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AGRICULTURAL

FIELD

EXPERIMENTS

VOL. 10 PART 1

ORISSA

1948-53



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**INDIAN COUNCIL OF AGRICULTURAL RESEARCH
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FOREWORD

It is a well recognized fact that the level of agricultural production in India is one of the lowest in the world and it is only by the exploitation of scientific methods of agriculture that we can hope to increase our agricultural production to the level necessary for providing a reasonable standard of living to the country's population. Properly planned and conducted field experiments provide a reliable basis for propagating improved agricultural techniques among farmers. A number of research institutes and other experimental centres are functioning under the Central Ministry of Agriculture, the Commodity Committees and the State Governments, in which research on agricultural problems is going on. The need for an integrated account of the researches done in these organisations and institutions in the country has been felt for a long time, particularly in the context of planning. The absence of such a unified account has often led to duplication of work and delay in the utilisation of the results for practical farming. The Institute of Agricultural Research Statistics of the Indian Council of Agricultural Research has, therefore, rendered a most timely service by preparing a compendium of all agricultural field experiments conducted in India upto 1953 and similar compendia are under preparation by the Institute for subsequent years.

The present compendium contains critical summaries of results of experiments bearing on important agronomic factors such as the responses of crops to fertilizers and manures, inter-relationship of fertilizers, varieties and cultivation practices and other information of value for giving sound advice to farmers in different regions. I am sure that these results will be fully utilised by agricultural institutions, research workers, planners and extension organisations. The chief merit of the present publication is that it brings together in one place the results of experimentation carried out under diverse soil, climatic and agricultural conditions obtaining in India. Workers in one State can thus supplement data for their own area by results from other regions where conditions may be similar and thereby re-inforce their own conclusions. For the same reason I hope that this publication will be of use to workers in other countries also.

A Standing Committee consisting of the Agricultural Commissioner with the Government of India, the Director, Indian Agricultural Research Institute and the Statistical Adviser, Indian Council of Agricultural Research, has been set up to provide general guidance to the work under this scheme. I congratulate the members of this Committee and in particular the Statistical Adviser and his associates at the Institute of Agricultural Research Statistics for bringing out this compendium. The preparation of this compendium has been made possible only by the whole hearted co-operation of the States and other organisations in making available the results of their experimental researches for this purpose. My thanks are due to the officers of the State Departments of Agriculture and other institutions for participating in this work. I hope that the present series will be followed by periodical publication of similar compendia for later years, in order that the availability, in a consolidated form, of results of scientific experiments in agriculture in India may be maintained up-to-date.

NEW DELHI,
August 20, 1962.

A.D. PANDIT
Vice-President,
Indian Council of Agricultural Research.

PREFACE

A large number of agricultural field experiments on different problems is being conducted in the country by Central and State Governments, Research Institutes, Commodity Committees and other organisations engaged in agricultural research. In addition, a number of schemes involving field experimentation is sponsored by the Indian Council of Agricultural Research in different States. The absence of a unified record of the results of these various experiments has considerably handicapped planning of further research and development and has often led to duplication of efforts.

Vaidyanathan brought out in 1933 a useful catalogue of manurial experiments conducted in India till then. Considering that Vaidyanathan's work was confined to manurial experiments and the fact that an enormous increase has taken place in the number and scope of agronomic experiments in recent years in India, the Indian Council of Agricultural Research launched the scheme of National Index of Field Experiments in 1954. The object of the scheme was two-fold :

(i) the preparation of compendium of all the field experiments for the period 1935-53 and

(ii) the preparation of index cards for individual experiments from 1954 onwards.

Under the scheme, results of all agricultural field experiments other than purely varietal trials were to be consolidated. Subsequently at the time of the extension of the scheme in 1959 it was decided that the compendium would be prepared in the first instance for the period 1948-53 and a similar compendium would be prepared for the period 1954-59. The present series for the period 1948-53 has been prepared in pursuance of this decision.

The compendium is divided into 15 volumes one each for (1) Andhra Pradesh (2) Assam, Manipur and Tripura (3) Bihar (4) Gujarat (5) Kerala (6) Madhya Pradesh (7) Madras (8) Maharashtra (9) Mysore (10) Orissa (11) Punjab, Jammu & Kashmir and Himachal Pradesh (12) Rajasthan (13) Uttar Pradesh (14) West Bengal and (15) all Central Institutes. In each volume back-ground information of the respective State regarding its physical features, soils, rainfall and climate, agricultural production and area under different crops is given. A map showing different regions of the State, soils and agricultural research farms is also included. The experiments reported in each volume have been arranged cropwise for each State. All the experiments belonging to a particular crop at various research stations are grouped together. For a particular crop, experiments are arranged according to the following classification :

Manurial (M), Cultural (C), Irrigational (I), Diseases, Pests and Chemicals other than fertilisers (D), Rotational (R), Mixed Cropping (X) and combinations of these wherever they occur (e.g., CM as Cultural-cum-Manurial). Experiments in which crop varieties also form a factor are denoted by adding V to their symbol and are given together (e.g., MV as Manurial-cum-Varietal). The results of an experiment are given along with other basic information such as rotation of crops followed, cultural practices adopted, etc.

For making maximum use of the experimental data all the important tables giving the average yields of various treatments along with the appropriate standard errors have been presented. No attempt has, however, been made to summarise the data of groups of experiments on any particular item and to draw any general conclusions. This will be done for the period 1948-59 while publishing the compendium for the period 1954-59.

This publication is the result of the co-operative endeavour of a large number of persons both at the Centre and in the States. I should particularly mention in this connection, guidance and help rendered in the formulation of the scheme by Dr. D.J. Finney F.R.S. of Aberdeen University, Scotland, during his stay at the Institute of Agricultural Research Statistics as an F.A.O. Statistical Expert in 1952-53.

At the Institute of Agricultural Research Statistics, the work under the scheme was carried out under the supervision and guidance of Shri T.P. Abraham, Assistant Statistical Adviser. Shri G.A. Kulkarni, Statistician, looked after the detailed working of the scheme. These officers have been largely responsible for the preparation of the manuscript of the compendium and it is a pleasure to thank them for the hard work they have put in for getting this compendium ready. Messrs O.P. Kathuria, B.V. Srikantiah, M.L. Sahni, B.P. Dyundi, S.D. Bal and P.K. Jain of the statistical staff of the Institute deserve special mention for their careful scrutiny of the data and preparation of the material for the compendium. Thanks are also due to Dr. Uttam Chand, Professor of Statistics, now with the Central Statistical Organisation, Shri K.S. Avadhany, Assistant Statistician, also now with the Central Statistical Organisation, and Shri K.C. Raut, Statistician in this office who were associated with the scheme in its initial stages.

The burden of collecting data from original records by visiting different research stations and the analysis of a large number of experiments, only the primary data for which had been recorded in the files, fell on the regional staff appointed by the Indian Council of Agricultural Research in different States. They deserve to be congratulated for the patient work they have put in. The State Departments of Agriculture, Central Institutes and Commodity Committees made data for the experiments conducted within their jurisdiction readily available. The Indian Council of Agricultural Research acknowledges this willing co-operation without which the consolidation of the results would not have been possible. Various State officers who helped the project by making the data accessible to the statistical staff of the project and worked as the regional supervisors for the scheme also deserve thanks by the Council for their active help. The list of names of the regional supervisors is given on the following page.

NEW DELHI,
August 16, 1962.

V.G. PANSE
Statistical Adviser
Institute of Agricultural Research Statistics
(I.C.A.R.)

REGIONAL SUPERVISORS FOR THE NATIONAL INDEX
OF FIELD EXPERIMENTS

Region and headquarters	Regional Supervisors :
1. ANDHRA PRADESH (HYDERABAD)	SHRI D.V.G. KRISHNAMOORTHY, Deputy Director of Food Production, Andhra Pradesh. SHRI JAGANNATH RAO, Joint Director of Agriculture (Research), Andhra Pradesh. DR. KHADRUDDIN KHAN, Joint Director of Agriculture (Research), Andhra Pradesh. DR. WAHIUDDIN, Headquarters Deputy Director of Agriculture (Research), Andhra Pradesh.
2. ASSAM, MANIPUR AND TRIPURA (SHILLONG)	SHRI L.K. HANDIQUE, Director of Agriculture, Assam. SHRI S. MAJID, Director of Agriculture, Assam. DR. S.R. BAROHA, Director of Agriculture, Assam.
3. BIHAR (SABOUR)	DR. R. RICHARIA, Principal, Agriculture College, Sabour. SHRI R.S. ROY, Principal, Agriculture College, Sabour.
4. KERALA (TRIVANDRUM)	SHRI N. SHANKARA MENON, Director of Agriculture, Kerala. SHRI P.D. NAIR, Director of Agriculture, Kerala.
5. MADHYA PRADESH (GWALIOR)	DR. T.R. MEHTA, Principal, Agriculture College, Gwalior.
6. MADRAS (COIMBATORE)	SHRI C.R. SHESHADRI, Vice-Principal & Secretary, Research Council, Agriculture College, Coimbatore. SHRI P.A. VENKATESWARAN, Vice-Principal & Secretary, Research Council, Agriculture College, Coimbatore. LATE SHRI M. BHAVANI SANKARA RAO, Vice-Principal & Secretary, Research Council, Agriculture College, Coimbatore. SHRI T. NATARAJAN, Agronomist & Secretary, Research Council, Agriculture College, Coimbatore. SHRI A.H. SARMA, Extension Specialist & Secretary, Research Council, Agriculture College, Coimbatore.
7. MAHARASHTRA & GUJARAT (FORMER BOMBAY STATE) (POONA)	SHRI D.S. RANGA RAO, Statistician, Department of Agriculture, Poona.

Owing to transfers and other changes more than one Regional Supervisor have been shown against several states as these officers have acted as Regional Supervisors during different periods from 1955 to 1962.

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|---|--|
| 8. MYSORE
(BANGALORE) | SHRI A. ANANT PADMANABHA RAU,
State Statistician, Mysore State. |
| 9. ORISSA
(BHUBANESHWAR) | DR. U.N. MOHANTY,
Dy. Director of Agriculture (H.Q.), Orissa. |
| 10. PUNJAB, JAMMU &
KASHMIR AND HIMACHAL
PRADESH (CHANDIGARH) | SHRI P.S. SAHOTA,
Statistician, Department of Agriculture, Punjab. |
| 11. RAJASTHAN
(JAIPUR) | SHRI H.C. KOTHARI,
Statistician, Department of Agriculture, Rajasthan. |
| 12. UTTAR PRADESH
(LUCKNOW) | DR. K. KISHEN,
Chief Statistician to Govt. of U.P.
Department of Agriculture, U.P. |
| 13. WEST BENGAL
(CALCUTTA) | SHRI S.N. MUKHERJEE,
Statistical Officer,
Directorate of Agriculture,
West Bengal.
DR. S. BASU,
Statistical Officer,
Directorate of Agriculture,
West Bengal. |
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**ABBREVIATIONS COMMON TO EXPERIMENTS ON ANNUAL AND
PERENNIAL CROPS AND EXPERIMENTS ON CULTIVATORS'
FIELDS**

Crop :- In the top left coner 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 given in brackets.

Abbreviations adopted for States are as follows :-

A.P.	Andhra Pradesh	Mn.	Manipur
As.	Assam	Mh.	Maharashtra
Bh.	Bihar	Ms.	Mysore
Di.	Delhi	M.P.	Madhya Pradesh
Gj.	Gujarat	Or.	Orissa
H.P.	Himachal Pradesh	Pb.	Punjab
J.K.	Jammu & Kashmir	Rj.	Rajasthan
K.	Kerala	Tr.	Tripura
M.	Madras	U.P.	Uttar Pradesh
		W.B.	West Bengal

Repetition of the experiment in other years is indicated in the same line against 'reference' by stating the year and serial number for each repetition side by side *e.g.* U.P. 53(19)/52(42)/51(20) etc.

Site :- Name of the Research Station is mentioned along with the place where it is located, *e.g.* Agri. Res. Stn. for Agricultural Research Station.

For Central Institutes, the corresponding standard abbreviations have been adopted *e.g.* I.A.R.I. for Indian Agricultural Research Institute.

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. *e.g.* CM. is to be read as Cultural-cum-Manurial.

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

(i) General mean. (ii) S.E. per plot. (iii) Result of test of significance. (iv) Summary table (s) with S.E. of comparison (s).

Abbreviations used in the text of the experiments :-

ac.—acre.	C.L.—Cart load.
Ammo. Phos.—Ammonium Phosphate.	C.M.—Cattle Manure.
A/N—Ammonium Nitrate.	C/N—Chilean Nitrate.
A/S—Ammonium Sulphate.	C/S—Copper Sulphate.
B.D.—Basal Dressing.	F.M.—Fish Meal or Fish Manure.
B.M.—Bone Meal.	F.W.C.—Farm Waste Compost.

F.Y.M.—Farm Yard Manure.	N.—Nitrogen.
G.M.—Green Manure.	Nitro phos—Nitro phosphate.
G.N.C.—Groundnut cake.	P.—Phosphate.
K —Potash.	Pot. Sul.—Potassium Sulphate.
lb. — Pounds.	Super—Super Phosphate.
M.C.—Municipal Compost.	T.C.—Town compost.
Mur. Pot.—Muriate of Potash.	Zn. Sul.—Zinc Sulphate.

BASAL CONDITIONS

Information under the above heading to be read against the following items :

A. For annual crops :

(i) (a) Crop rotation if any. (b) Previous crop. (c) Manuring of previous crops. (State amount and kind). (ii) (a) Soil type. (b) Soil analysis. (iii) Date of sowing/ planting. (iv) Cultural practices. (a) Preparatory cultivation. (b) Method of sowing/planting. (c) Seed-rate. (d) Spacing. (e) No. of seedlings per hole. (v) Basal manuring with time and method of application. (vi) Variety. (vii) Irrigated or Unirrigated. (viii) Post-sowing/planting cultural operations. (ix) Rainfall during crop season (State name of the season along with the month). (x) Date of harvest.

B. For perennial crops :

(i) History of site including manuring and other operations. (ii) (a) Soil type. (b) Soil analysis. (iii) Method of propagation of plants. (iv) Variety. (v) Date and method of sowing/planting. (vi) Age of seedling at the time of planting. (vii) Basal dressing with time and method of application. (viii) Cultural operations during the year. (ix) Inter cropping if any. (x) Irrigated or Unirrigated. (xi) Rainfall during crop season. (xii) Date of harvest.

C. For experiments on cultivators' fields :

(i) (a) Crop rotation, if any. (b) Previous crop. (c) Manuring of previous crop. (ii) Soil type in general. (iii) Basal manuring with 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) Period of sowing/planting per hold. (vii) Irrigated or Unirrigated. (viii) Post-sowing/planting cultural operations. (ix) Rainfall during crop season. (x) Period of harvesting.

DESIGN

Information under this heading to be read against the following items :

A. For annual crops :

(i) Abbreviations for designs : C.R.D.—Completely Randomised Design ; R.B.D.—Randomised Block Design ; L. Sq.—Latin Square ; Confd.—Confounded ; Fact.—Factorial. (other designs and modifications of the above to be indicated in full). (ii) (a) No. of plots per block. (b) Block dimensions (iii) No. of replications. (iv) Plot size. (a) Gross. (b) Net. (v) Border or guard rows kept. (vi) Whether treatments are randomised (separately in each block).

B. For perennial crops :

(i) Abbreviations for designs : C.R.D.—Completely Randomised Design ; R.B.D.—Randomised Block Design ; L. Sq.—Latin Square ; Confd.—Confounded. (other designs and modifications of the above indicated in full). (ii) (a) No. of plots per block. (b) Block dimensions. (iii) No. of replications. (iv) No. of trees/plot. (v) Border or guard rows kept. (vi) Are treatments randomised.

C. For experiments on cultivators' fields :

(i) Method of selection of experimental sites. (ii) No. and distribution of experiments. (iii) Plot size. (a) Gross. (b) Net. (iv) Whether treatments are randomised.

GENERAL

Information under this heading to be read against the following items :—

A. For annual crops :

(i) Crop conditions during growth with date of lodging, if any. (ii) Incidence of pests and diseases with control measures taken. (iii) Quantitative observations taken (iv) In case of repetition in successive years—(a) from what year to what year, (b) whether treatments were assigned to the same plots in the same manner every year, (c) reference to combined analysis, if any. (v) In case of repetition in other places, (a) names of the places along with reference. (b) reference to combined analysis, if any. (vi) Abnormal occurrences like heavy rains, frost, storm etc., if any. (vii) Any other important information.

B. For perennial crops :

(i) Crop condition during the year. (ii) Incidence of pests and diseases with control measures taken. (iii) Quantitative observations taken. (iv) In case of repetition in successive years—(a) from what year to what year, (b) reference to combined analysis, if any. (v) Abnormal occurrences like heavy rains, frost, storm etc, if any. (vi) Any other important information.

C. For experiments on cultivators' fields :

(i) Crop condition during growth. (ii) Incidence of pests and diseases with control measures taken. (iii) Quantitative observations taken. (iv) In case of repetition in successive years, (a) from what year to what year, (b) whether treatments were assigned to the same plots in the same manner every year, (c) reference to combined analysis, if any. (v) In case of repetition in other places names of places along with reference. (vi) Abnormal occurrences, like heavy rains, frost, storm etc., if any. (vii) Any other important information.

