experiments are given under 5 Results.

## 5. RESULTS :

61(152)

(i) 13 Kg/tree. (ii) 12.4 Kg/tree. (iii) None of the effects is significant. (iv) Av. yield of mangoes in Kg/tree.

	P <sub>0</sub>	F <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	11	24	15	20	17
N <sub>1</sub>	7	11	10	9	9
Mean	9	17	12	14	13
K <sub>0</sub>	7	18			
K <sub>1</sub>	10	17			

62(242)

(i) 6 Kg/tree. (ii) 6.7 Kg/tree. (iii) None of the effects is significant. (iv) Av. yield of mangoes in Kg/tree.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	11	4.0	7	7	7
N <sub>1</sub>	4	5.4	3	7	5
Mean	8	4	5	7.0	6
K <sub>0</sub>	5	5			
K <sub>1</sub>	10	4			

63(277)

(i) 95 Kg/tree. (ii) 53.6 Kg/tree. (iii) Main effect of N alone is highly significant. (iv) Av. yield of mangoes in Kg/tree.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	72	47	70	50	60
N <sub>1</sub>	121	138	114	145	130
Mean	96	93	92	98	95
K <sub>0</sub>	91	93			
K <sub>1</sub>	102	93			

C.D. for N marginal means = 47.0 Kg/tree.

64(299)

(i) 27 Kg/tree. (ii) 27.5 Kg/ha. (iii) Main effects of N and K are significant. (iv) Av. yield of mangoes in Kg/tree.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	18	11	2	27	15
N <sub>1</sub>	27	50	22	54	38
Mean	23	30	12	41	27
K <sub>0</sub>	10	14			
K <sub>1</sub>	36	47			

C.D. for N or K marginal means=24.1 Kg/tree.

65(231)

(i) 24 Kg/tree. (ii) 19.4 Kg/tree. (iii) Main effect of N alone is highly significant. (iv) Av. yield of mangoes in Kg/tree.

	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	12	9	15	6	10
N <sub>1</sub>	46	27	31	42	38
Mean	29	18	23	24	24
K <sub>0</sub>	29	18			
K <sub>1</sub>	29	18			

C.D. for N marginal means=17.0 Kg/tree.

**Crop :- Chiku.**

**Ref :- Gj. 60(22), 61(153), 62(156), 63(188), 64(123), 65(232).**

**Site :- Fruit Res. Stn., Gandevi.**

**Type :- 'CM'.**

Object :- To study the different root-stocks used for propagating Chiku in combination with manurial dose with regards to growth and yield of plants.

#### 1. BASAL CONDITIONS :

(i) N.A. (ii) Medium black. (iii) Grafting. (iv) Kalipathi. (v) 26.10.42 and 14.12.42 ; Spacing between plants 4.6 m. × 4.6 m. (vi) 1 and 2 years old. (vii) Nil. (viii) Stirring of soil and weeding. (ix) Nil. (x) Irrigated. (xi) 144 cm., 166 cm., N.A., 259 cm., 157 cm., 156 cm. (xi) N.A. for 60 and 61 ; Oct. 62 to May 63 ; Oct. 63 to May 64 ; Nov. 64 to May 65, N.A.

#### 2. TREATMENTS :

##### Main-plot treatments :

All combinations of (1), (2) and (3)

- (1) 2 levels of N as A/S : N<sub>0</sub>=0 and N<sub>1</sub>=5.8 Kg/tree.
- (2) 2 levels of P<sub>2</sub>O<sub>5</sub> as Super : P<sub>0</sub>=0 and P<sub>1</sub>=6.8 Kg/tree.
- (3) 2 levels of K<sub>2</sub>O as Pot. Sul : K<sub>0</sub>=0 and K<sub>1</sub>=2.6 Kg/tree.

##### Sub-plot treatments :

3 root stocks : R<sub>0</sub>=Chiku on Gootie, R<sub>1</sub>=Chiku on chiku and R<sub>2</sub>=Chiku on Rayan.

Manures applied in two doses : 2/3rd in April and 1/3 in Oct., 1960.



## 3. DESIGN :

- (i) Split-plot. (ii) (a) 8 main-plots/replication, 3 sub-plots/main-plot. (5) N.A. (iii) 2. (iv) (a) Nil.  
 (b) 2 trees/sub-plot. (v) One ring round the main-plot. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) Nil. (iii) Weights of *chiku*. (iv) 1942-50 and (1955). (v) to (viii) Nil.

## 5. RESULTS :

60(22)

- (i) 60 Kg/tree. (ii) (a) 25.9 Kg/tree. (b) 15.1 Kg/tree. (iii) Main effect of N is significant and interactions N×R, K×R are significant. (iv) Av. yield of *chiku* in Kg/tree.

	R <sub>0</sub>	R <sub>1</sub>	R <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	38	27	81	46	52	51	47	49
N <sub>1</sub>	86	47	81	72	71	60	83	72
Mean	62	37	81	59	62	56	65	60
K <sub>0</sub>	48	40	79	55	37			
K <sub>1</sub>	77	34	84	63	67			
P <sub>0</sub>	64	32	81					
P <sub>1</sub>	61	42	81					

C.D. for N marginal means = 17.7 Kg/tree

C.D. for R means at the same level of N or K = 16.0 Kg/tree

C.D. N for K means at the same levels of R = 22.0 Kg/tree

61(153)

- (i) 76 Kg/ha. (ii) (a) 33.1 Kg/tree. (b) 21.1 Kg/tree. (iii) Main effect of R is highly significant and that of N is significant. (iv) Av. yield of *chiku* in Kg/tree.

	R <sub>0</sub>	R <sub>1</sub>	R <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	P <sub>0</sub>	P <sub>1</sub>	Mean
N <sub>0</sub>	57	39	90	61	63	62	62	62
N <sub>1</sub>	103	53	114	85	95	90	90	90
Mean	80	46	102	73	79	76	76	76
P <sub>0</sub>	80	42	106	73	79			
P <sub>1</sub>	80	50	98	73	79			
K <sub>0</sub>	72	48	99					
K <sub>1</sub>	88	54	105					

C.D. for N marginal means = 22.6 Kg/tree

C.D. for R marginal means = 15.8 Kg/tree

62(156)

- (i) 87 Kg/tree. (ii) (a) 29.5 Kg/tree. (b) 22.8 Kg/tree. (iii) Main effects of N, R and interaction N×R are highly significant. (iv) Av. yield of *chiku* in Kg/tree.

	R <sub>0</sub>	R <sub>1</sub>	R <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	59	59	97	77	66	80	63	72
N <sub>1</sub>	124	71	114	97	108	94	111	103
Mean	92	65	105	87	87	87	87	87
K <sub>0</sub>	81	77	103	93	82			
K <sub>1</sub>	102	52	107	82	92			
P <sub>0</sub>	86	75	100					
P <sub>1</sub>	97	54	110					

C.D. for N marginal means = 20.0 Kg/tree  
 C.D. for R marginal means = 17.1 Kg/tree  
 C.D. for R means at the same level of N = 24.2 Kg/tree  
 C.D. for N means at the same level of R = 28.2 Kg/tree

63(188)

(i) 72 Kg/tree. (ii) (a) 24.7 Kg/tree. (b) 15.6 Kg/tree. (iii) Main effects of N, R and interaction N×R are highly significant. (iv) Av. yield of *chiku* in Kg/tree.

	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	S <sub>1</sub>	S <sub>2</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	47	32	90	54	60	58	55	57
N <sub>1</sub>	100	56	104	91	83	83	90	87
Mean	74	44	97	72	71	71	73	72
K <sub>0</sub>	69	45	97	69	72			
K <sub>1</sub>	78	43	96	75	70			
P <sub>0</sub>	78	42	96					
P <sub>1</sub>	69	46	98					

C.D. for N marginal means = 16.8 Kg/tree  
 C.D. for R marginal means = 11.7 Kg/tree  
 C.D. for R means at the same level of N = 16.5 Kg/tree  
 C.D. for N means at the same level of R = 21.4 Kg/tree

64(123)

(i) 94 Kg/tree. (ii) (a) 28.5 Kg/tree. (b) 22.6 Kg/tree. (iii) Main effect of R is highly significant, effect of N and interaction N×R significant. (iv) Av. yield of *chiku* in Kg/tree.

	R <sub>0</sub>	R <sub>1</sub>	R <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	70	53	117	71	88	82	78	80
N <sub>1</sub>	126	65	133	103	113	98	119	108
Mean	98	59	125	87	101	90	98	94
K <sub>0</sub>	83	65	122	78	101			
K <sub>1</sub>	114	53	128	96	100			
P <sub>0</sub>	96	49	117					
P <sub>1</sub>	100	69	133					

C.D. for N marginal means =19.4 Kg/tree  
 C.D. for R marginal means =17.0 Kg/tree  
 C.D. for R marginal means at the same level of N=24.0 Kg/tree  
 C.D. for N marginal means at the same level of R=27.6 Kg/tree

65(232)

(i) 77 Kg/tree. (ii) (a) 31.1 Kg/tree. (b) 20.4 Kg/tree. (iii) Main effects of R is highly significant.  
 (iv) Av. yield of *chiku* in Kg/tree.

	R <sub>0</sub>	R <sub>1</sub>	R <sub>2</sub>	P <sub>0</sub>	P <sub>1</sub>	K <sub>0</sub>	K <sub>1</sub>	Mean
N <sub>0</sub>	93	46	61	64	69	65	68	67
N <sub>1</sub>	99	58	103	84	90	77	97	87
Mean	96	52	82	74	80	71	83	77
K <sub>0</sub>	86	54	73	62	80			
K <sub>1</sub>	106	50	91	86	80			
P <sub>0</sub>	91	45	86					
P <sub>1</sub>	101	59	78					

C.D. for R marginal means =15.3 Kg/ha.

**Crop :- Groundnut (*Kharif*).**

**Ref :- Gj. 64(9).**

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'X'.**

Object :- To find out the economics of mixed cropping of Groundnut, Maize and Sesamum.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Bajra*. (c) 12.4 C.L./ha. of F.Y.M. +22.4 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 4.7.64. (iv) (a) 1 ploughing and 4 harrowings. (b) Drilling. (c) 74 Kg/ha. (d) 46 cm. between rows. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. +22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> +11.2 Kg/ha. of N. (vi) A.H.-32. (vii) Unirrigated. (viii) 1 interculturing. (ix) 73 cm. (x) 19.10.64.

**2. TREATMENTS :**

T<sub>1</sub>=Groundnut alone ; T<sub>2</sub>=Groundnut and Maize with 3.1 m. spacing ; T<sub>3</sub>=Groundnut and Maize with 6.1 m. spacing ; T<sub>4</sub>=Groundnut and Sesamum with 3.1 m. spacing ; and T<sub>5</sub>=Groundnut and Sesamum with 6.1 m. spacing.

One or two seeds of Maize and Sesamum are dibbled per place in all the rows of Groundnut immediately after sowing of Groundnut.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 2. (iv) (a) 10.1 m. × 10.1 m. (b) 8.2 m. × 8.2 m. (v) 91 cm. × 91 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Slight attack of aphids and *tikka* on Groundnut. 15 Kg/ha. of B.H.C. 10% sprayed before sowing as preventive measure. (iii) Pods, tops and grains yield. (iv) (a) 1953—contd. (b) No. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :**

(i) 793 Rs/ha. (ii) 50.1 Rs/ha. (iii) Treatment differences are not significant. (iv) Av. value of the produce in Rs/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	739	882	788	785	771

**Crop :- Cotton, Paddy, Groundnut, Sann and Chillies (Kharif). Ref :- Gj. 60(154), 61(116).**

**Site :- Trial-cum-Demons. Farm., Bardoli.**

**Type :- 'X'.**

Object :—To find out the most economic inter crop that can be grown with Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar*. (c) N.A. for 60(154); 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 61(116). (ii) Black soil. (iii) 7 to 9.7.1960; 18.6.1961. (iv) (a) 1, 2 ploughings and 2 to 5 harrowings. (b) Dibbling. (c) 9 Kg/ha. (d) 183 cm. × 61 cm. (e) —. (v) 12.4 C.L./ha. of F.Y.M.+44.8 Kg/ha. of N as A/S+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> as Super. (vi) Cotton : 2087; Chillies : Local; Paddy : *Sathi*-34—36; Groundnut : A.H.-32. (vii) Irrigated. (viii) 4 interculturings and 5 weedings for 60(154); 5 interculturings for 61(116). (ix) 117 cm.; 176 cm. (x) Cotton : 10.2.1961 to 3.4.1961; 16.3.1962 to 25.4.1962. Chillies : 2.11.1960 to 24.1.1961. Paddy : 2.11.1960. *Sann* : 26.8.1960. Groundnut : 26.11.1960.

**2. TREATMENTS :**

5 mixed crops : C<sub>1</sub>=Cotton alone, C<sub>2</sub>=Cotton with paddy, C<sub>3</sub>=Cotton with Groundnut, C<sub>4</sub>=Cotton with Chillies and C<sub>5</sub>=Cotton with *Sann*.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 14.6 m. × 12.2 m. (b) 11.0 m. × 9.1 m. (v) 183 cm. × 152 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) Attack of aphids and jassids for 60(154). 270 C.C. of Malathion and 100 C.C. of Parathion was sprayed; Attack of aphids, jassids and bollworms for 61(116). Folidol was sprayed once and endrine thrice. (iii) Yield of *kapas*, pod and grain. (iv) (a) 1959 to 1961. (b) No. (c) Results of combined analysis is given under 5. (v) N.A. (vi) Nil. (vii) Results of Expt. no. 59(140) have also been included for giving combined results.

**5. RESULTS :**

(i) 1055 Rs/ha. (ii) 236.8 Rs/ha. (48 d.f. made up of pooled error and Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>
Av. value of produce	1058	984	1093	1136	1005

**Crop :- Wheat and Gram (Rabi).**

**Ref :- Gj. 59(153), 60(172), 61(201).**

**Site :- Dry Farming. Res. Stn., Dhandhuka.**

**Type :- 'X'.**

Object :—To find out the best mixture of Wheat and Gram for Bhal tract.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Nil for 59(153); *jowar* for others. (c) Nil. (ii) Medium black to Sandy loam. (iii) 19.10.1959; 23, 24.10.1960; 27, 28.10.1961. (iv) (a) 5 to 6 harrowings for all; 1 ploughing for 61(201) only. (b) Drilling. (c) Wheat 45 Kg/ha.; Gram 22 Kg/ha. (d) 30 cm. between rows. (e) —. (v) Nil. (vi) Wheat A-206; Gram *Chafa*. (vii) Unirrigated. (viii) and (ix) Nil. (x) 21.3.1960; 18.2.61 (Gram) and 29.2.1961 (Wheat); 20, 21.2.1962.

**2. TREATMENTS :**

6 mixed cropping treatments : C<sub>1</sub>=Wheat alone, C<sub>2</sub>=Gram alone, C<sub>3</sub>=4 rows of Wheat+1 row of gram, C<sub>4</sub>=3 rows of Wheat and 2 rows of gram, C<sub>5</sub>=2 rows of Wheat and 3 rows of gram and C<sub>6</sub>=1 row of Wheat and 4 rows of gram.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.0 m. × 6.4 m. (b) 9.1 m. × 4.6 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

- (i) Normal. (ii) No incidence for 59(153); attack of pod borers on Gram for 60(172). Dusting of Gammaxine; attack of pod borers and Shankhali disease on Gram for 61(201). Dusting of Gammaxine. (iii) Yield of grain. (iv) (a) 1959 to 1961. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Very high effect of soil heterogeneity for 60(172). Rainfall was below normal for 61(201). (vii) Errors are heterogeneous and Treatments  $\times$  years interaction is absent.