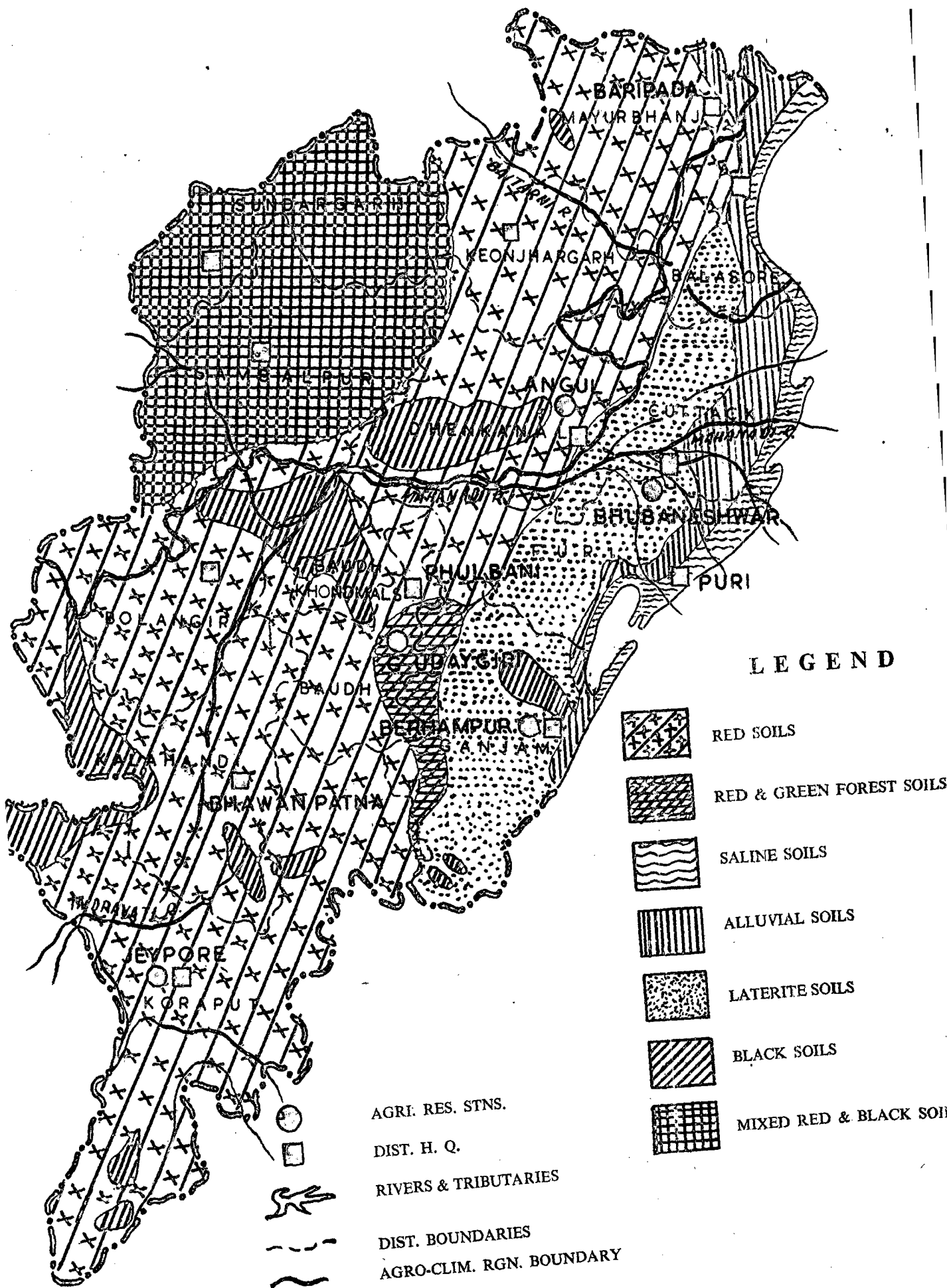
GLOSSARY OF VERNACULAR NAMES OF CROPS

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	Neilu	Bhatta	Bhat	Dangar	Dhan ; Chawal	Chaul ; Dhan
2.	Sugarcane	<i>Saccharum officinarum</i> L.	Kubiar	Akh		Cheruku	Karumbu	Karimbu	Kabbu	Oos	Sherdi	Ganna ; Kamad ; Naishakar	Kamad ; Ganna ; Eakh
3.	Turmeric	<i>Curcuma longa</i> ; <i>Curcuma domestica</i> Val.	Halodhi	Halud ; Haldi	Haldi	Pasupu	Manjal	Manjal	Arisina	Halad	Haldar	Haldi	Haldi
4.	Tapioca	<i>Manihot utilissima</i> ; <i>Manihot esculanta</i> Crantz.	Simolu Alu	Shimul alu		Karra Penda- lamu	Maruvalli Kizhaagu ; Kuchi Kizhaagu	Mara- cheeni	Mara- genasu	Tapioca		Tapioca	Tapioca
5.	Sweet Potato	<i>Ipomoea batatas</i> Lam	Mitha Aloo	Mishti Alu	Kanda- mula	Chi'aga- dadumpa	Seeni kilangu	Cheeni kizangu	Genasu	Ratalu	Shakaria	Shakar- kandi	Shakarkandi
6.	Potato	<i>Solanum tuberosum</i> L.	Alooguti	Alu	Bilati Alu	Bengla- dampa Uralagadda	Uruzhal kilangu	Urala kizangu	Alu gedde	Batata	Aloo, Batata	Aaloo	Alu
7.	Colocasia	<i>Colocasia antiquorum</i> Schott.	—	Kachu	Saru	Chemadum- palu	Sambu	Chembu	Kesavina gedde	Alu	Alvi	Akhi Dhueya	Arvi
8.	Groundnut	<i>Arachis hypogaea</i> L.	China badam	Cheena badam	C hina badam	Nelash- anga	Nilak- adalai	Nilak k- adla	Kadale kayi	Ehui- mug	Magafali	Mung- phali	Mungfali
9.	Nagpur Santra (orange)	<i>Citrus reticulata</i> Blanco	Kamala	Kamla lebu	Santra	Kamalaph alanu	Kamla ; Koorg Kudagu orange	Arangu		Santra	Santra ; Narangi	Santra	Santra

CONTENTS

	PAGE
FOREWORD	
PREFACE	... (i)
LIST OF ABBREVIATIONS	... (v)
GLOSSARY OF VERNACULAR NAMES OF CROPS	... (viii)
ORISSA STATE	... 1
STATEMENT SHOWING DETAILS OF EXPERIMENTAL STATIONS	5
EXPERIMENTAL RESULTS (CROP-WISE)	
Paddy	... 7
Sugarcane	... 30
Turmeric	... 33
Tapioca	... 61
Sweet Potato	... 63
Potato	... 66
Colocasia	... 67
Groundnut	... 68
Mixed cropping	... 69
Nagpur <i>Santra</i>	... 69

MAP OF ORISSA STATE SHOWING AGRO-CLIMATIC REGIONS, SOILS, AGRICULTURAL RESEARCH STATIONS ETC.



ORISSA STATE

1. GENERAL DESCRIPTION

The State of Orissa located on the eastern coast of India has an area of 60,136 square miles or about 38,487 thousand acres. The area according to village papers is 37,644 thousand acres. The State is bound by Madhya Pradesh on West, Bihar and West-Bengal on North, Andhra Pradesh on South and Bay of Bengal on East. The capital of the State is at Bhubaneswar. For administration purposes the State is divided into 13 districts. The land utilisation in 1955-56 was follows —

Classification of land.	Area (000 acre).
(i) Forests	8,739
(ii) Area not available for cultivation	
(a) Barren & unculturable land.	2,945
(b) Land put to non-agricultural uses.	2,861
Sub-total.	5,806
(iii) Other uncultivated land excluding fallow land.	
(a) Culturable waste.	3,504
(b) Permanent pastures and other grazing lands.	1,821
(c) Land under misc. tree crops not included in net area sown.	1,076
Sub-total.	6,401
(iv) Fallow lands.	
(a) Current fallow.	2,114
(b) Other	739
Sub-total.	2,853
(v) Net area sown.	1,334
(vi) Area sown more than once.	1,109
Total cropped area.	15,954.

2. PHYSICAL FEATURES

The State on the whole is characterized by its much diversified topography and its river system has a direct outlet into the Bay of Bengal. On the east is a belt of flat open country more or less parallel to the coast which itself is not homogeneous. On the coast, there are stretches of sand and sand-hills alternating with deltaic and tidal mud with mangrove swamps. Behind this coastal belt is an area of cultivated alluvial and laterite formations about 50 miles in width near Cuttack and Balasore and is narrowed on the north by the outlying hills of Nilgiri and Mayurbhanj and bounded on south by isolated rock hills and laterite formations. On the extreme south the boundary hills of Orissa and Madras States meet the Chilka lake. Physiographically the State has two natural divisions namely (i) Orissa Inland Division and (ii) Orissa Coastal Division; the former lies in the North-east plateau sub-region of the Peninsular hills and Plateau region whereas the latter is natural division of the North Madras and Orissa Coastal sub-region of the Eastern Ghats and Coastal region. The districts covered by these two divisions are :

(i) Orissa Inland Division :—

Mayurbhanj, Keonjhar, Dhenkhal, Sundergarh, Phulbani, Ganjam, and Sambalpur.

(ii) Orissa Coastal Division :—

Bolangir, Kalahandi, Koraput, Balasore, Cuttack, and Puri.

3. SOILS

(i) Orissa Inland Division :

This tract has a type of soil known as red soil. This granite which is so wide-spread in this region, gives rise to rather coarse sandy soil with just sufficient clay to hold together. There is accumulation of plenty of iron hydroxide on the surface which causes the

uppermost crust of the soil to set as hard as cement in dry season. The soils are poor in organic matter and plant nutrients. These characteristics are most marked in Bamanghaty sub-division of Mayurbhanj, Banai sub-division and basin of Sundargarh. Soil reaction of this division is neutral with *p* H. ranging from 7 to 7.5.

(ii) **Orissa Coastal Division :**

It contains deltaic alluvial soil. In the northern most section which lies in district of Balasore and which has been formed by rivers Subarnarekha, Barabaland and Salandi, the soil is sandy loam, while in the delta of the Baitarani and the Brahmani stretching over Bhadrak and Jeypore subdivision, the soil varies from clay loam to stiff clay. The Rushikulya delta of Ganjam is remarkably sandy. There is a narrow stretch of saline soil along the sea coast and also marshy and swampy patches of land here and there. Sand dunes are noticeable along surf-beaten coast.

4. RAINFALL AND CLIMATE

The coastal region on account of its proximity to the Bay of Bengal has a higher rainfall. The rest of the State has also a high rainfall owing to the hilliness and a forest cover. It is, however, not possible to indicate well defined zones of rainfall due to irregular topography of the area. The western and central hilly districts have an average rainfall varying from 54" to 58". The rainfall of the coastal area varies from 54" to 68". The principal rainfall occurs from June to September, but occasional showers are obtained in December-January and frequently thunder storms and showers in May. The relative humidity of the coastal areas is highest.

The districts of the State can be grouped together according to the normal rainfall as below :—

Districts	Rainfall range
(i) Bolangir.	50"— 60"
(ii) Sambalpur, Keonjhar, Puri and Ganjam.	60"— 70"
(iii) Sundargarh, Cuttack, Dhenkal, Phulbani, Kalahandi and Koraput.	70"— 80"
(iv) Balasore.	80"— 90"
(v) Mayurbhanj.	90"— 100"

The season-wise normal rainfall figures for the two divisions of the State are given in Table 1

TABLE 1

Seasonwise normal rainfall in inches for the State of Orissa.

Divisions	June to Sept.	Oct. to Dec.	Jan. to March	April to May	Total
(i) Orissa Inland					
Division	44.10	6.26	0.28	4.35	54.99
(ii) Orissa Coastal					
Division	42.40	8.62	0.45	5.47	56.94
State (simple average)	43.25	7.44	0.36	4.91	55.96

1" = 2.54 cm.

5. IRRIGATION

Total area irrigated in the State in 1955-56 was 24,14,448 acres. The distribution according to different sources of irrigation is given below :—

TABLE 2

Source wise distribution of area irrigated in 1955-56.

Source	Area (000 acres)
1. Government canals.	486.9
2. Private canals	69.4
3. Tanks	1222.6
4. Wells	94.1
5. Others	541.4
Total	2414.4

6. AGRICULTURAL PRODUCTION AND NORMAL CROPPING PATTERN

Paddy is the main crop of the State and occupies nearly 83% of the total cultivated area. It is grown in varying extent in all districts of which Balasore has the largest percentage of rice growing area. Jute is grown mainly in Cuttack and to a small extent in Balasore and Puri. Sugarcane is grown to a small extent. Cuttack and Sambalpar have proportionally the largest areas under sugarcane. Wheat, *Jowar*, *Bajra*, *Ragi* and Gram occupy the largest areas in Koraput.

In coastal region of the State double cropping of Paddy is common practice with the farmers.

The practice of rotating rice with pulses (black gram or green gram) is followed throughout the State.

The important rotations for wheat crop are :—

- (i) *Aus* paddy-Wheat
- (ii) Jute (early)-Wheat.
- (iii) *Jowar* mixed with *Arhar*-Fallow-Wheat.
- (iv) Cotton alone or alongwith black or green gram-Wheat.
- (v) Rice-Maize-Wheat along or mixed with gram.
- (vi) Rice-Pea-Fallow-Wheat.

The area, production and yield per acre for important crops are given in the table below.

TABLE 3

Area production and yield per acre of the principal crops of Orissa State for 1957-58.

Crop	Area (000 acres)	Production (000 tons)	Av. yield in lb./ac.
Rice	9,476	1755	415
<i>Ragi</i>	165	27	367
Small millets	111	12	242
Other cereals	100	17	381
Pulses	1,159	266	475
Oilseeds	514	64	275
Fibre crops	129	243	4045
Miscellaneous	69	97	3149

7. AGRICULTURAL RESEARCH AND EXPERIMENTATION

There were only five State agricultural farms which reported the experiments for the period 1948-53. Experiments on paddy crop were conducted at Berhampur and Jeypore farms. Experiments on sugarcane and vegetable crops like potato were carried out at Bhubaneshwar farm. The farm at G. Udaygiri reported experiments on turmeric crop. The experiment on citrus fruit crops were carried out at Angul farm. Out of the five farms two represented black cotton soil, clayey loam, loam laterite being represented by the others.

8. EXPERIMENTS

There were only 84 agricultural field experiments available for the period 1948-53. The distribution of these according to crops and types of treatments tried is given in table below :—

TABLE 4

Distribution of experiments according to crops and types of treatments.

Crop	M	C	CM	Mixed	Total
1. Paddy	23	5	1	—	29
2. Tapioca, Sweet potato and Potato	3	4	—	—	7
3. Sugarcane	2	—	2	—	4
4. Turmeric	18	17	—	5	40
5. Groundnut	—	1	—	—	1
6. Orange	1	—	—	—	1
7. Others	1	—	—	—	1
8. Mixed	—	—	—	1	1
Total	48	27	3	6	84

There were only 29 experiments on paddy which is the principle crop of the State. So far as the research on the agronomic problems was concerned the other important cereal crops did not receive any attention. It may be that experimentation on paddy and other crops is done for varietal trials for selection of high yielding and disease resistant varieties. There were 40 experiments on turmeric crop, 5 out of 6 experiments, reported on mixed cropping were on turmeric crop.

The rate of application of Nitrogen varied from 20 lb./ac. to 40 lb./ac., of P_2O_5 and K_2O from 40 lb./ac. to 80 lb./ac. Some experiments were conducted on paddy to study the effect of N, P_2O_5 and K_2O singly or in combination. There were other experiments with organic manures. The bulky manures applied were farm yard manure, urban and rural composts. The rate of application of farm yard manure was 4 to 15 tons/ac. and for urban and rural composts was 2 to 5 tons/acre. The other organic manures as source of nitrogen were Karanja cake, Groundnut cake, Gingelly cake and Niger oil cake. These organic manures were tried for comparison with ammonium sulphate.

So far as turmeric crop was concerned the amount of N varied from 60 to 120 lb./acre and of K_2O from 100 to 200 lb./acre. The organic manures commonly used for this crop were Niger oil cake, Sal leaf mulch, compost, groundnut cake, farm yard manure and cowdung. The amount of N applied through Til oil cake and ammonium sulphate for sugarcane varied from 80 to 160 lb./acre.

Out of 84 experiments, 64 experiments were carried out in Randomised blocks, and 15 were in split plot-design. There was one manurial experiment on Santra at Angul with 3^3 confounding and the other at G. Udaygiri on Turmeric from 1948 to 1951. In these 3^3 design the treatments were the combinations of 3 levels of N, 3 level of P_2O_5 and 3 levels of K_2O_5 (N=0, 60 and 120 ; $PO=0, 45$ and 90 and $K_2O=0, 100$ and 200 lb./ac

The split plot-design adopted was mostly for cultural experiments with spacing and method of planting as treatments. There were few experiments with split plot designs with manurial treatments.

The number of plots per block in R.B.D. varied from 3 to 10. In the split plot-design the number of main-plots per block varied from 4 to 9 and number of sub-plots per main plot-varied from 2 to 4.

The net-plot size varied from nearly 1.2 cent to 2.5 cents, although there were few experiments on turmeric (cultural) with 0.09 cent to 0.05 cent. The number of replications varied from 3 to 6.

STATEMENT SHOWING DETAILS OF AGRI. RES. STATIONS FOR ORISSA

Sl. No.	Name of the experimental station with location, year of experiment, the tract it represents and major crops.	Soil type and soil analysis.	Normal rainfall in inches.	Irrigation facilities.	No. of experiments.	General description of the topography of the exptl. area.
1	2	3	4	5	6	7
1.	Angul; Citrus fruit Res. Stn. Dist; Dhenkanal 15 miles from Meramundali Rly. Stn. Year of establishment: 1946. Major crops; Citrus fruit.	1. Soil types: Red loam but the experimental area has black cotton soil. 2. Depth: 2' on average. 3. Colour: Black. 4. Structure; Medium. 5. Soil analysis: Not available.	June 4.76 July 14.47 Aug. 0.49 Sept. 0.52 Oct. 0.23 Nov. to 0.23 May Nil. <hr/> Total. 20.47 Figures for 1957—58.	Irrigation from tank from 1948. There is proper drainage system.	1—Nagpur Santra.	Information not available.
2.	Berhampore; Rice Research Sub-Station. Dist; Ganjam. 6 miles from Berhampur Rly. Stn. Year of establishment: 1932. It represents coastal tract having red and clayey soils. Major crops: Paddy, Mung, Kulthi and Biri.	1. Soil type: Red and clayey soils. 2. Depth: 9" to 1½'. 3. Colour: Reddish to slight gray. 4. Structure: Very fine sand with clay colloidal trace. 5. Soil analysis: Not available.	June 2.47 July 9.43 Aug. 9.65 Sept. 2.12 Oct. 22.12 Nov. 11.32 Dec. — Jan. 0.87 Feb. — March — April 0.17 May — <hr/> Total. 58.25 Figure for 1958—59.	Only low land area is irrigated by canals. Facilities are available from 1946. No proper drainage system as yet.	14—Paddy. 1—Groundnut. 1—Mixed-cropping. <hr/> 16—Total.	Res. Stn. is having 2 major portions. High land and low land. <i>Highland</i> : entirely depends on vagaries of monsoon (31 ac). <i>Lowland</i> : It has irrigation facilities.

STATEMENTS SHOWING DETAILS OF AGRIC. RES. STATIONS FOR ORISSA

1	2	3	4	5	6	7
3.	Bhubaneswar : State Agricultural Res. Stn. Distt. Puri. 4 miles from Bhubaneswar Rly. Stn. Year of establishment : 1949. It represents coastal laterite tract of Orissa.	Soil types : Loam and Sandy loam soils other information not available.	Normal annual rainfall=55".	Information not available.	4—Sugarcane. 2—Tapioca. 4—Sweetpotato. 1—Colocasia.	No information.
4.	Jeypore : Rice Research sub-Stn. Distt : Koraput. 105 miles from Vijianagaram Rly. Stn. Year of establishment : 1937. Agronomic research on Paddy.	1. Soil type : Laterite and clayey soils. Other information not available.	Normal annual rainfall=70".	—	1—Paddy. 1—Potato. ----- 16—Total.	—
5.	G. Udayagiri. G. Udayagiri farm. Dist. Phulbani. 79 miles from Berhampur Rly. Stn. Year of establishment : 1938. It represents hilly tract. Multiplication of cereals, Millets, Pulses, Oil-seeds, and Green manure.	1. Soil Type :—Clayey loam and sandy loam. 2. Depth : 20' Red laterite and 15' clay complex. 3. Colour :—Red and brown. 4. Structure :—Red laterite and clay complex. 5. Soil analysis :—Not available.	June 7.73 July 10.65 Aug. 21.16 Sept. 9.14 Oct. 3.36 Nov. 1.20 Dec. — Jan. — Feb. — March 0.53 April 0.35 May 4.99 ----- Total. 59.11 Figures for the year. 1953.	Lift irrigation by pump irrigating 4 acres from 1944-1945. No drainage system.	35—Turmeric. 5—Mixed cropping ----- 40—Total.	The experimental farm is situated at a distance of 1½ miles towards west of G. Udayagiri. The area of the farm is 35 acres. It is situated above 15' level to the west of G. Udayagiri and at the foot of the hills surrounding it. It is subject to soil erosion during rainy season.

Crop :- Paddy.

Ref :- Or. 53(6).

Site :- Rice Res. Sub-Stn., Berhampore.

Type :- 'M'.

Object :- To study the effect of placement of manures.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Compost Expt. 5, 7, 10, 15 ton/ac. of compost. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) N.A. (iv) (a) N.A. (b) Transplanting. (c) and (d) N.A. (e) —. (v) 15 ton/ac. of F.Y.M. (vi) T-1242. (vii) Irrigated. (viii) Weeding. (ix) 40". (x) N.A.

2. TREATMENTS:

All combinations of (1) and (2) + a Control (no manure).

(1) 2 levels of N : $N_1=20$ and $N_2=40$ lb./ac.(2) 2 methods of application : $M_1=$ On surface and $M_2=$ Under sub-soil.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) $32' \times 17'$. (b) $30' \times 15'$. (v) 1' all round. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Paddy grain yield. (iv) (a) Not continued. (b) Nil. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 3199 lb./ac.