## 5. RESULTS :

## 59(153)

- (i) 341 Rs/ha. (ii) 52.0 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. monetary value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value of produce	414	212	412	401	340	271

C.D.=61.8 Rs/ha.

## 60(172)

- (i) 298 Rs/ha. (ii) 109.1 Rs/ha. (iii) Treatment differences are not significant. (iv) Av. monetary value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value	355	276	316	332	243	266

## 61(201)

- (i) 384 Rs/ha. (ii) 80.0 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. monetary value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value of produce	509	287	412	407	367	325

C.D.=95.2 Rs/ha.

**Crop :- Groundnut and Cotton (Kharif).**  
**Site :- Agri. Res. Farm, Halvad.**

**Ref :- Gj. 60(44), 61(64), 62(95).**  
**Type :- 'X'.**

**Object :-** To assess the best combination of cotton and Groundnut for mixed cropping with optimum spacing.

## 1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Wheat for 60(44); *Sann* (G.M.) for (164); cotton for 62(95). (c) 44.8 Kg/ha. of N+44.8 Kg/ha. of P<sub>2</sub>O<sub>5</sub> for 60(44); Nil for others. (ii) Medium black. (iii) 27.6.1960; 28, 29.6.1961; 24, 25.7.62. (iv) (a) 1 to 2 ploughings and 2 harrowings. (b) Dibbling for 60(44); Drilling for 61(64); Hand sowing for 62(95). (c) N.A. (d) As per treatments. (e) —. (v) Nil. (vi) Cotton C<sub>2</sub>—170, Groundnut AK-12-24. (vii) Un-irrigated for 62(95) Irrigated for others. (viii) 3 interculturings for 60(44), 3 weedings for 61(64), 2 weedings and 2 interculturings for 62(95). (ix) 21 cm., 62 cm., 35 cm. (x) Groundnut 26.10.1960, 17.10.61, 2.11.1962. Cotton 2.2.1961, N.A.

## 2. TREATMENTS :

- 6 mixed cropping treatments : C<sub>1</sub>=Groundnut alone with 61 cm. spacing, C<sub>2</sub>=Cotton alone with 91 cm. spacing, C<sub>3</sub>=Cotton alone with 183 cm. spacing. C<sub>4</sub>=Cotton with 183 cm. spacing and 1 row of groundnut, C<sub>5</sub>=Cotton with 183 cm. spacing and 2 rows of groundnut and C<sub>6</sub>=Cotton with 183 cm. spacing and 3 rows of groundnut.

## 3. DESIGN :

- (i) R.B.D. (ii) (a) 6. (b) 32.9 m.  $\times$  24.4 m. for 62(95), N.A. for others. (iii) 4. (iv) (a) 12.2 m.  $\times$  11.0 m. (b) 10.7 m.  $\times$  7.3 m. (v) 91 cm.  $\times$  183 cm. (vi) Yes

## 4. GENERAL :

(i) Good for 61(44), normal for others. (ii) Attack of black arm for 60(44). Endrex was sprayed once. No incidence for others. (iii) Yield of pods and *Kapas*. (iv) (a) 1959—1962. (b) No. (c) Results of combined analysis given under 5. (v) N.A. (vi) Nil. (vii) Results of expt. no 59(18) have also been included for giving combined results. Errors are heterogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 771 Rs/ha. (ii) 133.8 Rs/ha. (15 d.f. made up of Treatments  $\times$  years interaction). (iii) Treatment differences are highly significant. (iv) Av. value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value of produce	496	941	887	840	757	707

C.D. = 201.0 Rs/ha.

**Crop :- Cotton and Groundnut (*Kharif*).**

**Ref :- Gj. 60(131), 61(71), 62(212).**

**Site :- Irrigation-cum-Demons. Farm, Jamnagar.**

**Type :- 'X'.**

Object :- To study the effect of mixed cropping of cotton and Groundnut.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) *Jowar* for 62(212); N.A. for others. (c) Manure mixture applied to 62(212). N.A. for other (ii) Medium black. (iii) 2.7.1960, 26 to 28.6.1961, 17.7.1962 (Gap filling on 19.8.1962). (iv) (a) 1 to 3 ploughings and 1 to 3 harrowings. (b) Drilling for 60(131). N.A. for 61(71), Dibbling for 62(212). (c) cotton 7 Kg/ha. Groundnut 45 to 89 Kg/ha. for different spacings. (d) As per treatments. (e) Nil, (v) Nil. (vi) Cotton CO<sub>2</sub>-170 Groundnut A.K-12-24. (vii) Un-irrigated for 61(71) Irrigated for others. (viii) 2 to 5 weedings and 2 to 3 interculturings. (ix) 31 cm. 99 cm. 28 cm. (x) Groundnut 1.10.1960, 22.10.1961; N.A., cotton 2nd week of Jan, 1961, Feb. to mid. March, 1962, 18.3.1963 to 3.4.1963.

## 2. TREATMENTS :

6 mixed cropping treatments : C<sub>1</sub> = Groundnut alone with 46 cm. spacing, C<sub>2</sub> = Cotton alone with 91 cm. spacings, C<sub>3</sub> = Cotton alone with 183 cm. spacing, C<sub>4</sub> = Cotton with 91 cm. spacing and 1 row of groundnut with 91 cm. spacing, C<sub>5</sub> = Cotton with 183 cm. spacings and 2 rows of groundnut with 61 cm. spacing and C<sub>6</sub> = Cotton with 183 cm. spacing and 3 rows of groundnut with 46 cm. spacing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.2 m.  $\times$  11.0 m. (b) 10.4 m.  $\times$  7.3 m. (v) 91 cm.  $\times$  183 cm. (vi) Yes.

## 4. GENERAL :

(i) Un-satisfactory. (ii) Attack of jassides on cotton for 60(131). Endrex was sprayed. Attack of *tikka* and jassides on groundnut for 61(71). Attack of jassides on cotton for 61(71) was controlled by spraying. endrex, Attack of top shoot borers, ball worms, red leaf and black arms for 62(212). Endrex was sprayed (iii) Yield of pods and *Kapas*. (iv) (a) 1959—1962. (b) No. (c) Results of combined analysis are given under 5. (v) N.A., (vi) Cotton crop practically failed for 61(71); Poor soils and long draught in monsoon resulted in low yield for 62(212). (vii) Results of expt no 59(24) have also been included for giving combined results. Errors are heterogeneous and Treatments  $\times$  years interaction is present.

## 5. RESULTS :

(i) 239 Rs/ha. (ii) 96.0 Rs/ha. (15 d.f. made up of Treatments  $\times$  years interaction). (iii) Treatment differences are not significant. (iv) Av. value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value of produce	318	138	169	325	263	219

**Cro :- Groundnut and Cotton (Kharif).**

**Ref :- Gj. 60(85), 61(33).**

**Site :- Central. Exptl. Stn., Junagadh.**

**Type :- 'X'.**

**Object :-** To find out the best cropping mixture for Groundnut and Cotton.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) *Jowar* for 60(85), Groundnut, Castor, cotton for 61(33). (c) Nil. (ii) Medium black. (iii) 23.6.1960, 25.5.1961. (iv) (a) 1 to 2 ploughings. (b) Dibbling. (c) N.A. (d) As per treatments. (e) 2. (v) Nil for 60(85), 12.4 C.L./ha. of F.Y.M, (vi) Groundnut A-K-12-24, cotton CO<sub>2</sub>-170. (vii) Groundnut unirrigated and cotton irrigated for 60(85), irrigated for 61(33). (viii) 2 to 3 intercroppings and 3 to 4 weedings. (ix) 82 cm., 154 cm. (x) 10.10.1960. 11.10.1961.

**2. TREATMENTS :**

6 mixed cropping treatments : C<sub>1</sub>=Groundnut alone with 61 cm. spacing. C<sub>2</sub>=Cotton alone with 183 cm. spacing. C<sub>3</sub>=Cotton alone with 183 cm. spacing. C<sub>4</sub>=One row of cotton with 91 cm. spacing and 1 row of Groundnut. C<sub>5</sub>=One row of cotton with 183 cm. spacing and 2 rows of Groundnut. C<sub>6</sub>=One row of cotton with 183 cm. spacing and 3 rows of Groundnut with 46 cm. spacing.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 6. (b) 32.9 m. × 24.4 m. for 60(85) 43.9 m. × 6.7 m. for 61(33). (iii) 4. (iv) (a) 12.2 m. × 11.0 m. for 60(85), 11.0 m. × 6.7 m. for 61(33). (b) 10.4 m. × 7.3 m. for 60(85), 7.3 m. × 6.7 m. for 61(33). (v) 91 cm. × 183 cm. for 60(85), 183 cm. along the rows for 61(33). (vi) Yes.

**4. GENERAL :**

(i) Fair. (ii) Nil for 60(85), *Tikka* disease was observed moderately. (iii) *Kapas* and pod yield. (iv) (a) 1956-61 (modified in 58). (b) No. (c) Nil. (v) Nil. (vi) Nil for 60(85), Heavy rains throughout the year for 61(33). (vii) Expt 58(41) has also been included for giving combined results. Errors are heterogeneous and Treatments × years interaction is present.

**5. RESULTS :**

(i) 1274.1 Rs/ha. (ii) 885.4 Rs/ha. (10 d.f. made up of Treatments × years interaction). (iii) Treatment differences are not significant. (iv) Av. value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value of produce	1091.9	1032.9	1228.2	1296.3	1489.3	1506.7

**Crop :- Groundnut, Cotton, Castor (Kharif).**

**Ref :- Gj. 60(87), 61(31).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'X'.**

**Object :-** To find out the best cropping mixture for Groundnut, Cotton and Castor.

**1. BASAL CONDITIONS :**

(i) (a) Nil. (b) Cotton for 60(87), Groundnut and cotton for 61(31), (c) Nil. (ii) Medium black. (iii) 26.6.1960, 25.6.1961. (iv) (a) 1 to 2 ploughings. (b) Drilling for Groundnut and dibbling for castor and Cotton. (c) N.A. (d) As per treatments. (e) 2. (v) 12.5 C.L./ha. of F.Y.M. (vi) Groundnut Punjab-1 Castor T-3, Cotton Kalyan. (vii) Un-irrigated. (viii) 2 to 3 intercroppings and weedings. (ix) 82 cm. 154 cm. (x) 16.10.1960, 31.10.1961 for Groundnut.

**2. TREATMENTS :**

8 mixed cropping treatments : C<sub>1</sub>=Castor alone with 91 cm. spacing. C<sub>2</sub>=Cotton alone with 91 cm. spacing. C<sub>3</sub>=Groundnut alone with 91 cm. spacing. C<sub>4</sub>=Alternate rows of Castor and Cotton with 91 cm. spacings. C<sub>5</sub>=Alternate rows of groundnut and Castor with 46 cm. spacing. C<sub>6</sub>=Alternate rows of Cotton and Groundnut with 46 cm. spacing. C<sub>7</sub>=Alternate rows of Groundnut and Castor with 91 cm. spacing. C<sub>8</sub>=Alternate rows of Cotton and Groundnut with 91 cm. spacing.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) 30.5 m. × 22.0 m. for 60(87). 13.7 m. × 31.1 m. for 61(31). (iii) 4. (iv) (a) 13.7 m. × 3.7 m. for 61(31), 15.2 m. × 5.5 m. for 60(87). (b) 13.7 m. × 3.7 m. for 61(31), 13.7 m. × 3.7 for 60(87). (v) Nil for 61(31), 76 cm. × 91 cm. for 60(87). (vi) Yes.

## 4. GENERAL :

(i) Not satisfactory. (ii) Moderate Tikka disease was observed. (iii) *Kapas* and pods yield. (iv) (a) 1952-61 (modified in 55 and 58). (b) No. (c) Results of combined analysis given under 5. (v) (a) Nil. (b) Nil. (vi) Nil for 60(87), heavy rains throughout the year for 61(31). (vii) Expt. No. 58(42) has also been included for giving combined results. Errors are heterogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 555.4 Rs/ha. (ii) 320.6 Rs/ha. [14 d.f. made up of Treatments × years interaction]. (iii) Treatment differences are highly significant. (iv) Av. value of produce is Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	C <sub>8</sub>
Av. value of produce	355.1	296.0	758.6	377.3	582.2	848.8	562.3	662.9

C.D. = 280.7 Rs/ha.

**Crop :- Groundnut and Bajra (*Kharif*).**

**Ref :- Gj. 65(217).**

**Site :- Oilseed Res. Farm, Junagadh.**

**Type :- 'X'.**

Object :- To find out the suitability of sowing Groundnut with *Bajra*.

## 1. BASAL CONDITIONS :

(i) (a) Cotton-Groundnut and *Bajra*. (b) Cotton. (c) 12.4 C.L./ha. of F.Y.M. + 22.4 Kg/ha. of N + 11.2 Kg/ha. of P<sub>2</sub>O<sub>5</sub>. (ii) Medium black. (iii) 23.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha for Groundnut. (d) 61.0 cm. × 5.1 cm. (e) One/hill. (v) 12.2 Kg/ha. of N + 22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> to Groundnut. (vi) Groundnut : AH - 334 and *Bajra*-N-28-15 (vii) Unirrigated. (viii) 3 interculturations + 2 weedings. (ix) 59 cm. (x) 26.10.65 *Bajra* and 2.11.65 Groundnut.

## 2. TREATMENTS :

5 crop mixtures : T<sub>1</sub> = Groundnut alone, T<sub>2</sub> = *Bajra* alone, T<sub>3</sub> = 6 rows of Groundnut and one row of *Bajra*, T<sub>4</sub> = 9 rows of Groundnut and two rows of *Bajra* and T<sub>5</sub> = 12 rows of Groundnut and two rows of *Bajra*.

## 3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) —. (iii) 4. (iv) T<sub>1</sub> T<sub>2</sub> T<sub>3</sub> (a) 19.8 m. × 5.5 m. (b) 18.3 m. × 4.3 m. T<sub>4</sub> (a) 19.8 m. × 7.9 m., (b) 18.3 m. × 6.7 m., T<sub>5</sub> (a) 19.8 m. × 9.8 m. (b) 18.3 m. × 8.5 m. (v) —.

## 4. GENERAL :

(i) Below normal. (ii) Attack of tikka on Groundnut. (iii) Pods and Tops yield for Groundnut, Grain and fodder yield for *Bajra*. (iv) (a) 1965-1968. (b) No. (c) Nil. (v) N.A. (vi) Shortage of rains in September effected the crop. (vii) Nil.

## 5. RESULTS :

(i) 116.0 Rs/ha. (ii) 23.1 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of Groundnut and *Bajra* in Rs/ha.

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Av. yield	37.3	280.4	99.2	95.7	67.7

C.D. = 35.6 Rs/ha.