(ii) 324.3 lb./ac.

(iii) Control vs. other treatments effect is highly significant. Other effects are not significant.

(iv) Av. yield of paddy in lb./ac.

	N_1	N_2	Mean
M_1	3364	3412	3388
M_2	3340	3219	3280
Mean	3352	3216	3334

S.E. of marginal mean of N or M = 114.7 lb./ac.

S.E. of body of table = 162.1 lb./ac.

Crop :- Paddy.

Ref :- Or. 49(19).

Site :- Rice Res. Sub-Stn., Behrampore.

Type :- 'M'.

Object :- To study the effect of N and K_2O applied alone and in combination on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Behrampore. (iii) 3.8.49. (iv) (a) to (e) N.A. (v) Nil. (vi) N.A. (vii) Irrigated. (viii) Weeding. (ix) N.A. (x) 6.12.49.

2. TREATMENTS :

1 Control (no manure).

2. 40 lb./ac. of N + 40 lb./ac. of K_2O + 40 lb./ac. of P_2O_5 .3. 40 lb./ac. of N + 40 lb./ac. of K_2O + 50 lb./ac. of P_2O_5 .4. 40 lb./ac. of N + 40 lb./ac. of K_2O + 60 lb./ac. of P_2O_5 .5. 40 lb./ac. of N + 50 lb./ac. of K_2O + 40 lb./ac. of P_2O_5 .6. 40 lb./ac. of N + 50 lb./ac. of K_2O + 50 lb./ac. of P_2O_5 .7. 40 lb./ac. of N + 50 lb./ac. of K_2O + 60 lb./ac. of P_2O_5 .8. 40 lb./ac. of N + 60 lb./ac. of K_2O + 40 lb./ac. of P_2O_5 .9. 40 lb./ac. of N + 60 lb./ac. of K_2O + 50 lb./ac. of P_2O_5 .10. 40 lb./ac. of N + 60 lb./ac. of K_2O + 60 lb./ac. of P_2O_5 .Date of manuring : 2.8.49., sources of N, P_2O_5 and K_2O : N.A.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) N.A. (b) $16\frac{1}{2}' \times 16\frac{1}{2}'$. (v) N.A. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of grain. (iv) (a) 1949-1950. (b) N.A. (c) N.A. (v) (a), (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2276 lb./ac.
 (ii) 298.5 lb./ac.
 (iii) The treatments differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1600
2.	2380
3.	2413
4.	2153
5.	2307
6.	2353
7.	2087
8.	2410
9.	2467
10.	2587
S.E./mean	= 172.3 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 50(12).

Type : 'M'.

Object :- To study the effect of N, P_2O_5 and K_2O applied alone and in combination on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 26.8.50.
 (iv) (a) N.A. (b) Transplanting. (c) —. (d) Line to line spacing 6" and plant to plant 6". (e) 1. (v) Nil.
 (vi) B.A. M-11. (vii) Irrigated. (viii) Weeding. (ix) 36". (x) N.A.

2. TREATMENTS

- Control (no manure).
- 40 lb./ac. of N+40 lb./ac. of K_2O +40 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+40 lb./ac. of K_2O +50 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+40 lb./ac. of K_2O +60 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+50 lb./ac. of K_2O +40 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+50 lb./ac. of K_2O +50 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+50 lb./ac. of K_2O +60 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+60 lb./ac. of K_2O +40 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+60 lb./ac. of K_2O +50 lb./ac. of P_2O_5 .
- 40 lb./ac. of N+60 lb./ac. of K_2O +60 lb./ac. of P_2O_5 .

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 2. (iv) (a) N.A. (b) $16\frac{1}{2}' \times 16\frac{1}{2}'$. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Fair. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1949-50. (b) and (c) N.A. (v) (a) and (b) N.A. (vi) Nil. (vii) Experiment actually laid out with 3 replications but analysis done with two replications only, as the treatments were not randomised in 3rd replication.

5. RESULTS :

- (i) 1763 lb./ac.
 (ii) 237.4 lb./ac.
 (iii) Treatments do not differ significantly.

(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1245
2.	1900
3.	1860
4.	1760
5.	1750
6.	1750
7.	1720
8.	1700
9.	1905
10.	2045
S.E./mean	= 167.9 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 52(8).

Type :- 'M'.

Object :—To study the effect of compost on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sunnhemp. (c) Nil. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 15.8.52. (iv) (a) N.A. (b) Transplanting. (c) N.A. (d) Line to line spacing 6" and plant to plant 6". (e) 1. (v) Nil. (vi) T-1242. (vii) Irrigated. (viii) Weeding. (ix) 31". (x) 21.12.52.

2. TREATMENTS :

1. Control (no manure).
 2. 5 ton/ac. of F.Y.M.
 3. 7 ton/ac. of F.Y.M.
 4. 10 ton/ac. of F.Y.M.
 5. 15 ton/ac. of F.Y.M.
- Manure applied before transplanting.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 4. (iv) (a) 32' × 17'. (b) 30' × 15'. (v) 1' around. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Grain yield. (iv) (a) Not continued. (b) Nil. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2621 lb./ac.
- (ii) 252.5 lb./ac.
- (iii) Treatments do not differ significantly.
- (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2472
2.	2435
3.	2641
4.	2702
5.	2856
S.E./mean	= 126.0 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 50(10).

Type :- 'M'.

Object :—To study the effect of compost on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Clay loam. (b) Refer soil analysis, Behrampore. (iii) Transplanting 29.7.50. (iv) (a) N.A. (b) Transplanting. (c)—. (d) N.A. (e) 1. (v) Nil. (vi) NKD-35. (vii) Irrigated. (viii) Weeding. (ix) 36". (x) 15.11.50.

2. TREATMENTS :

1. Control (no manure).
2. F.Y.M. at 4 ton/ac.
3. F.Y.M. at 7 ton/ac.
4. F.Y.M. at 10 ton/ac.
5. Urban compost at 2 ton/ac.
6. Urban compost at 3.5 ton/ac.
7. Urban compost 5.0 ton/ac.
8. Rural compost at 2 ton/ac.
9. Rural compost at 3.5 ton/ac.
10. Rural compost at 5.0 ton/ac.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 33' x 33'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Generally good. (ii) N.A. (iii) Yield of grain. (iv) (a) Not continued. (b) Nil. (c) N.A. (v) (a) and (b) Nil. (vi) and (vii) Nil.

5. RESULTS .

- (i) 16.9 lb./ac.
 (ii) 308.7 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1613
2.	1887
3.	1840
4.	1780
5.	1480
6.	1467
7.	1773
8.	1593
9.	1520
10.	1433
S.E./mean	= 178.2 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub -Stn., Berhampore.

Ref :- Or. 49(4)

Type :- 'M'.

Object :- To study the effect of Super on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 13.8.49.
 (iv) (a) N.A. (b) Transplanting. (c) -. (d) N.A. (e) 1. (v) N.A. (vi) T-141. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) 28.11.49.

2. TREATMENTS :

1. Control.
 2. 40 lb./ac. of P_2O_5 .
 3. 50 lb./ac. of P_2O_5 .
 4. 60 lb./ac. of P_2O_5 .
- Manures applied on 12.8.1949.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) $16\frac{1}{2} \times 16\frac{1}{2}$ ". (v) N.A. (vi) Yes.

4. GENERAL :

(i) Generally good. (ii) N.A. (iii) Yield of grain. (iv) (a) 1949 to 1950. (b) N.A. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

- (i) 2192 lb./ac.
(ii) 392.0 lb./ac.
(iii) Treatments do not differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2113
2.	2223
3.	2140
4.	2293
S.E./mean	= 160.0 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 50(2)/49(4).

Type :- 'M'.

Object :- To study the effect of Super on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) As per treatments (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore.
(iii) 24.7.50. (iv) (a) N.A. (b) Transplanting. (c) . d) N.A. (e) 1. (v) Nil. (vi) T-141. (vii) Irrigated.
(viii) Weeding. (ix) 36". (x) 26.11.50.

2. TREAEMENTS :

1. Control.
2. 40 lb /ac. of P_2O_5 as Super.
3. 50 lb./ac. of P_2O_5 as Super.
4. 60 lb./ac. of P_2O_5 as Super.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) $16\frac{1}{2}' \times 16\frac{1}{2}'$ (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Good in all replications except in 6th. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1949 to 1950.
(b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1447 lb./ac.
(ii) 413.8 lb./ac.
(iii) Treatments do not differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1540
2.	1820
3.	1867
4.	1760
S.E./mean	= 168.9 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 49(3).

Type :- 'M'.

Object :- To study the effect of Potash on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 13.8.49.
(iv) (a) to (d) N.A. (e) 1. (v) N.A. (vi) T-141. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) 27.11.49.

2. TREATMENTS :

1. Control (no manure).
2. 40 lb./ac. of K_2O .
3. 50 lb./ac. of K_2O .
4. 60 lb./ac. of K_2O .

Source of K_2O and time and method of its application N.A.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) $16\frac{1}{2}' \times 16\frac{1}{2}'$. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Fair. (ii) N.A. (iii) Yield of grain. (iv) (a) 1949 to 1950. (b) N.A. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2399 lb./ac.
 (ii) 207.3 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2243
2.	2407
3.	2413
4.	2532
S.E./mean	= 84.61 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Strn. Berhampore.

Ref :- Or. 50(11) 49(3).

Type :- 'M'.

Object :- To study the effect of Potash on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) Transplanting on 20.8.50. (iv) (a) N.A. (b) Transplanting. (c) and (d) N.A. (e) 1. (v) N.A. (vi) T.-141. (vii) Irrigated. (viii) Weeding. (ix) 36". (x) 27.11.50.

2. TREATMENTS :

1. Control (no manure).
2. 40 lb./ac. of K_2O .
3. 50 lb./ac. of K_2O .
4. 60 lb./ac. of K_2O .

3. DESIGN

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) $16\frac{1}{2}' \times 16\frac{1}{2}'$. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Fair. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1949 to 1950. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1844 lb./ac.
 (ii) 170.6 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1767
2.	1927
3.	1827
4.	1853
S.E./mean	= 69.6 lb./ac.

Crop :- Paddy.

Ref :- Or. 48(2).

Site :- Rice Res. Sub-Stn., Berhampore.

Type :- 'M'.

Object :—To study the effect of oilcakes on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) Transplanting on 5.8.48. (iv) (a) N.A. (b) Transplanting. (c) —. (d) Line to line and plant to plant 6". (e) N.A. (v) N.A. (vi) T. 1242. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) 20.12.48.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N : $N_0=0$, $N_1=45$ and $N_2=60$ lb./ac.

(2) 3 sources of N : Karanja cake (K.C.), G.N.C. and Gingelly cake (G.C.).

3. DESIGN :

(i) 3×3 Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 31'×17½'. (b) 30'×16½'. (v) 6" around. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) N.A. (iii) N.A. (iv) (a) 1948 to 1950. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1829 lb./ac.

(ii) 317.7 lb./ac.

(iii) None of the effects is significant.

(iv) Av. yield of grain in lb./ac.

 $N_0=1738$ lb./ac.

	K.C.	G.N.C.	G.C.	Mean
N_1	2062	1669	1782	1838
N_2	1796	1972	1969	1912
Mean	1929	1820	1875	1875

S.E. of marginal mean of source = 112.3 lb./ac.

S.E. of marginal mean of N = 91.7 lb./ac.

S.E. of body of body of table = 158.9 lb./ac.

Crop :- Paddy.

Ref :- Or. 49(1)/48(2).

Site :- Rice Res. Sub-Stn., Berhampore.

Type :- 'M'.

Object :—To study the effect of oilcakes on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 24.7.49. (iv) (a) to (e) N.A. (v) N.A. (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N : $N_0=0$, $N_1=45$ and $N_2=60$ lb./ac.

(2) 3 levels of N : Karanja cake (K.C.), G.N.C. and Gingelly cake (G.C.)

3. DESIGN :

(i) 3×3 Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 31'×17½'. (b) 30'×16½'. (v) 6" around. (vi) Yes.

4. GENERAL

(i) N.A. (ii) N.A. (iii) N.A. (iv) (a) 1948 to 1950. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS

- (i) 2479 lb./ac.
 (ii) 298.4 lb./ac.
 (iii) None of the effects is significant.
 (iv) Av. yield of grain in lb./ac.

N ₀ =2367 lb./ab.				
	K.C.	G.N.C.	G.C.	Mean
N ₁	2333	2734	2310	2459
N ₂	2536	2646	2651	2611
Mean	2434	2690	2480	2535

S.E. of marginal mean of sources = 105.5 lb./ac.
 S.E. of marginal mean of N = 86.1 lb./ac.
 S.E. of body of the table = 149.2 lb./ac.

Crop :- Paddy.

Ref :- Or. 50(1)/49(1)/48(2).

Site :- Rice Res. Sub.-Stn., Berhampore.

Type :- 'M'.

Object :- To study the effect of oilcakes on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore.
 (iii) Transplanting on 22.7.50. (iv) (a) N.A. (b) Transplanting. (c) -. (d) N.A. (e) 1. (v) N.A. (vi) T-1242.
 (vii) Irrigated. (viii) Weeding. (ix) 36%. (x) 10.12.50.

2. TREATMENTS :

All combinations of (1) and (2)

(1) 3 levels of N : N₀=0, N₁=45 and N₂=60 lb./ac.

(2) 3 sources of N : Karanja cake (K.C.), G.N.C., and Gingelly cake (G.C.).

3. DESIGN :

(i) 3×3 Fact. in R.B.D. (ii) (a) 9. (b) N.A. (iii) 4. (iv) (a) 31'×17½'. (b) 30'×16½'. (v) 6" around.

4. GENERAL :

(i) Poor. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) 1948 to 1950. (b) Yes. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2048 lb./ac.
 (ii) 408.6 lb./ac.
 (iii) None of the effects is significant.
 (iv) Av. yield of grain in lb./ac.

N ₀ =1747 lb./ac.				
	K.C.	G.N.C.	G.C.	Mean
N ₁	2211	1969	2244	2141
N ₂	2112	2354	2304	2257
Mean	2161	2161	2274	2199

S.E. of marginal mean of source = 148.0 lb./ac.
 S.E. of marginal mean of N = 120.8 lb./ac.
 S.E. of body of table = 209.3 lb./ac.

Crop :- Paddy (Kharif).

Ref :- Or. 48(10).

Site :- Rice Res. Sub.-Stn., Jeypore.

Type :- 'M'.

Object :-To study the effect of oilcakes on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 12.5.48/5 to 8.8.48. (iv) (a) N.A. (b) Transplanting. (c) —. (d) Line to line 6", plant to plant 9". (e) 2. (v) Nil. (vi) T-90 (late). (vii) Unirrigated. (viii) Weeding. (ix) 50.79". (x) 19.11.48.

2. TREATMENTS :

All combinations of (1) and (2) + Control (no manure).

(1) 3 levels of N : $N_1=20$, $N_2=40$ and $N_3=60$ lb./ac.

(2) 3 sources of N : Karanja cake (K.C.), Mustard cake (M.C.) and Niger cake (N.C).

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 4. (iv) (a) $31\frac{1}{2}' \times 17\frac{1}{2}'$. (b) $30' \times 16\frac{1}{2}'$. (v) 9" along length ; 6" along breadth. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of grain [and straw. (iv) (a) 1948 to 1950. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 7230 lb./ac.
- (ii) 1202 lb./ac.
- (iii) None of the effects is significant.
- (iv) Av. yield of straw in lb./ac.

	Control = 6171 lb./ac.			
	K.C.	M.C.	N.C.	Mean
N_1	6171	7585	7868	7208
N_2	6685	7592	6515	6931
N_3	7970	7736	8005	7904
Mean	6942	7636	7463	7348

S.E. of marginal mean = 347.0 lb./ac.
S.E. of body of table = 601.8 lb./ac.

Crop :- Paddy (Kharif).

Ref :- Or. 49(22).

Site :- Rice Res. Sub.-Stn., Jeypore.

Type :- 'M'.

Object :-To compare different cakes as sources of N.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Black cotton. (c) Refer soil analysis, Jeypore. (iii) 27.7.49. (iv) (a) to (c) N.A. (d) $6" \times 6"$. (e) 2. (v) Nil. (vi) T-90 (late) (vii) Unirrigated. (viii) Weeding. (ix) 49.47". (x) N.A.

TREATMENTS :

1. Control (no manure).
2. Karanja cake at 20 lb./ac. of N.
3. Karanja cake at 40 lb./ac. of N.
4. Karanja cake at 60 lb./ac. of N.
5. Mustard cake at 20 lb./ac. of N.
6. Mustard cake at 40 lb./ac. of N.
7. Mustard cake at 60 lb./ac. of N.
8. Niger cake at 20 lb./ac. of N.
9. Niger cake at 40 lb./ac. of N.
10. Niger cake at 60 lb./ac. of N.
11. Karanja cake + Mustard cake at 40 lb./ac. of N.
12. Karanja cake + Niger cake at 40 lb./ac. of N.
13. Mustard cake + Niger cake at 40 lb./ac. of N.
14. Karanja cake + Mustard cake + Niger cake at 40 lb./ac. of N.

Manures applied on 17.7.49.

3. DESIGN :

(i) R.B.D. (ii) (a) 14. (b) N.A. (iii) 3. (iv) (a) $31\frac{1}{2}' \times 17\frac{1}{2}'$. (b) $30' \times 16\frac{1}{2}'$. (v) 9" along length; 6" along breadth. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of grain. (iv) (a) 1943 to 1949. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2305 lb./ac.
 (ii) 540 lb./ac.
 (iii) Treatments do no differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield	Treatment	Av. yield
1.	2031	8.	2160
2.	2757	9.	2191
3.	2101	10.	2512
4.	2827	11.	2251
5.	2040	12.	2405
6.	2116	13.	2464
7.	1905	14.	2513
S.E./mean		=311.8 lb./ac.	

Crop :- Paddy (*Khariif*).

Site :- Rice Res. Sub-Stn., Jeypore.

Ref :- Or. 49(7).

Type :- 'M'.

Object :—To study the effect of K_2O on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Nil. (c) Nil. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 12.10.49. (iv) (a) N.A. (b) Transplanting. (c) —. (d) Line to line and plant to plant 6". (e) 2. (v) Nil. (vi) J-7 (late). (vii) Unirrigated. (viii) Weeding. (ix) 49.47". (x) 5.12.49.

2. TREATMENTS :

- Control (no manure).
 - 40 lb./ac. of K_2O .
 - 60 lb./ac. of K_2O .
 - 80 lb./ac. of K_2O .
- Time, method of application and source of K_2O N.A.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) N.A. (b) $16\frac{1}{2}' \times 16\frac{1}{2}'$. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Very poor. (ii) Nil. (iii) Yield of grain. (iv) (a) No. (b) Nil. (c) No. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 325.0 lb./ac.
 (ii) 205.5 lb./ac.
 (iii) Treatments do not differ significantly.
 (v) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	357.5
2.	520.0
3.	275.0
4.	147.5
S.E./mean	=102.7 lb./ac.

Crop :- Paddy (*Kharif*).
Site :- Rice. Res. Sub-Stn., Jeypore.

Ref :- Or. 49(17).
Type :- 'M'.

Object :- To study the effect of G.M. and Oilcake applied singly and in combination.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 2.8.49. (iv) (a) N.A. (b) Transplanting. (c) —. (d) Line to line and plant to plant 6". (e) 2. (v) Nil. (vi) T.-812 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 49.47". (x) 22.11.49.

2. TREATMENTS :

1. Control (no manure).
 2. G.M. at 40 lb./ac. of N.
 3. G.M. + Niger cake at 40 lb./ac. of N.
 4. G.M.+A/S at 40 lb./ac. of N.
 5. Nigercake at 40 lb./ac. of N.
 6. Nigercake + A/S at 40 lb./ac. of N.
 7. A/S at 40 lb./ac. of N.
 8. A/S+Nigercake+G.M. at 40 lb./ac. of N.
- A/S applied on 4.8.49.