**Crop :- Sesamum and Cotton (Kharif).**  
**Site :- Oilseeds Res. Stn., Manund.**

**Ref :- Gj. 63(40), 64(289).**  
**Type :- 'X'.**

Object :—To work out the economics of growing Sesamum as mixed crop with Cotton.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Mustard. (c) Nil. (ii) Sandy loam. (iii) 9.7.63 ; 16.6.64. (iv) (a) 1 ploughing ; 2 ploughings+2 harrowings. (b) Dibbling for Cotton ; Drilling for Sesamum. (c) 2.2 Kg/ha. for Sesamum, 7.8 Kg/ha for Cotton. (d) As per treatments. (e) —. (v) Nil. (vi) PT 58-35 for Sesamum and Kalyan for Cotton. (vii) Unirrigated. (viii) 1 interculturing ; 2 weeding.s (ix) 76 cm. ; 43 cm. (x) Sesamum ; 4.10.63 ; 25.9.64, Cotton ; 20.3, 16.3 and 24 3.64 ; 12.2.65, 27.2.65.

2. TREATMENTS :

6 crop mixtures :  $T_1$ =Sesamum alone with 46 cm. spacing.,  $T_2$ =Cotton alone with 91 cm. spacing  $T_3$ = One row of Sesamum in between two rows of Cotton with 91 cm. spacing.  $T_4$ =Two rows of Sesamum in between two rows of Cotton with 137 cm. spacing.  $T_5$ =3 rows of Cotton and one row of Sesamum both with 91 cm. spacing.  $T_6$ =Cotton and Sesamum as mixture in the same row.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 12.2 m.×6.2 m. ; 11.9 m.×7.3 m. (b) 11.0 m.×5.5 m. 11.0 m.×6.2 m. (v) 61 cm.×30 cm. ; 61 cm.×46 cm. (vi) Yes.

4. GENERAL :

(i) Below normal. (ii) Nil ; white ants attack on Cotton and attack of some unknown insects on Sesamum. (iii) Seed Cotton and Sesamum pods yields. (iv) (a) 1963 and 1964. (b) No. (c) Nil. (v) and (vi) Nil. (vii) Error variances are heterogeneous and Treatments×years interaction is present.

5. RESULTS :

(i) 723 Rs/ha. (ii) 516.2 Rs/ha. based on 5 d.f. made up of (Treatments×years) interaction. (iii) Treatment differences are not significant. (iv) Mean value of produce in Rs/ha.

Treatment	$T_1$	$T_2$	$T_3$	$T_4$	$T_5$	$T_6$
Av. value of produce	720	513	917	753	784	657

**Crop :- Cotton, Paddy, Groundnut, Bajra (Kharif).**

**Ref :- Gj. 61(185).**

**Site :- Trial-Cum-Demons. Farm, Thasra.**

**Type :- 'X'.**

Object:—To find out the suitable and economical inter crop that can be grown in between Cotton crop.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) and (c) N.A. (ii) Sandy loam. (Goradu). (iii) 1.7.61. (iv) (a) 2 ploughings and 3 harrowings. (b) Cotton Dibbled others Drilled. (c) Cotton : 11 Kg/ha. (d) 152 cm.×61 cm. (e) N.A. (v) 22.4 Kg/ha. of  $P_2O_5$ +44.8 Kg/ha. of N+12.4 C.L./ha. of F.Y.M. (vi) Cotton, Digvijay, Paddy, sathi, Groundnut AK 12-24 and Bajra N.A. (vii) Irrigated. (viii) 5 interculturings and 5 weedings. (ix) 73 cm. (x) 19.5.62.

2. TREATMENTS :

$C_1$ =Cotton alone.  $C_2$ =2 rows of Paddy in between 2 rows of Cotton.  $C_3$ =One row of Groundnut between two rows of Cotton.  $C_4$ =One row of Bajra between two rows of Cotton.  $C_5$ =Two rows of Sannhamp (G.M.) between two rows of Cotton.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 18.3 m.×6.1 m. (b) 15.9 m.×3.1 m. (v) 122 cm.×152 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Attack of cater pillars at initial stages ; Aphids and Red Cotton bugs ; termites attack ; Insecticide was sprayed twice. (iii) *Kapas*, pods and grain yield. (iv) (a) to (c) No. (v) N.A. (vi) The crop was affected by Frost. (vii) Nil.

## 5. RESULTS :

(i) 1359 Rs/ha. (ii) 58.9 Rs/ha. (iii) Treatment differences are highly significant. (iv) Av. value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>
Av. value of produce	1219	1907	1117	1204	1348

C.D. = 90.6 Rs/ha.

**Crop :- Wheat and Gram (Rabi). Ref :- Gj. 60(158), 61(102), 62(47), 63(44),**  
**Site :- Dry Framing Res. Stn., Vallabhipur. Type :- 'X'.**

Object :-- To find out the suitable proportion of Wheat and Gram for mixed cropping.

## 1. BASAL CONDITIONS :

(i) (a) Nil. (b) Nil for 60 (158) ; *Jowar* for 63 (44) ; Wheat for others. (c) Nil for 60 (158) ; 12.4 C.L./ha. of F.Y.M. + 11.2 Kg/ha. of N for 63 (44) ; 11.2 Kg/ha. of N for others. (ii) Medium black. (iii) 28.10.60, 28.10.61 ; 20.10.62, 2.11.1963. (iv) (a) 1 ploughing + 8 to 10 harrowings. (b) Drilling. (c) 56 Kg/ha. for 60 (158), 61 (102), 49 Kg/ha. for others. (d) 30 cm. between rows. (e) -. (v) Nil for 60 (158), 61 (102) ; 12.4 C.L./ha. of F.Y.M. for others. (vi) Wheat : A-206 ; Gram : *Chafa*. (vii) Unirrigated. (viii) 1 hand weeding for 60 (158) ; 1 interculturing for 63 (44) ; Nil for others. (ix) Nil ; Nil ; 3 cm., 9 cm. (x) 23.2.61, 11.2.62, 11.2.63 for Wheat and 22.1.63 for Gram ; 5.3.64 for Wheat and 12.2.64 for Gram.

## 2. TREATMENTS :

6 mixed cropping treatments : C<sub>1</sub>=Wheat alone, C<sub>2</sub>=Gram alone, C<sub>3</sub>=4 rows of Wheat+1 row of Gram, C<sub>4</sub>=3 rows of Wheat+2 rows of gram, C<sub>5</sub>=2 rows of Wheat+3 rows of gram and C<sub>6</sub>=1 row of Wheat+4 rows of gram.

## 3 DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 9.1 m. × 3.7 m. (b) 7.3 m. × 3.1 m. (v) 91 cm. × 30 cm. (vi) Yes.

## 4. GENERAL :

(i) Stunted growth for 61 (102) ; Normal for others. (ii) Slight attack a white ants in Wheat for 61 (102), 62 (47) ; No incidence for others. (iii) Yield of grain. (iv) (a) 1960-1963. (b) No. (c) Results of combined analysis are given under 5. (v) N.A. (vi) Less cold in winter for 61 (158) ; Due to absence of rains the growth are affected for 61 (102). (vii) Errors are heterogeneous and Treatments × years interaction is present.

## 5. RESULTS :

(i) 372 Rs/ha. (ii) 47.9 Rs/ha. (15 d.f. made up of treatments × years interaction). (iii) Treatment differences are not significant, (iv) Av. value of produce in Rs/ha.

Treatment	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>
Av. value of produce	410	322	383	392	378	347

**Crop :- Cotton-Lang-Jowar.**  
**Site :- Central Res. Stn., Broach.**

**Ref :- Gj. 60(12).**  
**Type :- 'R'.**

Object : -To assess the use of lang and Jowar as rotational crops with Cotton.