3. DESIGN :

(i) R.B.D. (ii) (a) 8. (b) N.A. (iii) 3. (iv) (a) 34'×17½'. (b) 33'×16½'. (v) 6" border around. (vi) Yes.

4. GENERAL :

(i) Generally good. (ii) N.A. (iii) Yield of grain. (iv) (a) No. (b) and (c) Nil. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1783 lb./ac.
(ii) 533.8 lb./ac.
(iii) Treatments do not differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1480
2.	1958
3.	1601
4.	1910
5.	2177
6.	1707
7.	1640
8.	1793
S.E./mean	=308.2 lb./ac.

Crop :- Paddy (*Kharif*).
Site :- Rice. Res. Sub-Stn. Jeypore.

Ref :- Or. 49(2).
Type :- 'M'.

Object :- To study the effect of rural and urban composts against F.Y.M.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 30.7.49. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 9"×9". (e) 2. (v) Nil. (vi) T-812. (vii) Unirrigated. (viii) Weeding. (ix) 49.47". (x) 1.12.49.

2. TREATMENTS :

1. Control.
2. F.Y.M. at 4 ton/ac.
3. F.Y.M. at 7 ton/ac.

4. F.Y.M. at 10 ton/ac.
5. Urban compost at 2 ton/ac.
6. Urban compost at 3.5 ton/ac.
7. Urban compost at 5 ton/ac.
8. Rural compost at 2 ton/ac.
9. Rural compost at 3.5 ton/ac.
10. Rural compost at 5 ton./ac.

3. DESIGN :

- (i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 33'×33'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Poor growth. (ii) Nil. (iii) Yield of grain. (iv) (a) Not continued. (b) —. (c) —. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 895 lb./ac.
 (ii) 216.1 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	647
2.	932
3.	1073
4.	812
5.	952
6.	737
7.	903
8.	1000
9.	948
10.	948
S.E./mean	= 124.8 lb./ac.

Crop :- Paddy (*Kharif*).

Ref :- Or. 48(9).

Site :- Rice Res. Sub-Stn. Jeypore.

Type :- 'M'.

Object :- To study the effect of application of *Dhaincha*, Niger cake and A/S on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 12.6.48/26.7.48. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6"×6". (e) 2. (v) Nil. (vi) T—812 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 50.79%. (x) 19.11.48.

2. TREATMENTS :

1. Control (no manure)
2. *Dhaincha* at 40 lb./ac. of N.
3. Nigercake at 40 lb./ac. of N.
4. A/S at 40 lb./ac. of N.

Dhaincha and Niger cake applied on 24.7.48, while A/S on 21.8.48.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 34'×12'. (b) 33'×11'. (v) 6" around. (vi) Yes.

4. GENERAL:

- (i) Good to fair. (ii) Nil. (iii) Yield of grain. (iv) (a) 1945-1951. (b) Yes. (c) N.A. (v) (a) N.A. (b) N.A. (vi, and (vii) Nil.

5. RESULTS :

- (i) 3186 lb./ac.
(ii) 438.2 lb./ac.
(iii) Treatments do not differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2780
2.	3844
3.	3058
4.	3062
S.E./mean	= 196.0 lb./ac.

Crop :- Paddy (*Kharif*).

Ref :- Or. 49(18)/48(9).

Site :- Rice Res. Stn., Jeypore.

Type :- 'M'.

Object :- To study the effect of application of *Dhaincha*, Niger cake and A/S on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore.
(iii) 8.6.49/1, 2.8.49. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6" × 6". (e) 2. (v) Nil. (vi) T-812
(medium). (vii) Unirrigated. (viii) Weeding. (ix) 49.47". (x) 8.11.49.

2. TREATMENTS :

1. Control.
2. *Dhaincha* at 40 lb./ac. of N.
3. Niger cake at 40 lb./ac. of N.
4. A/S at 40 lb./ac. of N.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 34' × 12'. (b) 33' × 11'. (v) 6" border around.
(vi) Yes.

4. GENERAL :

- (i) Good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1945 to 1951. (b) Yes. (c) N.A. (v) (a) N.A. (b)
N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2026 lb./ac.
(ii) 222.5 lb./ac.
(iii) Treatments do not differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1951
2.	2245
3.	2053
4.	1855
S.E./mean	= 99.5 lb./ac.

Crop :- Paddy (*Kharif*).

Ref :- Or. 50(13)/49(18)/48(9).

Site :- Rice Res. Sub-Stn., Jeypore.

Type :- 'M'.

Object :- To study the direct and residual effect of application of *Dhaincha*, Niger cake and A/S on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) As per treatments. (ii) (a) Black Cotton. (b) Refer soil analysis, Jeypore
(iii) (a) 8.6.50/1.8.50. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6" × 6". (e) 2. (v) Nil. (vi) T 812
(medium). (vii) Unirrigated. (viii) Weeding. (ix) 44.63". (x) 30.11.50.

2. TREATMENTS :

1. Control (no manure).
2. *Dhaincha* at 40 lb./ac. of N.
3. Niger Cake at 40 lb./ac. of N.
4. A/S at 40 lb./ac.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 31'×12'. (b) 33'×11'. (v) 6" border alround. (vi) Yes.

4. GENERAL :

- (i) Very good. (ii) Nil. (iii) Yield of grain. (iv) (a) 1945-1951. (b) Yes. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1720 lb./ac.
 (ii) 491.1 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1810
2.	1672
3.	1816
4.	1584
S.E./mean	= 219 lb./ac.

Crop :-Paddy (*Khariif*).

Ref :-Or 51(7)/50(13)/49(18)/48(9).

Site :-Rice Res. Sub-Stn., Jeypore. Type :-'M'.

Object :-To study the direct and residual effect of application of *Dhaincha*, Nigercake and A/S on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) As under treatments. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 2.6.51/21.7.51. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6"×6". (e) 2. (v) Nil. (vi) T 812 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 70.86%. (x) 5.12.51.

2. TREATMENTS :

1. Control (no manure).
2. *Dhaincha* at 40 lb./ac. of N.
3. Nigercake at 40 lb./ac. of N.
4. A/S at 40 lb./ac. of N.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) 34'×12'. (b) 33'×11'. (v) ½' border all round. (vi) Yes.

4. GENERAL :

- (i) Not uniform. (ii) Nil. (iii) Yield of grain. (iv) (a) 1945-1951. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) Nil. (vii) Residual effect not studied.

5. RESULTS :

- (i) 2897 lb./ac.
 (ii) 421.9 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2944
2.	2856
3.	2906
4.	2881
S.E./mean	= 188.0 lb./ac.

Crop :- Paddy (*Kharif*).
Site :- Rice Res. Sub-Stn., Jeypore.

Ref :- Or. 52(10).
Type :- 'M'.

Object :- To study the effect of Super, Hyper phosphate and B.M. on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Nigercake, *Dhaincha* and A/S to give 40 lb./ac. of N. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 11.6.52./31.7.52. (iv) (a) N.A. (b) Transplanting. (c) —, (d) 6"×6". (e) 2. (v) Nil. (vi) J-5 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 91.59". (x) 30.10.52.

2. TREATMENTS :

1. Control (no manure).
2. Hyper phosphate at 250 lb./ac.
3. Super at 250 lb./ac.
4. B.M. at 125 lb./ac.
Manures applied on 30.7.52.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 33'×11'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Nil. (iii) Yield of grain and straw. (iv) (a) Yes, 1952 continuing. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2720 lb./ac.
- (ii) 341.4 lb./ac.
- (iii) Treatments do not differ significantly.
- (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2591
2.	2767
3.	2673
4.	2850
S.E./mean	= 152.0 lb./ac.

Crop :- Paddy (*Kharif*).
Site :- Rice Res. Sub-Stn., Jeypore.

Ref :- Or. 53(8)/52(10).
Type :- 'M'.

Object :- To study the effect of Super, Hyper phosphate and B.M. on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) As under treatments. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) 2.8.53. (iv) (a) N.A. (b) Transplanted. (c) N.A. (d) 6"×6". (e) 2. (v) Nil. (vi) J-5 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 82.25". (x) 15.12.53.

2. TREATMENTS :

1. Control.
2. Hyper phosphate at 250 lb./ac.
3. Super at 250 lb./ac.
4. B.M. at 125 lb./ac.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) N.A. (b) 33'×11'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1952 continued. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 3036 lb./ac.
 (ii) 392.3 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2842
2.	3345
3.	2883
4.	3075
S.E./mean	= 175.4 lb./ac.

Crop :- Paddy (1st Crop). Ref :- Simple trials on cultivators field (T.C.M.), 1953.

Centre :- Kalahandi (Orissa).

Type :- 'M'

Object :- I (b) (ii) To study the effect of different levels and types of N and P.

1. BASAL CONDITIONS :

- (i) (a) N.A. (b) N.A. (c) N.A. (ii) Red loam—clay to clay loam, pH. 7.0. (iii) Nil. (iv) N.A. (v) N.A. (vi) June-July. (vii) Unirrigated. (viii) N.A. (ix) 57". (x) December.

2. TREATMENTS :

O = Control.

P = 20 lb./ac. of P_2O_5

N_1P = A/S at 20 lb./ac. of N + 20 lb./ac. of P_2O_5 .

N_2P = A/S at 40 lb./ac. of N + 20 lb./ac. of P_2O_5 .

N_1^*P = Urea at 20 lb./ac. of N + 20 lb./ac. of P_2O_5 .

N_2^*P = Urea at 40 lb./ac. of N + 20 lb./ac. of P_2O_5 .

All fertilizers applied before puddling P_2O_5 applied in the form of Super.

3. DESIGN :

(i) and (ii) Eleven community project centres, representing the entire paddy growing tract of the country were selected. From each community project centre, one development block was selected. Villages were selected at random from the selected block and a list of cultivators growing paddy for each selected village was prepared. From this list, two cultivators were selected at random and one field each belonging to them was taken for trial. In each selected field an unreplicated trial was laid out. (iii) N.A. (iv) Yes.

4. GENERAL :

- (i) Normal. (ii) Nil. (iii) Grain yield data. (iv) (a) 1953—56. (b) No. (c) N.A. (v) N.A. (vi) Nil. (vii) Nil.

5. RESULTS :

Treatment	Av. yield in lb./ac.
O	1739
P	2343
N_1P	2658
N_2P	2457
N_1^*P	2513
N_2^*P	2487
G.M.	2366
S.E./mean	166.2
No. of expts.	9

Crop :- Paddy (1st crop). Ref :- Simple trials on cultivators field (T.C.M.), 1953.

Centre :- Kalahandi (Orissa). Type :- 'M'.

Object :- I (b) (ii) To study the effect of different levels and types of N and P.

1. BASAL CONDITIONS :

- (i) (a) N.A. (b) N.A. (c) N.A. (ii) Red loam clay to clay-loam, pH. 7.0. (iii) Nil. (iv) N.A. (v) N.A. (vi) June—July. (vii) Unirrigated. (viii) N.A. (ix) 57". (x) December.

2. TREATMENTS :

O Control.

P =20 lb./ac. of P_2O_5 N_1P =A/S at 20 lb./ac. of N+20 lb./ac. of P_2O_5 . N^*_1P =Urea at 20 lb./ac. of N+20 lb./ac. of P_2O_5 .All fertilizers applied before puddling P_2O_5 applied in the form of Super.

3. DESIGN :

(i) and (ii) Eleven community project centres, representing the entire paddy growing tract of the country were selected. From each community project centre, one development block was selected. Villages were selected at random from the selected block and a list of cultivators growing paddy for each selected village was prepared. From this list, two cultivators were selected at random and one field each belonging to them was taken for trial. In each selected field an unreplicated trial was laid out. (iii) N.A. (iv) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield data. (iv) (a) 1953—56. (b) No. (c) N.A. (v) N.A. (vi) Nil. (vii) Nil.

5. RESULTS :

Treatment	Av. yield in lb/ac.
O	2315
P	2571
N_1P	2768
N_2P	3155
G.M.	2702
S.E./mean	153.0
No. of expts.	11

Crop :- Paddy. (1st crop). Ref :- Simple trials on cultivator's fields (T.C.M), 1953-
Centre :- Kalahandi (Orissa). Type :- 'M'.

Object :-III. To study the effect of A/S with different sources of P.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) N.A. (c) N.A. (ii) Red loam-clay to clay loam-pH 7.0. (iii) Nil, (iv) N.A. (v) N.A. (vi) June-July. (vii) Unirrigated. (viii) N.A. (ix) 57%. (x) December.

2. TREATMENTS :

O =Control.

N =A/S at 20 lb./ac. of N.

NP =A/S at 20 lb./ac. of N+Super at 20 lb./ac. of P_2O_5 .NP' =A/S at 20 lb./ac. of N+Nitrophos at 20 lb./ac. of P_2O_5 .NP'' =A/S at 20 lb./ac. of N+Ammo. Phos. at 20 lb./ac. of P_2O_5 .

All fertilizers applied before puddling.

3. DESIGN :

(i) and (ii) Eleven community project centres, representing the entire paddy growing tract of the country were selected. From each community project centre, one development block was selected. Villages were selected at random from the selected block and a list of cultivators growing paddy for each selected village was prepared. From this list, two cultivators were selected at random and one field each belonging to them was taken for trial. In each selected field an unreplicated trial was laid out. (iii) N.A. (iv) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv)(a) 1953—56. (b) No. (c) N.A. (v) N.A. (vi) Nil. (vii) Nil.

5. RESULTS :

Treatment	Av. yield in lb /ac.
O	2413
N	2715
NP	3224
NP'	2675
NP''	3205
G.M.	2846
S.E./mean	257.5
No. of expts.	6

Crop :- Paddy (1st crop). Ref :- Complex experiments (T.C.M.), 1953.

Centre :- Sahaspur (Orissa). Type :- 'M'.

Object :-I(a) To study the effect of types and levels of N and P_2O_5 on non-acid soils.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) N.A. (c) N.A. (ii) (a) Sandy loam, light soil. (b) N.A. (iii) T.P. 6, 8.9.53. (iv) N.A. (v) N.A. (vi) Sarda Type-141. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) November, 1953.

2. TREATMENTS :

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

(1) 3 levels of N : $N_0=0$, $N_1=20$ and $N_2=40$ lb./ac.

(2) 2 sources of N : A/S and Urea.

(3) 3 levels of P_2O_5 as Super or Triple Super : $P_0=0$, $P_1=20$ and $P_2=40$ lb./ac.

Manured after puddling before transplanting.

3. DESIGN :

(i) R.B.D. (ii) (a) 15. (b) N.A. (iii) 3. (iv) (a) N.A. (b) 1/59.8 ac. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953-56. (b) No. (c) N.A. (v) [(a) Aduthurai, Karjat, Burdwan, Mankhanada, Maruteru and Chavai. (b) N.A. (vi) Nil. (vii) Nil.

5. RESULTS :

(i) 1959 lb./ac.

(ii) 294.6 lb./ac.

(iii) Main effect of "levels of N" is highly significant. "Source of N" is also significant. Other effects and interactions are not significant.

(iv) Av. yield of grain in lb./ac.

	N_0	N_1	N_2	Mean	A/S	Urea	Mean
P_0	1277	1821	2282	1896	2166	1936	2051
P_1	1168	1834	2385	1921	2302	1917	2109
P_2	1617	2041	2297	2059	2 97	2141	2169
Mean	1354	1899	2321	1959	2222	1998	2110
A/S	—	1935	2508	2222			
Urea	—	1862	2134	1998			

For N×P table

S.E. of body of table (N_0 col.)	=170.1 lb./ac.
S.E. of body of table (N_1 or N_2 Col.)	=120.3 lb./ac.
S.E. for the marginal mean (N_0 Col.)	= 98.2 lb./ac.
S.E. for marginal mean (N_1 or N_2 Col.)	= 69.4 lb./ac.
S.E. for P marginal means	= 75.9 lb./ac.

For 'source of N×P' table

S.E. of body of table	= 120.3 lb./ac.
S.E. for P marginal means	= 85.0 lb./ac.
S.E. of marginal means for source	= 69.4 lb./ac.

For 'source × level of N' table

S.E. of body of table	= 98.2 lb./ac.
S.E. of any marginal mean	= 69.4 lb./ac.

Crop :- Paddy (1st crop). Ref :- Complex experiments (T.C.M.), 1953.
Centre :- Sahaspur (Orissa). Type :- 'M'.

Object :- VI. To study the residual value of Phosphatic manure.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) N.A. (c) N.A. (ii) (a) Sandy loam, light soil. (b) N.A. (iii) TP 1 to 3.9.53. (iv) N.A. (v) N.A. (vi) B.A.M. 9. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) End of December, 1953.

2. TREATMENTS :

5 treatments replicated as follows :-

(1) O = Untreated	1 plot/block
(2) C = Control	6 plots/block
(3) $P_{\frac{1}{2}}$ = $\frac{1}{2}$ unit dressing	1 plot/block
(4) P_1 = Unit dressing	2 plots/block
(5) P_2 = 2 unit dressing	2 plots/block

Unit dressing = 20 lb./ac. of P_2O_5 .

A basal dressing of 20 lb./ac. of N as A/S applied to all treatments except treatment (1).

3. DESIGN :

(i) R.B.D. (ii) (a) 12. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 1/59.8 ac. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield. (iv) (a) 1953-56. (b) No. (c) N.A. (v) (a) Aduthurai, Shimoga, Burdwan, Mankhanda, Maruteru and Chalvai. (b) N.A. (vi) Nil. (vii) Nil.

5. RESULTS :

- (i) 2216 lb./ac.
(ii) 436.6 lb./ac.
(iii) Treatment differences are significant.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield	S.E./mean
O	1613	218.3
C	2166	89.1
$P_{\frac{1}{2}}$	2355	218.3
P_1	2306	154.3
P_2	2509	154.3

Crop :- (1st Crop).

Ref :- Complex experiments (T.C.M.), 1953.

Centre :- Sahaspur (Orissa)

Type :- 'MV'.

Object :- VIII. To study the effect of N, P along with varieties.

1. BASAL CONDITIONS :

(i) (a) N.A. (b) N.A. (c) N.A. (ii) (a) Sandy loam, light soil. (b) N.A. (iii) T P. 4,5,9.53. (iv) N.A. (v) N.A. (vi) As under treatments. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) 26.12.53.

2. TREATMENTS

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

(1) 3 levels of N as A/S : $N_0=0$, $N_1=20$ and $N_2=40$ lb./ac.

(2) 3 levels of P_2O_5 as Super : $P_0=0$, $P_1=20$ and $P_2=40$ lb./ac.

(3) 3 varieties : $V_1=T-812$, improved, $V_2=Local$ and $V_3=T-141$, improved.

Manures applied just before transplanting.

3. DESIGN :

(i) 3^3 Conf. Factorial. (ii) (a) 3 blocks/replication ; 9 plots/block. (b) N.A. (iii) 1. (iv) (a) N.A. (b) 1/59.8 acre. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Normal. (ii) Nil. (iii) Grain yield data. (iv) (a) 1953—56. (b) No. (c) N.A. (v) (a) Karjat, Ponnampet, Burdwan, Mankhanada, Maruteru and Chalvai. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1951 lb./ac.

(ii) 246.2 lb./ac.

(iii) Main effect of N alone is highly significant. Other effects and interactions are not significant.

(iv) Av. yield of grain in lb./ac.

	N_0	N_1	N_2	Mean	V_1	V_2	V_3
P_0	1360	2137	2449	1982	1928	2160	1858
P_1	1323	1992	2375	1897	1933	2027	1730
P_2	1458	1956	2510	1975	1800	2052	2072
Mean	1380	2028	2445	1951	1887	2080	1886
V_1	1350	1928	2384				
V_2	1440	2183	2616				
V_3	1351	1974	2334				

S.E. for marginal mean = 82.1 lb./ac.

S.E. for body of table = 142.1 lb./ac.

Crop :-Paddy.

Site :-Rice Res. Sub-Stn., Berhampore.

Ref :-Or. 48(1).

Type :-'C'.

Object :-To study the effect of different seed-rates on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 10.7.48. (iv) (a) and (b) N.A. (c) As per treatments. (d) and (e) N.A. (v) N.A. (vi) B.A.M. 12. (vii) N.A. (viii) N.A. (ix) N.A. (x) 22, 23.10.48.

2. TREATMENTS :

1. Seed-rate at 60 lb./ac.
2. Seed-rate at 70 lb./ac.
3. Seed-rate at 80 lb./ac.
4. Seed-rate at 90 lb./ac.
5. Seed-rate at 100 lb./ac.
6. Seed-rate at 110 lb./ac.

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 66'×22'. (v) 2' spacing between plots. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) N.A. (iii) Yield of grain. (iv) (a) 1945—1948. (b) and (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1242 lb./ac.

(ii) 251.5 lb./ac.

(iii) Treatments do not differ significantly.

(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1321
2.	1246
3.	1172
4.	1200
5.	1270
6.	1243
S.E./mean	= 102.7 lb./ac.

Crop :-Paddy (*Kharif*).
Site :-Rice Res. Sub-Stn., Jeypore.

Ref :-Or. 49(5).
Type :-'C'.

Object :-To find the proper time of transplantation.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) Karanja, Mustard and Nigercakes to supply 20, 40 and 60 lb./ac. of N in each case. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) As per treatments. (iv) (a) N.A. (b) Transplanted. (c) —. (d) 9"×9". (e) 2. (v) Nil. (vi) T. 812 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 49.47". (x) 15.11.49 and 25.11.49.

2. TREATMENTS :

1. Transplanted on 17.7.49.

2. Transplanted on 2.8.49.

3. Transplanted on 17.8.49.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 33'×30'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Medium. (ii) Nil. (iii) Yield of grain. (iv) (a) No. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) N.A.

5. RESULTS :

(i) 1872 lb./ac.

(ii) 545.2 lb./ac.

(iii) Treatments do not differ significantly.

(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2185
2.	1961
3.	1469
S.E./mean	= 272.6 lb./ac.

Crop :- Paddy (*Kharif*).

Ref :- Or. 50(15).

Site :- Rice Res. Sub-Stn., Jeypore.

Type :- 'C'.

Object :—To study the effect of different times of transplanting on Paddy.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) As under treatments. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6" × 6". (e) 2. (v) N.A. (vi) T-812 (medium). (vii) Unirrigated. (viii) Weeding. (ix) N.A. (x) N.A.

2. TREATMENTS :

1. Transplanted on 3.7.1950.
2. Transplanted on 15.7.1950
3. Transplanted on 27.7.1950.
4. Transplanted on 8.8.1950.
5. Transplanted on 20.8.1950.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 20' × 22'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of grain. (iv) (a) 1950—1952. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 559.0 lb./ac.
 (ii) 305.0 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1253
2.	710
3.	643
4.	128
5.	55
S.E./mean	= 124.5 lb./ac.

Crop :- Paddy (*Kharif*).

Ref :- Or. 51(8).

Site :- Rice Res. Sub-Stn., Jeypore.

Type :- 'C'.

Object :—To find the proper time of transplantation.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Paddy. (c) N.A. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6" × 6". (e) 2. (v) Nil. (vi) T-812 (medium). (vii) Unirrigated. (viii) Weeding. (ix) 70.86". (x) 15.12.51.

2. TREATMENTS :

1. Transplanting on 3rd July.
2. Transplanting on 15th July.
3. Transplanting on 27th July.
4. Transplanting on 8th August.
5. Transplanting on 20th August.

3. DESIGN :

(i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 11' × 10'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) Yes ; 1950-51 ; 1952-53. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1548 lb./ac.
(ii) 479.9 lb./ac.
(iii) Treatments differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2345
2.	1650
3.	1638
4.	895
5.	1213
S.E./mean	= 195.9 lb./ac.

Crop :- Paddy (*Kharif*).

Site :- Rice Res. Sub-Stn., Jeypore.

Ref :- Or. 52(9).

Type :- 'C'.

Object :- To find the proper time of transplantation.

2. BASAL CONDITIONS :

- (i) (a) Nil. (b) Paddy. (c) Nil. (ii) (a) Black cotton. (b) Refer soil analysis, Jeypore. (iii) As per treatments. (iv) (a) N.A. (b) Transplanting. (c) —. (d) 6" x 6". (e) 2. (v) Nil. (vi) T-812 (medium). (vii) Un-irrigated. (viii) Weeding. (ix) 91.59%. (x) 12.12.52.

2. TREATMENTS :

1. Transplanted on 3rd July.
2. Transplanted on 15th July.
3. Transplanted on 27th July.
4. Transplanted on 8th August.
5. Transplanted on 20th August.

3. DESIGN :

- (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 11' x 10'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) Nil. (iii) Yield of grain. (iv) (a) 1950-51. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) Nil. (vii) Treatment (5) discarded as there was no transplanting on 20th August.

5. RESULTS :

- (i) 1782 lb./ac.
(ii) 355.9 lb./ac.
(iii) Treatments differ significantly.
(iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	1741
2.	2054
3.	1943
4.	1392
S.E./mean	= 145.3 lb./ac.

Crop :- Paddy.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 53(7).

Type :- 'CM'.

Object :- To study the effect of Japanese method of cultivation on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Paddy. (b) Paddy. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 30.7.53. (iv) (a) to (e) As per treatments. (v) G.M. 6000 lb./ac. allowed to rot. 100 lb./ac. of A/S and 100 lb. Super applied just before planting. (vi) B.A. M-3 (vii) Irrigated. (viii) Weeding. (ix) 40%. (x) 16.12.53.

2. TREATMENTS

1. Cultivators, method (i.e.,) local method (control).
2. Local method of cultivation and manuring as per recommendations of the Agri. department.
3. Local method of cultivation and manuring as (i) G.M. 6000 lb./ac. whenever it is practised or green leaves applied at puddling time (ii) 5 C.L. of F.Y.M. or compost applied one month before planting (iii) 200 lb. of A/S and 200 lb. of Super at planting time.
4. Local method of cultivation and Japanese method of manuring.
5. Japanese method of cultivation and manuring.

3. DESIGN :

- (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 5. (iv) (a) 33' × 33'. (b) 30' × 30'. (v) 1.5' around. (vi) Yes.

4 GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of grain and straw. (iv) (a) to (c) N.A. (v) (a) to (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2923 lb./ac.
 (ii) 353.8 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of grain in lb./ac.

Treatment	Av. yield
1.	2667
2.	2865
3.	3107
4.	3223
5.	2754
S.E./mean	= 158.0 lb./ac.

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Crop :- Sugarcane.

Ref :- Or. 52(12).

Site :- State Res. Stn., Bhubaneswar.

Type :- 'M'.

Object:—To study the effect of organic and inorganic manures applied singly and in combinations on Sugarcane.

1. BASAL CONDITIONS :

- (i) (a) Sugarcane—Ratoon—Paddy. (b) *Dhaincha*. (c) Nil. (ii) (a) Loamy. (b) Refer soil analysis, Bhubaneswar. (iii) 12.5.52/14.5.52. (iv) (a) 5 to 10 ploughings. (b) Planting in furrows of 6" depth. (c) N.A. (d) 3' between rows. (e) N.A. (v) Nil. (vi) C.O. 42 (medium). (vii) Unirrigated. (viii) Hoeing and weeding at intervals. 2 earthings 1st : 5.7.52 to 7.7.52 and 2nd : after manuring. (ix) N.A. (x) 6.1.53 to 8.1.53.

2. TREATMENTS :

1. Control (no manure).
 2. 80 lb./ac. of N as Tilcake.
 3. 160 lb./ac. of N as Tilcake.
 4. 80 lb./ac. of N as A/S.
 5. 160 lb./ac. of N as A/S.
 6. 60 lb./ac. of N as Oilcake + 40 lb./ac. of N as A/S.
 7. 80 lb./ac. of N as Oilcake + 80 lb./ac. of N as A/S.
- Manures applied on 13.8.1952.

3. DESIGN :

- (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 72' × 18½'. (b) 66' × 16½'. (v) 3' length wise and 1' breadth wise. (vi) Yes.

4. GENERAL :

- (i) Fair. (ii) N.A. (iii) Yield of sugarcane. (a) 1952—continued. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1.86 ton/ac.
 (ii) 1.21 ton/ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of sugarcane in ton/ac.

Treatment	Av. yield
1.	0.81
2.	1.94
3.	2.63
4.	1.95
5.	1.51
6.	2.10
7.	2.09
S.E./mean	= 0.494 ton/ac.

Crop :- Sugarcane.

Ref :- Or. 53(9)/52(12).

Site :- State Res. Stn., Bhubaneswar.

Type :- 'M'.

Object :- To study the residual effect of organic and inorganic manures applied singly and in combination to Ratoon crop.

1. BASAL CONDITIONS :

(i) (a) Sugarcane-Ratoon-Paddy. (b) Sugarcane. (c) As per treatments. (ii) (a) Loam soil. (b) Refer soil analysis, Bhubaneswar. (iii) 6.1.53 to 8.1.53 (date of harvest of plant crop). (iv) (a) N.A. (b) Planting in furrows. (c) N.A. (d) 3' between rows. (e) —. (v) Nil. (vi) C.O. 421 (medium). (vii) Irrigated. (viii) Hoeing and weeding at intervals. (ix) N.A. (x) 27.11.53 to 12.12.53.

2. TREATMENTS :

1. Control (no manure).
2. 80 lb./ac. of N as Tilcake.
3. 160 lb./ac. of N as Tilcake.
4. 80 lb./ac. of N as A/S.
5. 160 lb./ac. of N as A/S.
6. 40 lb./ac. of N as Oilcake + 40 lb./ac. of N as A/S.
7. 80 lb./ac. of N as Oilcake + 80 lb./ac. of N as A/S.

Manures applied on 13.8.52.

Treatment applied last year.

3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 6. (iv) (a) 72' × 18½'. (b) 66' × 16½'. (v) 3' length wise and 1' breadth wise. (vi) Yes.

4. GENERAL :

(i) Good. (ii) N.A. (iii) Yield of sugarcane. (iv) (a) 1952-53—continued. (b) Yes. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 5.39 ton/ac.
 (ii) 2.24 ton/ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of sugarcane in ton/ac.

Treatment	Av. yield
1.	3.13
2.	4.99
3.	7.56
4.	5.54
5.	6.19
6.	4.54
7.	5.80
S.E./mean	= 0.91 ton/ac.

Crop :- Sugarcane.

Ref :- Or. (52)11.

Site :- State Res. Stn. Bhubaneswar,

Type :- 'M'.

Object :—To study the effect of time of application of A/S on Sugarcane yield.

1. BASAL CONDITIONS :

(i) (a) Sugarcane—Ratoon—Paddy. (b) *Dhaincha*. (c) Nil. (ii) (a) Loam soil. (b) N.A. (iii) 22.2.52. (iv) (a) 5 to 10 ploughings, levelling. (b) Planted in furrows of 6" depth. (c) N.A. (d) 3' between rows. (e) —. (v) 20 C.L./ac. of F.Y.M. (vi) CO. 419 (late). (vii) Irrigated. (viii) Hoeing and weeding at intervals. (ix) N.A. (x) 28.4.53 to 6.5.53.

2. TREATMENTS :

A/S at 5.7 srs./gross plot applied.

1. $\frac{1}{2}$ at planting + $\frac{1}{2}$ at 1st earthing on 17.5.52 + $\frac{1}{2}$ at 2nd earthing on 15.7.52. (Control)
2. at the time of planting (22.2.52).
3. after germination (6.5.52).
4. at tillering (21.5.52).
5. before rains (2.7.52).
6. during rains (15.7.52).

3. DESIGN :

(i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 54' x 22'. (b) 51' x 19'. (v) 1½' all round. (vi) Yes.

4. GENERAL :

(i) Not good. (ii) N.A. (iii) Yield of sugarcane. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 7.32 ton/ac.
 (ii) 3.05 ton/ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of sugarcane in ton/ac.

Treatment	Av. yield
1.	9.64
2.	4.91
3.	5.28
4.	7.43
5.	7.79
6.	8.86
S.E./mean	= 1.525 ton/ac.

Crop :- Sugarcane.

Ref :- Or 53(10)/52(11).

Site :- State Res. Stn. Bhubaneswar.

Type :- 'M',

Object :—To study the residual effect of time of application of A/S to the planted cane on the Ratoon crop.

1. BASAL CONDITIONS :

(i) (a) Sugarcane—Ratoon—Paddy. (b) Sugarcane. (c) As per treatments. (ii) (a) Loam soil. (b) —. (iii) 22.2.52 planting and 6.5.53 ratoon. (iv) (a) 5 to 10 ploughings, levelling (b) Planted in furrows of 6" depth. (c) N.A. (d) 3'. (e) —. (v) 20 C.L./ac. of F.Y.M. (vi) CO. 419 (late). (vii) Irrigated. (viii) Hoeing and weeding. (ix) N.A. (x) 5 to 13.1.54.

2. TREATMENTS :

A/S at 5.7 srs./plot applied.

1. $\frac{1}{3}$ at planting + $\frac{1}{3}$ at 1st earthing on 17.5.52 + $\frac{1}{3}$ at 2nd earthing on 15.7.52 Control.
2. at the time of planting (22.2.52).
3. after germination (6.5.52).
4. at tillering (21.5.52)
5. before rains (2.7.52).
6. during rains (15.7.52).

Treatments applied last year.

DESIGN :

R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) 54' × 22'. (b) 51' × 19'. (v) 1½' all round. (vi) Yes.

GENERAL :

(i) Good. (ii) N.A. (iii) Yield of sugarcane. (iv) (a) 1952—continued. (b) Yes. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 12.73 ton/ac.
- (ii) 4.68 ton/ac.
- (iii) Treatments do not differ significantly.
- (iv) Av. yield of sugarcane in ton/ac.

Treatment	Av. yield
1.	14.56
2.	10.32
3.	12.35
4.	13.70
5.	10.81
6.	14.63
S.E./mean	= 2.34 ton/ac.

Crop :- Turmeric.

Ref :- Or. 48(3).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'M'.

Object :- To study the effect of N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, Udayagiri. (iii) 27.5.48 to 5.6.48. (iv) (a) N.A. (b) Sowing in furrows. (c) N.A. (d) Lines 1½' apart, plants 1' apart. (e) N.A. (v) 150 mds./ac. of *Sal* leaf applied as much to all the plots immediately after planting. (vi) Jobedi. (vii) Unirrigated. (viii) N.A. (ix) 9". (x) 9 to 12.2.49.

2. TREATMENTS :

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

- (1) 3 levels of N : N₀=0, N₁=60 and N₂=120 lb./ac.
- (2) 3 levels of P₂O₅ : P₀=0, P₁=45 and P₂=90 lb./ac.
- (3) 3 levels of K₂O : K₀=0, K₁=100 and K₂=200 lb./ac.

Sources of N, P₂O₅ and K₂O : N.A. Manures applied on 31.7.48.

3. DESIGN :

- (i) 3³ Partially Confd. (ii) (a) 3 block/replication ; 9 plots/block. (b) N.A. (iii) 3. (iv) (a) 27' × 51'. (b) 24' × 19'. (v) 1½' on each side of length and 1' on each side of breadth. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 7165 lb./ac.
 (ii) 1421 lb./ac.
 (iii) Main effects of N and P are highly significant. Other effects are not significant.
 (iv) Av. yield of turmeric in lb./ac.

	P ₀	P ₁	P ₂	Mean	K ₀	K ₁	K ₂
N ₀	5623	6196	6759	6193	6748	5443	6387
N ₁	6706	7480	8223	7469	7013	7703	7692
N ₂	6833	7660	9008	7834	7268	7788	8446
Mean	6367	7112	7997	7165			
K ₀	6069	6737	8223	7010			
K ₁	6164	6907	7863	6978			
K ₂	6928	7692	7904	7508			

S.E. of any marginal mean = 273.5 lb./ac.
 S.E. of body of the table = 470.3 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49(12).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'M'.

Object : To study the effect of N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) N.A. (vi) Jobedi. (vii) Unirrigated. (viii) N.A. (ix) 57". (x) 21.1.50.

2. TREATMENTS :

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

(1) 3 levels of N : N₀=0, N₁=60 and N₂=120 lb./ac.

(2) 3 levels of P₂O₅ : P₀=0, P₁=45 and P₂=90 lb./ac.

(3) 3 levels of K₂O : K₀=0, K₁=100 and K₂=200 lb./ac.

Manures applied on 16.8.49. Sources of N, P₂O₅ and K₂O : N.A.

3. DESIGN :

(i) 3³ Partially Conf'd. (ii) (a) 3 blocks replication ; 9 plots/block. (b) N.A. (iii) 4. (iv) (a) 27'×21'. (b) 24'×19'. (c) 1½' on each side of length and 1' on each side of breadth (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 6919 lb./ac.
(ii) 1160 lb./ac.
(iii) Main effect of N is highly significant. Other main effects and interactions are not significant.
(iv) Av. yield of turmeric in lb./ac.

	P ₀	P ₁	P ₂	Mean	K ₀	K ₁	K ₂
N ₀	5403	5371	5551	5442	5330	5117	5678
N ₁	7302	7653	7748	7568	7387	7420	7897
N ₂	7802	7663	7780	7748	7769	7229	8247
Mean	6836	6896	7026	6919			
K ₀	6783	7069	6836	6895			
K ₁	6571	6571	6623	6589			
K ₂	7154	7048	7621	7274			

S.E. of any marginal mean = 223.2 lb./ac.

S.E. of body of table = 386.7 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res. Stn., G. Udayagiri.

Ref :- Or. 50(5).

Type :- 'M'.

Object :- To study the effect of N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) 6, 7.6.50
(iv) (a) to (c) N.A. (d) 18 lines with 21 plants per line in a plot. (e) N.A. (v) Nil. (vi) Mother rhizomes of Jabedi (Local variety). (vii) Unirrigated. (viii) N.A. (ix) 43". (x) 15.1.51. to 19.1.51.

2. TREATMENTS :

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

(1) 3 levels of N : N₀=0, N₁=60 and N₂=120 lb./ac.

(2) 3 levels of P₂O₅ : P₀=0, P₁=45 and P₂=90 lb./ac.

(3) 3 levels of K₂O : K₀=0, K₁=100 and K₂=200 lb./ac.

N as A/S ; P₂O₅ as Super and K₂O as Pot. Sul. applied on 29.8.50 to 1st and 2nd replication and on 30.8.50 to 3rd replication.

3. DESIGN :

- (i) 3³ Partially Conf'd. (ii) (a) 3 blocks/replication ; 9 plots/block. (b) N.A. (iii) 3. (iv) (a) 27'×21'.
(b) 4'×19'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) N.A.
(b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 5568 lb /ac.
(ii) 1310 lb./ac.
(iii) Effect of N is significant. Other effects are not significant.

(iv) Av. yield of turmeric in lb./ac.

	P ₀	P ₁	P ₂	Mean	K ₀	K ₁	K ₂
N ₀	4957	4691	4862	4837	4245	5202	5063
N ₁	5318	5965	6348	5877	5700	6050	5881
N ₂	5657	6251	6060	5989	6656	5541	5774
Mean	5311	5636	5757	5568			
K ₀	5318	5360	5923	5534			
K ₁	5477	5902	5414	5598			
K ₂	5138	5647	5933	5573			

S.E. of any marginal mean =252.1 lb./ac.

S.E. of body of table =436.7 lb./ac.

Crop :- Turmeric.

Ref :- Or. 51(1).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'M'.