1. BASAL CONDITIONS :

(i) (a) As per treatments. (b) Nil. (c) 12.4 C.L./ha. of F.Y.M. (ii) Deep black. (iii) Cotton : 21.6.60, Jowar and lang 15.10.60. (iv) Two harrowings. (b) Dibbled (cotton), lang and Jowar drilled. (c) 6 Kg/ha. (cotton), 13 Kg/ha. (Jowar), 45 Kg/ha. (lang). (d) and (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) Digvijay (cotton). (vii) Unirrigated. (viii) 3 Interculturings. (ix) N.A. (x) Cotton 16.1.61 and 1.2.61. Jowar 3.3.61, lang 20.1.61.

2. TREATMENTS :

3 Rotational treatments :  $T_1$ =Cotton-Jowar,  $T_2$ =Cotton-Lang and  $T_3$ =Cotton-Mixture of Jowar and Lang.

(All the phases of the above rotations have been tried).

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.0 m.×11.0 m. (b) 8.5 m.×7.3 m. (v) 122 cm.×183 cm. (vi) Yes.

4. GENERAA :

(i) Normal. (ii) Nil. (iii) Yield of cotton *Kapas* and grain for others. (iv) (a) 1954—1960. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

5. RESULTS :

**Cotton**

(i) 885 Kg/ha. (ii) 86.9 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	$T_1$	$T_2$	$T_3$
Av. yield	776	1061	818

C.D.=111.9 Kg/ha.

**Jowar**

(i) 544 Kg/ha. (ii) 168.8 Kg/ha. (iii) Treatment difference is significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_1$	$T_3$
Av. yield	709	380

C.D.=217.1 Kg/ha.

**Lang**

(i) 248 Kg/ha. (ii) 80.7 Kg/ha. (iii) Treatment difference is highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	$T_2$	$T_3$
Av. yield	360	136

C.D.=103.7 Kg/ha.

**Crop :- Jowar-Bajra-Groundnut-Cotton.** Ref :- Gj. 60(11), 61(108), 62(20), 63(5), 64(34), 65(122).

**Site :- Agri. Res. Stn., Amreli.**

**Type :- 'R'.**

Object :-To find out suitable rotation of crops for this tract.

## 1. BASAL CONDITIONS :

(i) (a) and (b) As per treatments. (c) 12.4 C.L./ha. of F.Y.M. for 60 to 63, Nil for 64 and 65. (ii) Medium black soil. (iii) 30.6.60, 19.7.61 for *Jowar Bajra groundnut*, 20,7.61 for cotton 15.7.62, 13.7.63, 14, 15.6.64, 18.7.65. (iv) (a) 1 ploughing, 1 to 3 harrowings. (b) Drilling. (c) *Jowar* 11 Kg/ha, *Bajra* 4 Kg/ha. to 6 Kg/ha. Groundnut 67 Kg/ha. to 90 Kg/ha. cotton 17 Kg/ha. (d) 91 cm. × 15 cm. for *Bajra* and cotton ; 46 cm. × 15 cm. for *Jowar* and groundnut. (e) N.A. (v) 12.4 C.L./ha. of F.Y.M. (vi) *Jowar*-EMS, groundnut-AH-32 *Bajra*-EMS, cotton : CJ-73. (vii) Unirrigated. (viii) 2 to 3 interculturings and 1 weeding. (ix) 40 cm. for 60, 33 cm. for 61, 29 cm. for 62, 56 cm. for 63, 73 cm. for 64, 60 cm. for 65. (x) *Jowar-Bajra* groundnut-cotton, N.A. for 60, 28.10.61 to 8.1.62, 7.11.62 to 31.10.62, 2.11.63 to 3.12.63, 31.10.64 to 6.2.65, 20.11.65 to 14.12.65.

## 2. TREATMENTS :

1 a <i>Jowar—Jowar</i>	3 a <i>Groundnut—Jowar</i>
1 b <i>Jowar—Bajra</i>	3 b <i>Groundnut—Bajra</i>
1 c <i>Jowar—Groundnut</i>	3 c <i>Groundnut—Groundnut</i>
1 d <i>Jowar—Cotton</i>	3 d <i>Groundnut—Cotton</i>
2 a <i>Bajra—Jowar</i>	4 a <i>Cotton —Jowar</i>
2 b <i>Bajra—Bajra</i>	4 b <i>Cotton —Bajra</i>
2 c <i>Bajra —Groundnut</i>	4 c <i>Cotton —Groundnut</i>
2 d <i>Bajra—Cotton</i>	4 d <i>Cotton —Cotton</i>

## 3. DESIGN :

(i) R.B.D. (ii) (a) 16. (b) 43.9 m. × 43.9 m. (iii) 2. (iv) (a) 11.0 m. × 11.0 m. (b) 9.1 m. × 9.1 m. (v) 91 cm. × 91 cm. (vi) Yes.

## 4. GENERAL :

(i) Normal. (ii) Nil. (iii) Pods, grain and *Kapas* yield. (iv) (a) 1956—contd. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

## 5. RESULTS :

## 60(11)

I *Jowar*

(i) 1857 Kg/ha. (ii) 161.8 Kg/ha. (iii) Treatment differences are highly significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	1712	1032	3003	1682

C.D. = 514.8 Kg/ha.

II *Bajra*

(i) 2048 Kg/ha. (ii) 265.7 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	1870	1521	2893	1909

C.D. = 845.5 Kg/ha.

III *Groundnut*

(i) 2168 Kg/ha. (ii) 238.7 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	1584	1450	3346	2291

C.D. = 759.5 Kg/ha.

IV *Cotton*

(i) 1765 Kg/ha. (ii) 523.3 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	1	2	3	4
Av. yield	1694	1274	1748	2344

**61(101)****I Jowar**

(i) 376 Kg/ha. (ii) 81.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	234	394	397	480

**Bajra**

(i) 514.1 Kg/ha. (ii) 81.67 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	424	547	543	544

**III Groundnut**

(i) 750 Kg/ha. (ii) 22.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	1	2	3	4
Av. yield	709	798	753	741

**IV Cotton**

(i) 82 Kg/ha. (ii) 35.9 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	1	2	3	4
Av. yield	65	102	114	47

**60(20)****I Jowar**

(i) 232 Kg/ha. (ii) 289.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	42	291	272	324

**II Bajra**

(i) 568 Kg/ha. (ii) 417.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	396	568	755	554

**III Groundnut**

(i) 355 Kg/ha. (ii) 136 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	1	2	3	4
Av. yield	212	649	326	233

**IV Cotton**

(i) 207 Kg/ha. (ii) 23.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	1	2	3	4
Av. yield	149	273	167	239

**63(5)****I Jowar**

(i) 967 Kg/ha. (ii) 238.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	534	694	1281	1360

**II Bajra**

(i) 518 Kg/ha. (ii) 244.0 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	260	408	738	665

**III Groundnut**

(i) 813 Kg/ha. (ii) 147.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	1	2	3	4
Av. yield	725	710	871	946

**IV Cotton**

(i) 710 Kg/ha. (ii) 26.8 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	1	2	3	4
Av. yield	729	780	741	585

C.D. = 85.3 Kg/ha.

**64(34)****I Jowar**

(i) 837 Kg/ha. (ii) 91.1 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	405	773	1107	1062

C.D. = 289.9 Kg/ha.

**II Bajra**

(i) 540 Kg/ha. (ii) 161.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	422	524	622	593

**III Groundnut**

(i) 911 Kg/ha. (ii) 286.2 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	1	2	3	4
Av. yield	867	1040	840	987

**IV Cotton**

(i) 600 Kg/ha. (ii) 174.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	1	2	3	4
Av. yield	604	560	653	584

**65(122)****I Jowar**

(i) 757 Kg/ha. (ii) 58.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	595	668	983	783

C.D.=182.2 Kg/ha.