Object :- To study the effect of N, P₂O₅ and K₂O applied alone and in combinations.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) 17th and 18 May 51 (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) Nil. (vi) Jabedi. (vii) Unirrigated. (viii) Mulching on 22.5.51. (ix) 39%. (x) 13th to 19th Feb. 1952.

2. TREATMENTS :

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

(1) 3 levels of N : N₀=0, N₁=60 and N₂=120 lb./ac.(2) 3 levels of P₂O₅ : P₀=0, P₁=45 and P₂=90 lb./ac.(3) 3 levels of K₂O : K₀=0, K₁=100 and K₂=200 lb./ac.N as A/S, P₂O₅ as Super and K₂O as Pot. Sul. applied on 6.8.1951.

3. DESIGN :

(i) 3³ Partially Confd. (ii) (a) 3 blocks/replication ; 9 plots/blocks. (b) N.A. (iii) 3. (iv) (a) 21' × 18'. (b) 19' × 16'. (v) 1' around. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 11923 lb./ac.

(ii) 2129 lb./ac.

(iii) No effect is significant.

(iv) Av. yield of turmeric in lb./ac.

	P ₀	P ₁	P ₂	Mean	K ₀	K ₁	K ₂
N ₀	11049	11367	12466	11627	11543	11813	11526
N ₁	12610	12036	12546	12397	11781	12195	13214
N ₂	12036	11049	12149	11745	12753	11273	11208
Mean	11898	11484	12387	11923			
K ₀	11273	12021	12784	12026			
K ₁	12386	10492	12403	11760			
K ₂	12036	11940	11973	11983			

S.E. of any marginal mean = 409.7 lb./ac.

S.E. of body of table = 709.7 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res. Stn., G. Udayagiri

Ref :- Or. 48 (8).

Type :- 'M'.

Object :- To study the effect of artificial fertilizers containing P₂O₅, (Super) Magnesia (MgO) and K₂O on Turmeric.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayageri. (iii) 24th, 25th—6 1948. (iv) (a) to (c) N.A. (d) Between lines 1½' and plant to plant 1'. (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 150 md/ac. of sal leaf as mulch immediately after planting. (ix) 9". (x) 7, 8, 2.49.

2. TREATMENTS :

1. Control (no manure).
 2. 30 md./ac. of Ash.
 3. 40 lb./ac. of P₂O₅ as Super.
 4. 180 lb./ac. of K₂O.
 5. 40 lb./ac. of MgO.
 6. 40 lb./ac. of P₂O₅ as Super+180 lb./ac. of K₂O.
 7. 40 lb./ac. of MgO+180 lb./ac. of K₂O.
 8. 40 lb./ac. of P₂O₅ as Super+40 lb./ac. of MgO.
 9. 40 lb./ac. of P₂O₅ as Super+40 lb./ac. of MgO+180 lb./ac. of K₂O.
- Manures applied on 2.8.1948.

3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 6. (iv) (a) 21'×15'. (b) 19'×12'. (v) 1½' on each side of length and 1' on each side of breadth. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1950. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 6610 lb./ac.
(ii) 1282 lb./ac.
(iii) Treatments are not significantly different.
(iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	6366
2.	6270
3.	7225
4.	5285
5.	6589
6.	6780
7.	6525
8.	7067
9.	7385
S.E./mean	= 523.3 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49 (12).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'M'.

Object :—To study the effect of artificial fertilizers containing P_2O_5 , K_2O , and MgO alone and in combination against *Sal* ash.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 7.6.1949. (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 150 md/ac. of sal leaf immediately after planting as leaf mulch. (ix) 57%. (x) 28.12 1949 to 2.1.50.

2. TREATMENTS :

1. Control (no manure).
 2. 30 md/ac. of sal ash.
 3. 40 lb./ac. of P_2O_5 .
 4. 180 lb./ac. of K_2O .
 5. 40 lb./ac. of MgO .
 6. 40 lb./ac. of P_2O_5 + 180 lb./ac. of K_2O .
 7. 180 lb./ac. of K_2O + 40 lb./ac. of MgO .
 8. 40 lb./ac. of P_2O_5 + 40 lb./ac. of MgO .
 9. 40 lb./ac. of P_2O_5 + 180 lb./ac. of K_2O + 40 lb./ac. of MgO .
- Manures applied on 18, 19 August, 1949.

3. DESIGN :

(i) R.B.D. (ii) (a) 9. (b) N.A. (iii) 6. (iv) (a) 21' × 15'. (b) 19' × 12'. (v) 1' on each side of length and 1½' on each side of breadth. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1950. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 7971 lb./ac.

(ii) 1234 lb./ac.

(iii) Treatments do not differ significantly.

(iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	8088
2.	7929
3.	7196
4.	8404
5.	7769
6.	7674
7.	8247
8.	8088
9.	8343
S.E./mean	= 504 lb./ac.

Crop :- Turmeric.

Res :- Or. 50(6).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'M'.

Object :—To study the effect of artificial fertilizers containing P_2O_5 , K_2O and MgO applied singly and in combination against *Sal* ash.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 30.6.50. (iv) (a) N.A. (b) Planting in furrows. (c) N.A. (d) Row to row 1½', plant to plant 1'. (e) N.A. (v) Nil. (vi) Mother rhizomes (mixed seed). (vii) Unirrigated. (viii) Mulching on 20.7.50 to 22.7.50. (ix) 43%. (x) 27.1.51.

2. TREATMENTS :

1. Control (no manure).
 2. 30 md./ac. of *Sal* ash.
 3. 40 lb./ac. of P_2O_5 + 40 lb./ac. of MgO + 180 lb./ac. of K_2O .
 4. 60 lb./ac. of P_2O_5 + 60 lb./ac. of MgO + 180 lb./ac. of K_2O .
 5. 80 lb./ac. of P_2O_5 + 80 lb./ac. of MgO + 180 lb./ac. of K_2O .
- Artificial fertilizers applied on 12.9.1950.

3. DESIGN :

- (i) R.B.D. (ii) (a) 5. (b) N.A. (iii) 6. (iv) (a) 32' × 18'. (b) 30' × 15'. (v) 1' on each side of length and 1½' on each side of breadth. (vi) Yes.

4. GENERAL :

- (i) Fair. (ii) Nil. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1950. (b) and (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2026 lb./ac.
 (ii) 649.5 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	2016
2.	2210
3.	2113
4.	1629
5.	2161
S.E./mean	= 265.1 lb./ac.

Crop :- Turmeric.

Ref :- Or. 48(4).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'M'.

Object :- To find out if *Sal* leaf mulch could be replaced by organic manures.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 27 to 30.6.48
 (iv) (a) N.A. (b) Planting in furrows. (c) N.A. (d) Plant to plant 1' and line to line 1½'. (e) N.A.
 (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 9". (x) 31.1.59.

2. TREATMENTS :

1. 150 md./ac. of *Sal* leaf mulch (112 lb./ac. of N).
 2. 280 md./ac. of cowdung (112 lb./ac. of N).
 3. 17½ md./ac. of G.N.C. (112 lb./ac. of N).
- Manures were applied on 27.6.48.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 24' × 21'. (b) 21' × 19'. (v) 1½' along each side of length and 1' along each side of breadth. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) N.A.

5. RESULTS:

- (i) 4773 lb./ac.
 (ii) 865.5 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	5679
2.	5065
3.	3574
S.E./mean	= 353.3 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49(20).

Site :- Turmeric Res. Stn. G. Udayagiri,

Type :- 'M'.

Object :—To find out if *Sal* leaf mulch could be replaced by other kinds of organic manures.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis G. Udayagiri. (iii) 7.6.49. (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) Nil. (vi) Mixed. (vii) Unirrigated. (viii) N.A. (ix) 57" (x) 15 to 17.1.50.

2. TREATMENTS :

1. *Sal* leaf mulch at 150 md./ac.
 2. Cowdung at 280 md./ac.
 3. G.N.C. at 17.5 md./ac.
- Organic manures applied on 6.6.49.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) 27'×21'. (b) 24'×19'. (v) 1½' border along length side and 1' border along breadth side. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 4559 lb./ac.
 (ii) 835.9 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	4602
2.	6305
3.	2770
S.E./mean	=341.1 lb./ac.

Crop :- Turmeric.

Ref :- Or. 50(8).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'M'.

Object :—To find out if *Sal* leaf mulch could be replaced by other kinds of organic manures.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) P₂O₅ at 40 lb./ac., K₂O 180 lb./ac. MgO at 40 lb./ac., *Sal* ash at 30 lb./ac. (ii) (a) Laterite. (b) Refer soil analysis. G. Udayagiri (iii) 12,13.6.50. (iv) (a) N.A. (b) Planting in furrows (c) to (e) N.A. (v) N.A. (vi) Mother rhizomes of mixed seed. (vii) Unirrigated. (viii) N.A. (ix) 43". (x) 11.1.51.

2. TREATMENTS :

1. *Sal* leaf at 112 lb./ac. of N
 2. Compost at 112 lb./ac. of N.
 3. G.N. C. at 112 lb./ac. of N.
- G.N.C. and compost are applied in furrows before planting and the planting is done in these furrows. *Sal* leaf is applied as mulch immediately after planting.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) 27'×21'. (b) 24'×19'. (v) 1½' border along length side and 1' along breadth side. (vi) Yes.

4. GENERAL :

- (i) Fair. (ii) Nil. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) , and (vii) Nil.

5. RESULTS :

- (i) 3815 lb./ac.
 (ii) 602.6 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	5555
2.	3311
3.	2578
S.E./mean	= 246.0 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res. Stn. G. Udayagiri.

Ref :- Or. 51(6).

Type :- 'M'.

Object :- To find out if *Sal* leaf mulch could be replaced by other kinds of organic manures.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 27.5.51.
 (iv) (a) Ploughing with 6" plough. (b) Planting in furrows. (c) N.A. (d) Line to line 1½' plant to plant 1½'. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 39". (x) 10.1.52.

2. TREATMENTS :

1. *Sal* leaf mulch at 112 lb./ac. of N.
2. F.Y.M. at 112 lb./ac. of N.
3. Compost at 112 lb./ac. of N.
4. G.N.C. at 112 lb./ac. of N.

3. DESIGN:

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 8' x 32'. (b) 6' x 30'. (v) 1' around. (vi) Yes.

4. GENERAL

- (i) N.A. (ii) N.A. (iii) Yield of turmeric. (iv) (a) 1946 to 1951. (b) N.A. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 7290 lb./ac.
 (ii) 1287 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	10365
2.	6776
3.	5929
4.	6091
S.E./mean	= 525.5 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res. Stn. G. Udayagiri.

Ref :- Or. 52(4).

Type :- 'M'.

Object :- To find out a substitute for leaf mulching by other kinds of organic manures by conducting yield trial.

1. BASAL CONDITIONS

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) Ploughing with 6" plough. (b) to (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding. (ix) N.A. (x) N.A.

2. TREATMENTS :

1. *Sal* leaf mulch.
2. F.Y.M.
3. Fresh Cow dung.
4. Compost.
5. Castor Cake.
6. Niger Cake.
7. Soil dust mulch.

Amount of manures applied N.A.

3. DESIGN :

- (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 64'×6'. (b) 62'×4'. (v) 1' around. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1954. (b) No. (c) N.A. (v) (a) Nil. (b) (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 5181 lb./ac.
 (ii) 1847 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	11584
2.	5384
3.	4916
4.	2956
5.	3513
6.	3778
7.	4137
S.E./mean	= 923.5 lb./ac.

Crop :-Turmeric.

Ref :-Or. 53(4).

Site :-Turmeric Res. Stn., G. Udayagiri.

Type :-'M'.

Object :-To find out a substitute for leaf mulching by other kinds of organic manures by conducting an yield trial.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) Ploughing with 6" plough. (b) to (c) N.A. (v) 112 lb./ac. of N. (vi) N.A. (vii) Unirrigated. (viii) Weeding. (ix) N.A. (x) N.A.

2. TREATMENTS :

1. *Sal* leaf mulch.
2. F.Y.M.
3. Fresh Cowdung.
4. Compost.
5. Castor cake.
6. Niger cake.
7. Soil dust mulch.

Amount of manures applied N.A.

3. DESIGN :

- (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 4. (iv) (a) 64'×6'. (b) 62'×4½'. (v) 1' along length side and 9" along breadth side. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952-1954. (b) No. (c) N.A. (v) (a) No. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 8049 lb./ac.
- (ii) 1414 lb./ac.
- (iii) Treatments differ highly significantly.
- (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	17330
2.	10414
3.	6479
4.	5933
5.	5464
6.	5855
7.	4871
S.E./mean	= 707.0 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res. Stn., G. Udayagiri.

Ref :- Or. 48(5).

Type :- 'M'.

Object :- To find out the optimum dose of ash required for turmeric crop.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 7 to 10.5.48.
- (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) 150 md/ac. of sal leaf mulch immediately after planting. (ix) 9". (x) 23 to 29.1.49.

2. TREATMENTS :

- 1. Control (no manure).
- 2. 30 md./ac. of ash.
- 3. 60 md./ac. of ash.
- 4. 90 md./ac. of ash.
- 5. 120 md./ac. of ash.
- 6. 150 md./ac. of ash.

3. DESIGN :

- (i) L. sq. (ii) (a) 6. (b) N.A. (iii) 6. (iv) (a) 27'×21'. (b) 25'×18'. (v) 1' on each side of length and 1½' on each side of breadth. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946-1948. (b) No. (c) N.A. (v) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 12315 lb./ac.
- (ii) 1752 lb./ac.
- (iii) Treatments do not differ significantly.
- (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	11406
2.	12632
3.	11551
4.	13584
5.	12664
6.	12052
S.E./mean	= 715.0 lb./ac.

Crop :- Turmeric.

Ref :- Or. 52(5).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'M'.

Object :- To study the effect of varying doses of organic and inorganic N and to study their residual effect on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 11, 12.5 52. (iv) (a) Ploughing with 6" plough. (b) and (c) N.A. (d) 9" between rows and 6" within rows. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+a Control (no manure).

(1) 2 sources of N : N.C.=Niger cake and A/S.

(2) 3 doses of N : $N_1=6$, $N_2=90$ and $N_3=120$ lb./ac.

3. DESIGN :

- (i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 5. (iv) (a) $64' \times 7\frac{1}{2}'$. (b) $62' \times 5\frac{1}{2}'$. (v) $1' \times 1'$. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1954. (b) No. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 19979 lb./ac.

(ii) 3197 lb./ac.

(iii) Interaction $N \times$ Sources is significant while all other effects are not significant.

(iv) Av. yield of turmeric in lb./ac.

Control = 18727 lb./ac.

	N_1	N_2	N_3	Mean
N.C.	19059	20898	23300	21086
A/S	21716	18395	17756	19289
Mean	20387	19646	20528	20187

S.E. of marginal mean of N = 1011.0 lb./ac.

S.E. of marginal mean of source = 825.5 lb./ac.

S.E. of body of table = 14.9.8 lb./ac.

Crop :- Turmeric.

Ref :- Or. 53(5).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'M'.

Object :- To study the effect of varying doses of organic and inorganic N and to study their residual effect on Paddy.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) Ploughing with 6" plough. (b) and (c) N.A. (d) 9" between rows and 6" within rows. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

All combinations of (1) and (2)+a Control (no manure).

(1) 2 sources of N : N.C.=Niger cake and A/S.

(2) 3 doses of N : $N_1=60$, $N_2=90$ and $N_3=120$ lb./ac.

3. DESIGN :

(i) R.B.D. (ii) (a) 7. (b) N.A. (iii) 5. (iv) (a) 64'×7½'. (b) 62'—5½'. (v) 1'×1'. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1954. (b) N.A. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5 RESULTS

- (i) 21169 lb./ac.
 (ii) 3344.5 lb./ac.
 (iii) 'Control vs. others', N, source effect and the interaction are not significant.
 (iv) Av. yield of turmeric in lb./ac.

Control=21658 lb./ac.				
	N ₁	N ₂	N ₃	Mean
N.C.	21351	23395	19513	21420
A/S	19844	20483	21939	20755
Mean	20597	21939	20726	21087

S.E. of marginal mean of N = 1057.6 lb./ac.
 S.E. of marginal mean of source = 863.5 lb./ac.
 S.E. of body of table = 1495.5 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res; Stn. G. Udayagiri.

Ref :- Or. 48(6).

Type :- 'M'.

Object :- To find out if sal leaf mulch could be replaced by other kinds of leaf mulch and green manuring or not.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 25.7.48. (iv) (a) N.A. (b) Planting in furrows. (c) N.A. (d) Plant to plant 1' line to line 1½'. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 9'. (x) 1,2,2.49.

2. TREATMENTS :

Main-plot treatments :-

4 manures : L₁=Sal leaf at 150 md./ac., L₂=Mixed leaf at 150 md./ac., L₃=Dhaincha at 150 md./ac. and L₄=Sunnhemp at 150 md./ac.

Sub-plot treatments :-

2 methods of application : M₁=Applied as leaf mulch and M₂=Applied as G.M.

3. DESIGN

(i) Split plot. (ii) (a) 4 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 32'×12'. (b) 30'×9'. (v) Each sub-plot is bounded by bunds 1½' side and 1' high on all sides. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1949. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 641.2 lb./ac.
 (ii) (a) 173.1 lb./ac.
 (b) 204.8 lb./ac.
 (iii) No effect is significant.

(iv) Av. yield of turmeric in lb./ac.

	L ₁	L ₂	L ₃	L ₄	Mean
M ₁	617.6	741.1	784.0	552.1	673.7
M ₂	577.3	660.4	534.4	663.0	608.8
Mean	597.4	700.7	659.2	670.6	641.2

S.E. of difference of two

1. L marginal means = 86.6 lb./ac.
2. M marginal means = 72.4 lb./ac.
3. M means at the same level of L = 144.8 lb./ac.
4. L means at the same level of M = 134.1 lb./ac.

Crop :- Turmeric.

Ref - Or. 49(15).

Site :- Turmeric Res. Sub-Stn., G. Udayagiri

Type :- 'M'.

Object :- To find out if sal leaf mulch could be replaced by other kinds of leaf mulch or not.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 11 to 14.3.59.
 (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) N.A. (vi) Mixed seed. (vii) Unirrigated. (viii) N.A.
 (ix) 57". (x) 14 to 15.2.50.

2. TREATMENTS :

Main-plot treatments :-

- 4 manures : L₁=Sal leaf at 150 md./ac., L₂=Mixed leaf at 150 md./ac., L₃= *Dhaincha* at 150 md./ac. and
 L₄=Sunnhemp at 150 md./ac.

Sub-plot treatments :-

- 2 methods of application : M₁=Applied as leaf mulch and M₂=Applied as G.M.

3. DESIGN :

- (i) Split plot. (ii) (a) 4 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 32' x 12',
 (b) 30' x 9'. (v) 1' along length and 1½' along breadth on both sides. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric. (iv) (a) 1946 to 1949. (b) No. (c) N.A. (v) (a) and (b) N.A.
 (vi) and (vii) Nil.

5. RESULTS :

- (i) 4355 lb./ac.
 (ii) (a) 666.3 lb./ac.
 (b) 1368.5 lb./ac.
 (iii) None of the effects is significant.
 (iv) Av. yield of turmeric in lb./ac.

	L ₁	L ₂	L ₃	L ₄	Mean
M ₁	4194	4073	4516	4073	4214
M ₂	4799	4339	3831	4516	4496
Mean	4496	4456	4173	4295	4355

S.E. of difference between two

1. L marginal means = 333.1 lb./ac.
2. M marginal means = 483.9 lb./ac.
3. M means at the same level of L = 967.7 lb./ac.
4. L means at the same level of M = 761.0 lb./ac.

Crop :- Turmeric.

Ref :-Or. 49 (11).

Site :- Turmeric Res. Stn., G. Udayagiri,

Type :- 'C'.