**II Bajra**

(i) 95 Kg/ha. (ii) 40.0 Kglha. (iii) Treatment differences are not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	1	2	3	4
Av. yield	60	97	106	116

**III Groundnut**

(i) 365 Kg/ha. (ii) 68.6 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pod in Kg/ha.

Treatment	1	2	3	4
Av. yield	367	352	206	233

**IV Cotton**(i) 205 Kg/ha. (ii) 89.0 Kg/ha. (iii) Treatment differences are not significant, (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	1	2	3	4
Av. yield	289	280	98	152

**Crop :- Groundnut-Cotton-Bajra (Kharif).****Ref :- Gj. 65(216).****Site :- Oil seeds Reseach Farm, Junagadh.****Type 'R'.**

Object :—To find out the best rotational practice.

**1. BASAL CONDITIONS :**(i) As per treatments. (b) Cotton. (c) 12.4 C.L. F.Y.M.+22.4 Kg/ha. of N+11.2 Kg/ha. P<sub>2</sub>O<sub>5</sub> (ii) Medium black soil. (iii) 24.7.65. (iv) (a) 2 harrowings. (b) Hand dibbling. (c) 67.2 Kg/ha. groundnut. (d) 91.5 cm. × 5.1 cm. (e) One plant/hill. (v) 11.2 Kg N+22.4 Kg P<sub>2</sub>O<sub>5</sub>/ha. for Groundnut, 22.4 Kg. N+11.2 Kg./ha. P<sub>2</sub>O<sub>5</sub> for cotton and Bajra. (vi) Groundnut AH 334, cotton—Kalyan Bajra—N—28-15-2. (vii) Un-Irrigated. (viii) 3 interculturings, 3 weedings. (ix) 59.2 mm. (x) 26.11.65 Groundnut, 17.10.62 Bajra, cotton N.A.**2. TREATMENTS :**

8 Rotational treatments : A=Groundnut every year. B=Groundnut followed by cotton in next year. C=Cotton followed by groundnut in next year. D=Groundnut followed by Bajra in next year. E=Bajra followed by groundnut in next year. F=Groundnut followed by cotton followed by Bajra. G=Cotton followed by Bajra followed by groundnut. H=Bajra followed by groundnut followed by cotton.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 8. (b) —. (iii) 4. (iv) (a) 10.3 m. × 5.5 m. (b) 9.1 m. × 3.7 m. (v) 61.0 cm. × 91.5 cm. (vi) Yes.

**4. GENERAL :**

(i) Below normal. (ii) Nil. (iii) Groundnut pods and tops, cotton, seed cotton. Bajra grain and fodder yield. (iv) (a) 1965. (b) Yes (As per treatments). (c) Nil. (v) N.A. (vi) Shortage of rains in September. (vii) Nil.

**5. RESULTS :****Groundnut**

(i) 194 Kg/ha. (ii) 82.7 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of pods in Kg/ha.

Treatment	A	B	C	D
Av. yield	125	185	297	168

**Cotton**

(i) 390 Kg/ha. (ii) 78.7 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	C	G
Av. yield	424	357

**Bajra**

(i) 559 Kg/ha. (ii) 47.6 Kg/ha. (iii) Treatment difference is not significant. (iv) Av. yield of grain in Kg/ha.

Treatment	E	H
Av. yield	583	535

**Crop :- Groundnut-Wheat-Sann.**

**Ref :- Gj. 60(86), 61(32), 62(82).**

**Site :- Central Exptl. Stn., Junagadh.**

**Type :- 'R'.**

Object :—To find out the best rotation for Groundnut and Wheat.

**1. BASAL CONDITIONS :**

(i) (a) and (b) As per treatments. (c) Nil. (ii) Medium black soil. (iii) Groundnut : 23.6.60, 25.6.61, 14.7.62, Wheat : N.A. for 60 and 61, 27.10.62. (iv) (a) 1 to 2 ploughings. (b) Drilling. (c) Groundnut : 90 Kg., Wheat : 67 Kg/ha. (d) Groundnut : 61 cm. between rows, Wheat : 30 cm. between rows. (e) N.A. (v) Nil. (vi) Groundnut : A.K. 12-24, Wheat : N.P-710 in 60, N.P-719 in 61, N.A. for 62. (vii) Groundnut : Unirrigated, Wheat : Irrigated. (viii) 2 to 3 interculturings, 1 to 6 weedings. (ix) 82 cm. for 60, 154 cm. for 61 and 62 cm. for 62. (x) Groundnut : 10.10.60, 11.10.61, 12.10.62, Wheat : N.A. for 60 and 61, 15.2.63.

**2. TREATMENTS :**

4 rotational treatments :  $R_1$  = Groundnut after Groundnut (fallow in *Rabi*),  $R_2$  = Wheat in *Rabi* after Groundnut in *Kharif*.  $R_3$  = Wheat in *Rabi* after Sann in *Kharif* (Sann G.M. burried),  $R_4$  = Wheat in *Rabi* after fallow in *Kharif*.

**3. DESIGN :**

(i) R.B.D. (ii) (a) 4. (b) 14.6 m. × 12.2 m. (iii) 6. (iv) (a) 12.2 m. × 3.7 m. (b) 11.0 m. × 2.4 m. (v) 61 cm. × 61 cm. (vi) Yes.

**4. GENERAL :**

(i) Normal. (ii) *Tikka* was observed in Groundnut. (iii) Grain and pods yield. (iv) (a) 1957-1962. (b) Yes. (c) Nil. (v) N.A. (vi) and (vii) Nil.

**5. RESULTS :****60(86)**

(i) 576.89 Rs./ha. (ii) 128.41 Rs./ha. (iii) Treatment differences are highly significant. (iv) Av. money value in Rs./ha.

Treatment :	$R_1$	$R_2$	$R_3$	$R_4$
Av. money value	561.89	773.39	448.79	483.49

C.D. = 157.97 Rs./ha.

**61(32)**

(i) 426.4 Rs./ha. (ii) 47.3 Rs./ha. (iii) Treatment differences are highly significant. (iv) Av. money value in Rs./ha.

Treatment :	$R_1$	$R_2$	$R_3$	$R_4$
Av. money value	100.1	568.5	537.2	499.9

C.D. = 58.2 Rs/ha.



62(82)

(i) 1873.0 Rs./ha. (ii) 213.0 Rs./ha. (iii) Treatment differences are highly significant. (iv) Av. money value in Rs./ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>
Av. money value	533.0	2350.0	2032.0	2577.0

C.D.=261.2 Rs./ha.

**Crop :- Cotton-Jowar-Tur.**

**Ref :- Gj. 62(138), 63(143), 64(77).**

**Site :- Agri. Res. Stn., Surat.**

**Type :- 'R'.**

Object :—To study the effect of local vs. departmental method of cultivation on soil fertility and yield of Cotton.

1. BASAL CONDITIONS :

(i) (a), (b) and (c) As per treatments. (ii) Deep black soil. (iii) 1.7.62, 28.6.63, 17.7.64. (iv) (a) 1 to 3 harrowings. (b) Dibbling. (c) 5 to 6 Kg/ha. (d) 152 cm. × 61 cm. (e) 1. (v) Nil. (vi) 2087 (late). (vii) Unirrigated. (viii) 3 to 8 interculturings. (ix) 61 cm. for 62, 120 cm. for 63, 213 cm. for 64. (x) 28.2.63, 6.4.64, 20.3.65.