Object :- To study the effect of partial shade on the growth and yield of turmeric.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Turmeric. (c) Sal ash at 30, 60, 90, 120, 150 md/ac. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 15.6.1949. (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) N.A. (vi) Mixed seed. (vii) Unirrigated. (viii) N.A. (ix) 57". (x) N.A.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric+Sunnhemp at 20 lb./ac.
3. Turmeric+Arhar at 10 lb./ac.

Sunnhemp and Arhar to be sown along with turmeric in order to provide partial shade for a prolonged period.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 20'×12'. (v) Border left. Details N.A. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1949 to 1951. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1754 lb./ac.
- (ii) 279.5 lb./ac.
- (iii) Treatments differ highly significantly.
- (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	2042
2.	1996
3.	1225
S.E./mean	= 139.8 lb./ac.

Crop :- Turmeric.

Ref :-Or. 50 (9).

Site :-Turmeric Res. Stn., G. Udayagiri.

Type 'C'.

Object :- To study the effect of partial shade on the growth and yield of turmeric.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) 16.6.1950. (iv) (a) N.A. (b) Planting in furrows with 8 lines/per plot and 20 plants/line. (c) N.A. (d) Row to row is 1½' plant to plant is 1½' (e) N.A. (v) N.A. (vi) Mixed seed of turmeric mother rhizomes. (vii) Unirrigated. (viii) N.A. (ix) 43". (x) N.A.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric+Sunnhemp at 20 lb./ac.
3. Turmeric +Arhar at 10 lb./ac.

Sunnhemp and Arhar sown along with turmeric and harvested for seed in order to provide partial shade for a prolonged period. It is sown in lines alternating with lines of turmeric so that there are 7 lines in a plot.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 20'×12'. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Fair. (ii) Nil. (iii) Yield of raw turmeric. (iv) (a) 1949 to 1951. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1049 lb./ac.
 (ii) 190.6 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	1089
2.	1029
3.	1029
S.E./mean	= 77.8 lb./ac.

Crop :- Turmeric.

Ref :- Or. 51(2).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'C'.

Object :—To study the effect of partial shade on the growth and yield of turmeric.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 15.6.51. (iv) (a) and (c) N.A. (d) *Arhar* was sown in lines alternately with turmeric. Turmeric was planted with spacing $1\frac{1}{2} \times 1'$ Sunnhemp was broadcast immediately before planting turmeric. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding. (ix) 39". (x) Sunnhemp : 23.10.51. Turmeric : 11.1.52 and *Arhar* : 17.2.52.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric with Sunnhemp.
3. Turmeric with *Arhar*.

3. DESIGN :

(i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) $8' \times 27'$. (b) $6' \times 25'$. (v) 1' border around. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before draige. (iv) (a) Yes 1949 to 1951. (b) No. (b) N.A. (v) (a) Nil. (b) No. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2549 lb./ac.
 (ii) 657.9 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	2637
2.	27.9
3.	2300
S.E./mean	= 272.6 lb /ac.

Crop :- Turmeric.

Ref :-Or. 49(13).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'C'.

Object :—To study the relative merits of planting whole mother rhizomes *versus* cut mother rhizomes with a view to reduce the seed rate.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 23.6.49
 (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) N.A. (vi) Mixed seed. (vii) Unirrigated. (viii) N.A. (ix) 57". (x) 12.2.50.

2. TREATMENTS :

1. Whole mother rhizomes.
2. Whole mothers rhizomes cut into 2 pieces.
3. Whole mother rhizomes cut into 3 pieces.
- 4: Whole mother rhizomes cut into 4 pieces.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 5. (iv) (a) N.A. (b) $4\frac{1}{2}' \times 4'$. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1949 to 1951. (b) No. (c) N.A. (v) (a) and (b) NA.. (vi) and (vii) Nil.

5. RESULTS :

- (i) 3464 lb./ac.
 (ii) 1008.8 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	5354
2.	4386
3.	2087
4.	2027
S.E./mean	=451.1 lb./ac.

Crop :- Turmeric.

Ref :- Or. 50(7).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :—To study the relative merits of planting whole mother rhizomes *versus* cut mother rhizomes with a view to reduce the seed rate.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 22.6.50. (iv) (a) N.A. (b) Sowing of seed in furrows with 5 lines/plot and 19 setts/line. (c) N.A. (d) Line to line $1\frac{1}{2}'$, plant to plant 1'. (e) N.A. (v) N.A. (vi) Mixed seed of turmeric. (vii) Unirrigated. (viii) Mulching on 22.6.50. (ix) 43". (x) 3.2:51.

2. TREATMENTS :

1. Whole mother rhizomes.
2. Mother rhizomes cut in to two pieces.

3. DESIGN :

- (i) R.B.D. (ii) (a) 2. (b) N.A. (iii) 6. (iv) (a) N.A. (b) $18' \times 6'$. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Good. (ii) Mild attack of caterpillar in some plots. (iii) Yield of raw turmeric. (iv) (a) 1949—1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 3587 lb./ac.
 (ii) 1079 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	4112
2.	3062
S.E./mean	= 440.6 lb./ac.

Crop :- Turmeric.

Ref :- Or. 51(4).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :—To study the merits of planting whole mother rhizomes *versus* cut mother rhizomes on the yield of Turmeric.

1. BASAL CONDITIONS

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (ii) 28.5.51. (iv) (a) Ploughing with 6" plough. (b) Planting in furrows. (c) N.A. (d) Line to line 1', seed to seed 6". (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) Weeding, mulching. (ix) 39". (x) 22.1.52 to 23.1.52.

2. TREATMENTS :

1. Whole mother rhizomes.
2. Whole mother rhizomes cut into 2 pieces.
3. Whole mother rhizomes cut into 3 pieces.
4. Whole mother rhizomes cut into 4 pieces.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 5'×30'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 19-9 to 1951. (b) Nil. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 17134 lb./ac.
 (ii) 2273 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	23522
3.	18005
3.	15342
4.	11665
S.E./mean	= 927.7 lb./ac.

Crop :- Turmeric.

Ref :- Or. 52(2).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :—To study the optimum depth and time of planting turmeric rhizomes.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) As per treatments. (iv) (a) to (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

Main-plot treatments :—

6 sowing dates : $D_1=15$ th April, $D_2=30$ th April, $D_3=15$ th May, $D_4=30$ th May, $D_5=14$ th June and $D_6=29$ th June.

Sub-plot treatments —

4 depths of sowing : $C_1=1\frac{1}{2}$ " , $C_2=3$ " , $C_3=4\frac{1}{2}$ " and $C_4=6$ ".

3. DESIGN

- (i) Split-plot. (ii) (a) 6 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) 32'×7½'. (b) 30'×6'. (v) 1'×9". (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952—1954. (b) No. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 18452 lb./ac.
(ii) (a) 4697.8 lb./ac.
(b) 3219.5 lb./ac.
(iii) Only dates of sowing effect is highly significant.
(iv) Av. yield of turmeric in lb./ac.

	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	Mean
C ₁	20715	18973	22361	22893	13697	8567	
C ₂	18973	18392	24035	21296	17908	9196	18303
C ₃	19215	23038	23619	24006	15585	10745	19368
C ₄	18053	21393	22651	22022	14810	10696	18271
Mean	19239	20449	23172	22554	15500	9801	18452

S.E. of difference of two

1. D marginal means = 1485.6 lb./ac.
2. C marginal means = 831.3 lb./ac.
3. C means at the same level of D = 2036.2 lb./ac.
4. D means at the same level of C = 2305.7 lb./ac.

Crop :-Turmeric.

Ref :-Or. 53(2).

Site :-Turmeric Res. Stn., G. Udayagiri.

Type :-'C'.

Object :-To study the optimum depth and time of planting turmeric rhizomes.

1. BASAL CONDITIONS :

(i) (a) No. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) As per treatments. (iv) (a) Ploughing with 6" plough. (b) to (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

Main-plot treatments :-

6 sowing dates : D₁=15th April, D₂=30th April, D₃=15th May, D₄=30th May, D₅=14th June and D₆=29th June.

Sub-plot treatments :-

4 depths of sowing : C₁=1½", C₂=3", C₃=4½" and C₄=6".

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/block ; 4 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) 32 × 7½'. (b) 30' × 6'. (v) 1' × 9". (vi) 1' × 9". (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952-1954. (b) No. (c) N.A. (v) (a) No. (b) N.A. (vi) and (vii) Nil.

5. RESULTS

- (i) 26331 lb./ac.
(ii) (a) 6067.2 lb./ac.
(b) 3622.9 lb./ac.
(iii) Dates of sowing effect is highly significant, depths of sowing effect is highly significant. Interaction is not significant.

(iv) Av. yield of turmeric in lb./ac.

	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	Mean
C ₁	23619	24297	27540	22942	29088	18731	24369
C ₂	25216	24442	31750	26717	33541	20183	26975
C ₃	26330	25555	29863	27056	30637	21635	26846
C ₄	22409	26620	32041	31266	29572	20909	27136
Mean	24393	25228	30298	26995	30709	20364	26331

S.E. of difference of two

1. D marginal means = 1918.6 lb./ac.
2. C marginal means = 935.4 lb./ac.
3. C means at the same level of D = 2291.4 lb./ac.
4. D means at the same level of C = 2760.2 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49(16).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :- To study the relative merits of planting mother and daughter rhizomes of turmeric with different spacing and to find out the right type of seed material.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 3, 5.5.49. (iv) (a) N.A. (b) Planting in furrows. (c) N.A. (d) As per treatments. (e) N.A. (v) Nil. (vi) Guttama (N.A.) (vii) Unirrigated. (viii) 150 md/ac. of sal leaf mulch applied immediately after planting. (ix) 57°. (x) 18.12.49.

2. TREATMENTS :

Main-plot treatments :-

4 spacings : S₁=9", S₂=12", S₃=15" and S₄=18".

Sub-plot treatments :-

2 types of seed material : R₁=Daughter rhizomes and R₂=Mother rhizomes.

3. DESIGN :

(i) Split-plot. (ii) (a) 4 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 5. (iv) (a) 30'×24'. (b) 30'×24'. (v) Nil. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1945—continuing. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 14034 lb./ac.

(ii) (a) 4809 lb./ac.

(b) 2139 lb./ac.

(iii) R effect is highly significant, interaction R×S is significant.

(iv) Av. yield of turmeric in lb./ac.

	R ₁	R ₂	Mean
S ₁	16226	19481	17854
S ₂	10950	15682	13316
S ₃	10757	14157	12457
S ₄	13153	11870	12512
Mean	12771	15297	14034

S.E. of difference of two

1. S marginal means = 2151 lb./ac.
2. R marginal means = 676 lb./ac.
3. R means at the same level of S = 1353 lb./ac.
4. S means at the same level of R = 2354 lb./ac.

Crop :- Turmeric.

Ref :- Or. 50(14).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'C'.

Object :—To study the relative merits of planting mother and daughter rhizomes of turmeric with different spacings and to find out the right type of seed material and optimum spacing required.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Turmeric (two years crop). (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 19.5.50. (iv) (a) to (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Though mulching with sal leaf was done at the same time in 'R₁' and 'R₂' plots yet early sprouting took place in 'R₁' plots. (ix) 43". (x) 29.12.50.

2. TREATMENTS :

Main-plot treatments :—

6 spacings : S₁=18"×12", S₂=12"×12", S₃=12"×9", S₄=9"×9", S₅=9"×6" and S₆=6"×6".

Sub-plot treatments :—

2 types of seed material : R₁=Daughter rhizomes and R₂=Mother rhizomes.

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 15'×12'. (b) 13'×9'. (v) 1' along length side and 1½' along breadth side. (vi) Yes.

4. GENERAL :

(i) Sprouts were stouter in R₁ than in R₂. Stand of crop better in R₁ than in R₂. Colour of leaves deep green in R₁ while yellowish green in R₂. No difference in dates of maturity. (ii) N.A. (iii) Yield of turmeric. (iv) (a) 1945—continued. (b) No. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 13899 lb./ac.

(ii) (a) 2270 lb./ac.

(b) 1432 lb./ac.

(iii) S effect and interaction S×R are highly significant.

(iv) Av. yield of turmeric in lb./ac.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	Mean
R ₁	10797	13217	14427	15450	16474	14892	14210
R ₂	7167	10611	11448	12658	18057	21598	13589
Mean	8982	11914	12937	14054	17265	18242	13899

S.E. of difference of two

1. S marginal means =1135.0 lb./ac.

2. R marginal means = 413.3 lb./ac.

3. R means at the same level of S =1013.0 lb./ac.

4. S means at the same level of R =1342.0 lb./ac.

Crop :- Turmeric.

Ref :- Or. 52 (1).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :—To study the relative merits of planting mother and daughter rhizomes of turmeric with different spacing required in planting.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) Date of planting 18.5.1952. (iv) (a) Ploughing with 6" plough. (b) Planting. (c) N.A. (d) As per treatment (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding, mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

Main-plot treatments :—

6 spacings : $S_1=18'' \times 12''$, $S_2=12'' \times 12''$, $S_3=12'' \times 9''$, $S_4=9'' \times 9''$, $S_5=9'' \times 6''$ and $S_6=6'' \times 6''$.

Sub-plot treatments :—

2 types of seed material : R_1 =Daughter rhizomes and R_2 =Mother rhizomes.

3. DESIGN :

(i) Split-plot. (ii) (a) 6 main-plots/block, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) $15' \times 9'$, $15' \times 8'$ or $15' \times 7.5'$ as per spacings. (b) $13' \times 6'$. (v) 1 row on each side of breadth and 1' on each side of length. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1953. (b) Yes. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 31332 lb./ac.

(ii) (a) 9124.5 lb./ac.

(b) 10011.3 lb./ac.

(iii) S effect and interaction $S \times R$ are significant while R effect is highly significant.

(iv) Av. yield of turmeric in lb./ac.

	S_1	S_2	S_3	S_4	S_5	S_6	Mean
R_1	19965	20663	31134	27783	20663	21361	23595
R_2	21640	36300	33089	41047	46631	55707	39069
Mean	20802	28481	32111	34415	33647	38534	31332

S.E. of difference of two.

1. S marginal means. =4562.3 lb./ac.
2. R marginal means. =2890.3 lb./ac.
3. R means at the same level of S =7079.1 lb./ac.
4. S means at the same level of R =6772.8 lb./ac.

Crop :- Turmeric.

Ref :- Or. 53 (1)/52 (1).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :—To study the relative merits of planting mother and daughter rhizomes of turmeric with different spacings so as to know the right type of seed material and the spacing required in planting.

1. BASAL CONDITIONS :

(i) (a) No. (b) N.A. (c) N.A. (ii) (a) Laterite soil. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) Ploughing with 6" plough. (b) to. (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :—

Main-plot treatments :

6 spacings : $S_1=18'' \times 12''$, $S_2=12'' \times 12''$, $S_3=12'' \times 9''$, $S_4=9'' \times 9''$, $S_5=9'' \times 6''$ and $S_6=6'' \times 6''$.

Sub-plot treatments :—

2 types of seed material : R_1 =Daughter rhizomes and R_2 =Mother rhizomes.

3. DESIGN:

(i) Split-plot. (ii) (a) 6 main-plots/block, 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) $15' \times 9'$, $15' \times 8'$, $15' \times 7\frac{1}{2}'$, or $15' \times 7'$ according to spacing. (b) $14' \times 6'$. (v) 1 row on each side of breadth and 6" on each side of length. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1953. (b) Yes. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 6754 lb./ac.
 (ii) (a) 2358.3 lb./ac.
 (b) 1873.0 lb./ac.
 (iii) Only spacing effect is highly significant.
 (iv) Av. yield of turmeric in lb./ac.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	Mean
R ₁	3500	5315	6288	6482	8945	8297	6471
R ₂	4473	6106	6547	7143	7454	10501	7037
Mean	3986	5710	6417	6812	8199	9399	6754

S.E. of difference of two

1. S marginal means = 1179.1 lb./ac.
2. R marginal means = 540.7 lb./ac.
3. R means at the same level of S = 1324.4 lb./ac.
4. S means at the same level of R = 1505.8 lb./ac.

Crop :- Turmeric.

Site :- Turmeric Res. Stn., G. Udayagiri.

Ref :- Or. 48(7).

Type :- 'C'.

Object :- To study the relative merits of planting turmeric on flat beds *versus* ridges of different widths.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 6,18.5.48. (iv) (a) N.A. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) Nil. (vi) Rucabithingia. (vii) Unirrigated. (viii) 150 md./ac. of sal leaf mulch applied immediately after planting. (ix) 9". (x) 14 to 17.2.49.

2. TREATMENTS :

1. Flat beds 27" wide with 18 lines of turmeric leaving 9" at either side of the bed. Line to line 1½'.
2. Ridges 3" wide, furrows 9" wide in a plot 27' wide *i.e.*, 18 ridges and 18 furrows. One line of turmeric on each ridge. Total 18 line per plot.
3. Ridges 2'—9" wide and furrows 9" wide in a plot 27' wide *i.e.*, 9 ridges and 9 furrows. Two lines to start leaving 4½" on either side of the ridge.
4. Ridges 3'—9" wide and furrows 9" wide in a plot in 27' wide *i.e.*, 6 ridges and 6 furrows. Three lines of turmeric on each ridge. Total 18 lines per plot, lines to start leaving 4½" on either side—line to line 1½' in all cases.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 64'×27'. (b) 62'×24'. (v) 1' and 1½' on either side of length and breadth. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric. (iv) (a) 1945 to 1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 4996 lb./ac.
 (ii) 975.0 lb./ac.
 (iii) Treatments do not differ significantly.

(iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	5549
2.	4280
3.	4904
4.	5251
S.E./mean	= 398.9 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49 (21).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :- To study the relative merits of planting turmeric on flat beds and on ridges.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 25 to 28.5.49. (iv) (a) N.A. (b) As per treatments (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) Rudabthingia. (vii) Unirrigated. (viii) N.A. (ix) 57". (x) 2 to 10.1.50.

2. TREATMENTS :

1. Flat bed spacing between lines 1½'.
2. 9' ridge.
3. 2'—3" ridge.
4. 3'—9" ridge.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 64'×27'. (b) 62'×24'. (v) 1' and 1½' on either side of length and breadth. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 4285 lb./ac.
 (ii) 704.3 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	4322
2.	4165
3.	4284
4.	4369
S.E./mean	=287.5 lb./ac.

Crop :- Turmeric.

Ref :- Or. 50(4).

Site :- Turmeric Res. Stn. G. Udayagiri.

Type :- 'C'.

Object :- To study the relative merits of planting turmeric on flat beds and on ridges of varying width.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 25.5.50. (iv) (a) N.A. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) Rudabthingia. (vii) Unirrigated. (viii) N.A. (ix) 43". (x) 20.1.51.

2. TREATMENTS:

1. Flat beds 64'×27' with 18 lines 1½' apart.
2. Ridges 9" wide and furrows 9" wide. 18 lines, 1 line per ridge 1½' apart with 64 plants/line.
3. Ridges 2'-3" and furrows 9" wide, 18 lines and 64 plants per line.
4. Ridge: 3'-9" and furrows 9" wide-18 lines, 3 lines per ridge 1½' apart with 64 plants/line.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 64'×27'. (b) 62'×24'. (v) 1' and 1½' on either side of length and breadth. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1946 to 1951. (b) No. (c) N.A. (v) (a), (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

- (i) 2385 lb./ac.
- (ii) 419.6 lb./ac.
- (iii) Treatments do not differ significantly.
- (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	2608
2.	2212
3.	2206
4.	2514
S.E./mean	= 171.1 lb./ac.

Crop :- Turmeric.

Ref :- Or. 51(5).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :—To study the merits of planting turmeric on flat beds and on ridges of varying widths.

1. BASAL CONDITIONS:

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 27, 28.4.51. (iv) (a) Ploughing with 6" plough. (b) Planting in furrows. (c) to (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) Mulching on 27, 28.4.51 ; weeding. (ix) 39". (x) 10.2.52.