2. TREATMENTS :

6 rotational treatments: R<sub>1</sub>=Cotton with 12.4 C.L/ha. of F.Y.M. to be followed by *Jowar-Tur* mixed unmanured, R<sub>2</sub>=Cotton with 12.4 C.L/ha. of F.Y.M. to be followed by *Jowar-Tur* mixed manured with 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, R<sub>3</sub>=Cotton with 12.4 C.L/ha. of F.Y.M. to be followed by Cotton unmanured, R<sub>4</sub>=Cotton with 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> to be followed by *Jowar-Tur* mix unmanured, R<sub>5</sub>=Cotton with 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> to be followed by *Jowar Tur* mixed with 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>, R<sub>6</sub>=Cotton with 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub> to be followed by Cotton with 44.8 Kg/ha. of N+22.4 Kg/ha. of P<sub>2</sub>O<sub>5</sub>.

N applied as A/S and P<sub>2</sub>O<sub>5</sub> as Super by ring method.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) Nil. (iii) 2. (iv) (a) 18.3 m. × 12.2 m. (b) 15.9 m. × 9.1 m. (v) 122 cm. × 152 cm. (vi) Yes.

4. GENERAL :

(i) Not satisfactory. (ii) Light attack of boll worms and wooly mites in 1962. (iii) *Kapas* yield. (iv) (a) 1962-64. (b) Yes. (c) Nil. (v) N.A. (vi) Severe cold in Feb. 64 and 4 cm. of rains on 26.11.63. Heavy rains throughout monsoon 64 which affected the crop adversely. (vii) 62 being the 1st year of experiment, hence only two distinct treatment are there.

5. RESULTS :

62(138)

(i) 450 Kg/ha. (ii) 46.9 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg./ha.

Treatment	Cotton with 12.4 C.L/ha. of F.Y.M.	Cotton with 44.8 Kg/ha. of N+22.4 Kg/ha. of P <sub>2</sub> O <sub>5</sub>
Av. yield	416	484

C.D.=60.4 Kg/ha.

63(143)

(i) 372 Kg/ha. (ii) 55.2 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>
Av. yield	321	303	263	441	377	529

C.D.=122.9 Kg/ha.

64(77)

(i) 345 Kg/ha. (ii) 52.1 Kg/ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg/ha

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>	R <sub>4</sub>	R <sub>5</sub>	R <sub>6</sub>
Av. yield	302	454	176	374	412	351

C.D. = 116.1 Kg./ha.

**Crop :- Cotton, Jowar and Lang. Ref :- Gj. 60(150), 61(54), 62(127), 63(134).**

**Site :- Agri. Res. Stn., Tancha. Type :- 'R'.**

Object :- To find out the suitable rotation for Cotton.

#### 1. BASAL CONDITIONS :

(i) (a) and (b) As per treatments. (c) Nil. (ii) Black soil. (iii) Cotton : 25.6.1960, 12.7.1961, 12.7.1962, 26.6.1963, *Jowar* and *Lang* : 10.10.1960, 22.10.1961, 8.10.1962, 11 to 13.10.1963. (iv) (a) 1 to 3 harrowings (b) Drilling for 60(150), Cotton : Dibbling and *Lang*, *Jowar* : Drilling for 61(54), Drilling and thinning for others. (c) Cotton : 7 Kg/ha., *Jowar* : 9 Kg./ha., *Lang* : 45 Kg./ha (d) Cotton : 183 cm. × 61 cm., *Jowar* : 91 cm. × 15 to 23 cm., *Lang* : 46 cm. between rows. (e) Nil. (v) G.M. for 60(150), Nil for others. (vi) Cotton : Digvijay, *Jowar* : No. 8, *Lang* : T-2-12. (vii) Unirrigated. (viii) 1 to 4 interculturings. (ix) 72 cm., 69 cm., 52 cm., 95 cm (x) Cotton : 7.2.1961 to 14.3.1961, 11.3.1962 to 18.4.1962, 1.2.1963 to 11.3.1963, 24.3.1964. *Jowar* : 27.3.1961, 26.4.1962, N.A., N.A. *Lang* : 11.1.1961, 6.2.1962, N.A., N.A.

#### 2. TREATMENTS :

3 rotational treatments : R<sub>1</sub>=Cotton after *Jowar*, R<sub>2</sub>=Cotton after *Lang* and R<sub>3</sub>=Cotton after *Jowar* + *Lang*.

2 phases of each of the above treatments were taken.

#### 3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 11.0 m. × 11.0 m. (b) 8.5 m. × 7.3 m. (v) 122 cm. × 183 cm. (vi) Yes.

#### 4. GENERAL :

(i) Unsatisfactory for 61(54), 63(134), Normal for others. (ii) Attack of stem borer, rats and catter pillars for 60(150), Attack of pod borers and wooly mites for 61(54), No incidence for others but 5% B.H.C. was dusted on *Lang*. (iii) Yield of grain and *Kapas*. (iv) (a) 1954-1963 (Expt. was started at Agri. Res. Stn., Bhuwa which was shifted to Tanch in 1959). (b) No. (v) N.A. (vi) Higher temperature in winter affected the *Jowar* crop for 60(150). Rains at maturity affected the yield of all crops for 60(150), Water lodging resulted in low yields of Cotton and *Jowar* for 61(54). (vii) Error variances are heterogeneous and Treatments × years interaction is absent.

#### 5. RESULTS :

##### 60(150) (Cotton)

(i) 218 Kg/ha. (ii) 40.5 Kg/ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg/ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
Av. yield	228	200	227

##### 61(54) (Cotton)

(i) 217 Kg./ha. (ii) 59.3 Kg./ha. (iii) Treatment differences are not significant. (iv) Av. yield of *Kapas* in Kg./ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
Av. yield	176	219	225

## 62(127) (Cotton)

(i) 565 Kg./ha. (ii) 92.7 Kg./ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg./ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
Av. yield	450	619	626

C.D.=119.3 Kg./ha.

## 63(134) (Cotton)

(i) 239 Kg./ha. (ii) 72.2 Kg./ha. (iii) Treatment differences are significant. (iv) Av. yield of *Kapas* in Kg./ha.

Treatment	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub>
Av. yield	175	299	243

C.D.=92.9 Kg./ha.

INDEX—( Crop-wise and Type-wise )

	M	MV	C	CV	CM	CMV	I	IV	IM	IMV	IC	ICV	ICM	ICMV	D	X	R
Paddy	1	30	34	—	39	—	—	—	—	—	—	—	—	—	51	—	—
Wheat	56	—	116	117	119	131	140	—	145	—	154	—	155	162	—	—	—
Jowar	181	188	191	—	199	217	217	—	—	—	—	—	219	—	—	—	—
Bajra	230	256	259	—	268	—	—	—	—	—	—	—	291	—	—	—	—
Maize	310	311	—	—	312	—	—	—	—	—	—	—	—	—	—	—	—
Gram	314	—	—	—	—	—	—	—	317	—	—	—	—	—	—	—	—
Tur	321	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mung	322	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Wal	323	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Brinjal	323	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onion	—	—	—	—	—	—	—	—	324	—	—	—	—	—	—	—	—
Potato	—	—	—	—	—	—	—	—	—	—	—	—	326	—	—	—	—
Sugarcane	327	—	333	334	338	—	—	—	348	—	—	—	—	—	—	—	—
Cotton	349	402	406	421	423	462	466	473	474	—	481	—	485	—	536	—	—
Tobacco	540	—	—	542	—	—	—	—	—	—	—	—	542	—	—	—	—
Groundnut	544	576	581	—	595	—	612	—	612	—	—	—	—	—	617	—	—
Til	—	—	—	—	621	—	—	—	—	—	—	—	—	—	—	—	—
Lang	623	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Castor	—	—	623	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Jowar fodder	625	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Legumes	626	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lucerne	—	—	—	—	626	—	—	—	—	—	—	—	—	—	—	—	—
Sann	—	—	—	—	—	—	—	—	—	—	—	—	—	—	628	—	—
Coconut	629	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mango	631	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chiku	—	—	—	—	633	—	—	—	—	—	—	—	—	—	—	—	—
X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	636	—
R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	644

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