2. TREATMENTS :

1. Flat bed.
2. Ridges 9" wide and furrows 9" wide, 12 lines, 1 line/ridge and 1½' apart.
3. Ridges 2'-3" wide and furrows 9" wide, 12 lines, 2 lines/ridge.
4. Ridges 3'-9" wide and furrows 9" wide, 12 lines, 3 lines/ridge.

3. DESIGN :

- (i) R.B.D (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 30'×18'. (b) 28'×15'. (v) 1' and 1½' on either side of length and breadth. (vi) Yes.

4. GENERAL:

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before drriage. (iv) (a) 1946—1951. (b) No. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 13551 lb./ac.
- (ii) 1196.6 lb./ac.
- (iii) Treatments differ highly significantly.
- (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	15522
2.	12272
3.	13344
4.	13067
S.E./mean	= 488.4 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49(8).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'C'.

Object :- To study the effect of placement of different types of seed material (depth of planting).

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 25.6.49 (iv) (a) N.A. (b) As per treatments. (c) N.A. (d) 1' x 1'. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 57'. (x) 13.2.50.

2. TREATMENTS :

1. Mother rhizomes placed below 1" of the surface.
2. Mother rhizomes placed below 2" of the surface.
3. Mother rhizomes placed below 3" of the surface.
4. Mother rhizomes placed below 4" of the surface.
5. Mother rhizomes placed below 5" of the surface.
6. Mother rhizomes placed below 6" of the surface.

3. DESIGN :

- (i) R.B.D. (ii) (a) 6. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 5' x 4'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric. (iv) (a) No. (b) Nil. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 5133 lb./ac.
 (ii) 1450 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	5615
2.	5513
3.	4730
4.	5853
5.	5173
6.	3914
S.E./mean	= 725.0 lb./ac.

Crop :- Turmeric.

Ref :- Or. 49(9).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'X'.

Object :- To study the effect of mixed cropping of Turmeric with early Paddy and *Arhar* on the yield of Turmeric.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) Sal ash at 30,60,90,120,150 md/ac. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 13.6.49. (iv) (a) N.A. (b) Planting in furrows. (c) to (e) N.A. (v) N.A. (vi) Mixed seed. (vii) Unirrigated. (viii) N.A. (ix) 57'. (x) 10,11.2.50.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric+early paddy at 40 lb./ac.
3. Turmeric+*Arhar* at 10 lb./ac.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 20' x 12'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1949 to 1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1619 lb./ac.
 (ii) 533.6 lb./ac.
 (iii) Treatments differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	2496
2.	1452
3.	908
S.E./mean.	= 266.8 lb./ac.

Crop :- Turmeric.

Ref :- Or. 50(3).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'X'.

Object :- To study the effect of mixed cropping of Turmeric with early Paddy and *Arhar* on the yield of Turmeric.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 15.6.50.
 (iv) (a) N.A. (b) N.A. (c) N.A. (d) Plant to plant 1' and row 1½' apart. (e) N.A. (v) N.A. (vi) Paddy (73-8) early. *Arhar* :- Bold grain. Turmeric :- Mother rhizomes of mixed seed. (vii) Unirrigated.
 (viii) N.A. (ix) Paddy 23.10.50 ; *Arhar* 16.12.50 and Turmeric 3.1.51.

2. TREATMENTS :

1. Turmeric alone.
 2. Turmeric+early paddy (73-8) at 40 lb./ac.
 3. Turmeric+*Arhar* (Bold grain) at 10 lb./ac.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 6. (iv) (a) N.A. (b) 20'×12'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) Fair. (ii) N.A. (iii) Yield of raw turmeric. (iv) (a) 1949 to 1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1080 lb./ac.
 (ii) 277.7 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	1211
2.	908
3.	1120
S.E./mean	= 113.4 lb./ac.

Crop :- Turmeric.

Ref :- Or. 51(3).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'X'.

Object :- To study the effect of mixed cropping of Turmeric with early Paddy and *Arhar* on the yield of Turmeric.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Turmeric. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) 11.6.51.
 (iv) (a) to (e) Paddy was broadcast immediately before planting turmeric at 20 lb./ac. Turmeric was planted ½' line to line and 1' seed to seed in all plots of all combinations. *Arhar* was sown in between the lines of turmeric 1½' line to line and 1½' seed to seed. (v) Nil. (vi) Paddy 73-8 (early). (vii) Unirrigated.
 (viii) Weeding. (ix) 39%. (x) Paddy 23.10.51 ; Turmeric 12.1.52 ; *Arhar* 17.2.52.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric+*Arhar* (Bold grain).
3. Turmeric+early paddy.

3. DESIGN :

- (i) R.B.D. (ii) (a) 3. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 21'×9'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1949 to 1951. (b) No. (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 2256 lb./ac.
 (ii) 479.4 lb /ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	2736
2.	1786
3.	2247
S.E /mean	= 239.7 lb./ac.

Crop :- Turmeric.

Ref :- Or. 52(3).

Stte :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'X'.

Object :-To study the effect of mixed cropping on Turmeric with *Ragi*, *Dhaincha* and Sunnhemp.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis. G. Udayagiri. (iii) 12.6.52. (iv) (a) Ploughing with 6" plough. (b) to (c) Nil. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric+*Dhaincha* broadcast at 8 srs./ac.
3. Turmeric+Sunnhemp broadcast at 12 srs./ac.
4. Turmeric+*Ragi* broadcast at 5 srs/ac.

3. DESIGN :

- (i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 32'×15'. (b) 30'×13½'. (v) 1'×9'. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1954. (b) and (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 3182 lb./ac.
 (ii) 438.6 lb./ac.
 (iii) Treatments differ highly significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	3440
2.	3676
3.	3225
4.	2386
S.E./mean	= 179.0 lb./ac.

Crop :- Turmeric.

Ref :- Or. 53(3).

Site :- Turmeric Res. Stn., G. Udayagiri.

Type :- 'X'

Object :- To study the effect of mixed cropping of Turmeric with *Ragi*, *Dhaincha* and Sunnhemp.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Laterite. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) Ploughing with 6" plough. (b) to (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) Weeding and mulching. (ix) N.A. (x) N.A.

2. TREATMENTS :

1. Turmeric alone.
2. Turmeric + *Dhaincha* (broadcast at 8 sr./ac.)
3. Turmeric + Sunnhemp (broadcast at 12 sr./ac.).
4. Turmeric + *Ragi* (broadcast at 5 sr./ac.).

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 6. (iv) (a) 32' × 15'. (b) 30' × 13½'. (v) 1' × 9". (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of turmeric before driage. (iv) (a) 1952 to 1954. (b) to (c) N.A. (v) (a) No. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 5947 lb./ac.
 (ii) 800.9 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of turmeric in lb./ac.

Treatment	Av. yield
1.	5790
2.	5450
3.	6758
4.	5790
S.E./mean	= 327.0 lb./ac.

Crop :- Tapioca.

Ref :- Or. 52 (13).

Site :- State Res. Stn., Bhubaneswar.

Type :- 'C'.

Object :- To compare different spacings and method of planting on Tapioca yield.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Sandy loam. (b) Refer soil analysis, G. Udayagiri. (iii) 20.6.1952. (iv) (a) N.A. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) N.A. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) N.A. (x) 31.12.1952.

2. TREATMENTS :

Main-plot treatments :

9 spacings : $S_1=2' \times 2'$, $S_2=2' \times 4'$, $S_3=2' \times 6'$, $S_4=4' \times 2'$, $S_5=4' \times 4'$, $S_6=4' \times 6'$, $S_7=6' \times 2'$, $S_8=6' \times 4'$, and $S_9=6' \times 6'$.

Sub-plot treatments :

2 methods of planting : $M_1=$ On ridges and $M_2=$ On maunds.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14' × 14'. (b) 12' × 12', (v) 1' all round. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of tapioca. (iv) (a) 1952—1953. (b) Yes. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 5362 lb./ac.
 (ii) (a) 3591 lb./ac.
 (b) 1923.9 lb./ac.
 (iii) None of the effects is significant.
 (iv) Av. yield of tapioca in lb./ac.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	Mean
M ₁	4226	4798	5433	3948	4099	6670	5363	5403	6365	5145
M ₂	5690	7033	4761	3639	6900	6900	5227	4964	5103	5580
Mean	4958	5915	5097	3793	5499	6785	5295	5183	5734	5362

S.E. of difference of two

1. S marginal means = 1795.5 lb./ac.
 2. M marginal means = 453.5 lb./ac.
 3. M means at the same level of S = 1360.4 lb./ac.
 4. S means at the same level of M = 2036.9 lb./ac.

Crop :- Tapioca.

Ref :- Or. 53 (13) 52 (13).

Site :- State Res. Stn., Bhubaneswar.

Type :- 'C'.

Object :- To compare the different spacings and methods of planting Tapioca.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Tapioca. (c) As per treatments. (ii) (a) Sandy loam. (b) Refer soil analysis, G. Udayagiri. (iii) N.A. (iv) (a) N.A. (b) As per treatments. (c) N.A. (d) As under treatments. (e) N.A. (v) N.A. (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) N.A.

2. TREATMENTS :

Main-plot treatments :

9 spacings : S₁ = 2' × 2', S₂ = 2' × 4', S₃ = 2' × 6', S₄ = 4' × 2', S₅ = 4' × 4', S₆ = 4' × 6', S₇ = 6' × 2', S₈ = 6' × 4' and S₉ = 6' × 6'.

Sub-plot treatments :

2 methods of planting : M₁ = on ridges and M₂ = on maunds.

3. DESIGN :

- (i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 14' × 14'. (b) 12' × 12'. (v) 1' all round. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Yield of tapioca. (iv) (a) 1952 to 953. (b) Yes. (c) N.A. (v) (a) No. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 13111 lb./ac.
 (ii) (a) 3554.4 lb./ac.
 (b) 3557 lb./ac.
 (iii) None of the effects is significant.
 (iv) Av. yield of tapioca in lb./ac.

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	Mean
M ₁	10143	11891	13555	17125	1539	15579	13546	9048	13733	13390
M	12539	14414	10975	13888	13839	13912	12527	1404	9293	12333
Mean	11341	13153	12265	15506	14865	14776	13036	11548	11513	13111

S.E. of difference of two

1. S marginal means = 1777.2 lb./ac.
 2. M marginal means = 838.4 lb./ac.
 3. M means at the same level of S = 2515.2 lb./ac.
 4. S means at the same level of M = 2514.4 lb./ac.

Crop :- Sweetpotato.

Ref :- Or. 52(15).

Site :- State Res. Stn., Bhubaneswar.

Type :- 'M'.

Object :- To study the effect of N, P₂O₅ and K₂O applied alone and in combination.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Sandy loam. (b) Refer soil analysis, Bhubaneswar. (iii) N.A. (iv) (a) 4 ploughings, breaking of clods, laddering. (b) and (c) N.A. (d) Rows 3' apart. (e) N.A. (v) (i) No dressing. (ii) F.Y.M. (iii) Green leaf. Each basal dressing for two replications entirely. (v) N.A. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) N.A.

2. TREATMENTS:

Main-plot treatments :—

All combinations of (1) and (2).

(1) 3 levels of N : N₀=0, N₁=50 and N₂=100 lb./ac.(2) 3 levels of K₂O : K₀=0, K₁=80 and K₂=160 lb./ac.

Sub-plot treatments :—

2 levels of P₂O₅ : P₀=0, P₁=80 lb./ac.Source of N is A/S ; P₂O₅ as Super and K₂O as Potash.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block ; 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) 15' × 84' (main-plot), 15' × 42' (sub-plot). (b) 9' × 40'. (v) In each sub-plot 3 rows, 1' length wise. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of sweetpotato. (iv) (a) 1952—contd. (b) Yes. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vi) Nil.

5. RESULTS :

- (i) 1285 lb./ac.
 (ii) (a) 890.6 lb./ac.
 (b) 625.6 lb./ac.
 (iii) Only main-plot treatment effect is significant. Further sub-division shows that only N effect is highly significant while others not significant.
 (iv) Av. yield of sweetpotato in lb./ac.

	K ₀	K ₁	K ₂	Mean	P ₀	P ₁
N ₀	785	803	998	862	831	893
N ₁	1141	1327	1456	1308	1145	1470
N ₂	1944	1142	1967	1684	1544	1822
Mean	1290	1091	1474	1285	1174	1395
P ₀	1073	897	1551	1174		
P ₁	1507	1284	1395	1395		

S.E. of marginal means of N or K = 148.4 lb./ac.

S.E. of body of table N × K = 257.1 lb./ac.

S.E. of difference of two

1. P marginal means = 120.4 lb./ac.

2. P means at the same level of N × K = 208.5 lb./ac.

3. N or K means at the same level of P = 256.5 lb./ac.

Crop :- Sweetpotato.

Ref :- Or. 53(12)/52(15).

Site :- State Res. Stn., Bhubaneswar.

Type :- 'M'.

Object :- To study the effect of N, P_2O_5 and K_2O applied alone and in combination.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sweetpotato. (c) As per treatments. (ii) (a) Sandy loam. (b) Refer soil analysis, Bhubaneswar. (iii) 17.7.53. (iv) (a) and (b) 6 ploughings, laddering and forming ridges. (c) N.A. (d) 3' apart. (e) N.A. (v) Reps. I and VI : F.Y.M. at 2 C.L./rep. Reps II and III : Nob asal dressing, Reps IV : and V : G.L. at 3 C.L./rep. (vi) N.A. (vii) Irrigated. (viii) Twice hoeing and weeding, gap filling on 7.8.53. training vines on 18.9.53. (ix) N.A. (x) 10.2.54.

2. TREATMENTS :

Main-plot treatments : -

All combinations of (1) and (2).

(1) 3 levels of N : $N_0=0$, $N_1=50$ and $N_2=100$ lb./ac.(2) 3 levels of K_2O : $K_0=0$, $K_1=80$ and $K_2=160$ lb./ac.

Sub-plot treatments :-

2 levels of P_2O_5 : $P_0=0$, $P_1=80$ lb./ac.Source of N is A/S ; P_2O_5 as Super and K_2O as Potash.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 6. (iv) (a) $15' \times 84'$ (main-plot) ; $15' \times 42'$ (sub-plot). (b) $9' \times 40'$ (sub-plot). (v) In each sub-plot 3 rows 3' apart ; 1' length wise (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of sweetpotato. (iv) (a) 1952—continued. (b) Yes. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS:

(i) 3647 lb./ac.

(ii) (a) 2184 lb./ac.

(b) 1315 lb./ac.

(iii) Main-plot treatment effect, N and NP are highly significant. Others effects are not significant.

	K_0	K_1	K_2		P_0	P_1
N_0	2950	2399	1531	2293	2154	2433
N_1	4294	4700	3799	4264	4450	4078
N_2	5227	3636	4292	4385	3812	4958
Mean	4157	3578	3207	3647		
P_0	3776	3375	3266	3472		
P_1	4538	3782	3148	3823		

S.E. of marginal means of N or K

=364.0 lb./ac.

S.E. of body of table N x K

=630.5 lb./ac.

S.E. of difference of two

1. P marginal means

=248.3 lb./ac.

2. P means at the same level of N or K

=438.4 lb./ac.

3. N or K means at the same level of P

=601.0 lb./ac.

Crop :- Sweetpotato.

Ref :- Or. 52(14).

Site :- State Res. Stn. Bhubaneswar.

Type :- 'C'.

Object :- To find out optimum spacing and method of planting Sweetpotato.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Sandy loam. (b) Refer soil analysis, Bhubaneswar. (iii) 11.7.52. (iv) (a) Four lines ploughing, breaking clods, twice laddering. (b) As per treatments. (c) N.A. (d) As per treatments. (e) N.A. (v) 10 C.L. F.Y.M./ac. Manuring with A/S at 50 lb./ac., P_2O_5 at 80 lb./ac. and K_2O at 10 lb./ac. 2 months after planting. (vi) N.A. (vii) Unirrigated. (viii) 3 hoeings, twice weeding, once training vines and twice earthing. (ix) N.A. (x) 8.12.55.

2. TREATMENTS :

Main-plot treatments :-

9 spacings: $S_1=1' \times 6''$, $S_2=1' \times 9''$, $S_3=1' \times 1'$, $S_4=2' \times 6''$, $S_5=2' \times 9''$, $S_6=2' \times 1'$, $S_7=3' \times 6''$, $S_8=3' \times 9''$ and $S_9=3' \times 1'$.

Sub-plot treatments :-

2 methods of planting: M_1 =On flat beds and M_2 =On ridges

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) $13' \times 7'$. (b) $12' \times 6'$. (v) $\frac{1}{2}'$ all round. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of sweetpotato. (iv) (a) 1952 to 1953. (b) Yes. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

(i) 1380 lb./ac.
 (ii) (a) 695.7 lb./ac.
 (b) 780.4 lb./ac.
 (iii) Only methods of planting effect is significant.
 (iv) Av. yield of sweetpotato in lb./ac.

	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	Mean
M_1	690	853	907	1355	1010	1313	1779	908	484	1033
M_2	932	1307	1543	2390	2505	2184	1434	1289	1966	1728
Mean	811	1080	1225	1872	1757	1748	1606	1098	1225	1380

S.E. of difference of two

1. S marginal means = 347.9 lb./ac.
2. M marginal means = 184.0 lb./ac.
3. M means at the same level of S = 551.9 lb./ac.
4. S means at the same level of M = 522.7 lb./ac.

Crop :- Sweetpotato.

Ref :- Or, 53(14)/52(14).

Site : State Res. Stn., Bhubaneswar.

Type :- 'C'.

Object :- To find out optimum spacing and method of planting Sweetpotato.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Sweetpotato. (c) As per treatments. (ii) (a) Sandy loam. (b) Refer soil analysis, Bhubaneswar. (iii) 2.8.53. (iv) (a) 4 ploughings, breaking clods twice and laddering (b) As under treatments. (c) to (e) N.A. (v) 5 C.L. compost, A/S at 40 lb./ac.; Super 55 lb./ac. and Pot. Sul. 295 lb./ac. of K_2O to whole exptl. plot. (vi) N.A. (vii) Irrigated. (viii) 3 hoeings, twice weeding, once training vines and twice earthing. (ix) N.A. (x) 22.12.53

2. TREATMENTS :

Main-plot treatments :—

9 spacings : $S_1=1' \times 6''$, $S_2=1' \times 9''$, $S_3=1' \times 1'$, $S_4=2' \times 6''$, $S_5=2' \times 9''$, $S_6=2' \times 1'$, $S_7=3' \times 6''$, $S_8=3' \times 9''$. and $S_9=3' \times 1'$.

Sub-plot treatments :—

2 methods of planting : $M_1=$ On flat beds and $M_2=$ On ridges.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block and 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) $13' \times 7'$. (b) $12' \times 6'$. (v) $\frac{1}{2}'$ all round. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield of sweetpotato. (iv) (a) 1952 to 1953. (b) Yes. (c) N.A. (v) (a) N.I. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 4365 lb./ac.
 (ii) (a) 1824 lb./ac.
 (b) 1758 lb./ac.
 (iii) None of the effects is significant.
 (iv) Av. yield of sweetpotato in lb./ac.

	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	Mean
M_1	6154	4727	4036	3791	3403	2959	3535	3819	3507	3992
M_2	6031	5199	5691	4840	4093	4575	5237	2675	4301	4738
Mean	6092	4963	4863	4315	3748	3767	4386	3217	3904	4365

S.E. of difference of two

1. S marginal means = 912.0 lb./ac.
 2. M marginal means = 414.4 lb./ac.
 3. M means at the same level of S = 1243.1 lb./ac.
 4. S means at the same level of M. = 1267.0 lb./ac.

Crop :- Potato.

Site :- Rice Res. Stn. Jeypore.

Ref :- Or. 49(6).

Type :- 'M'.

Object :- To study the effects of oil cake and A/S alone and in combination.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Black cotton type. (b) Refer soil analysis, Jeypore. (iii) 5.11.49. (iv) (a) to (e) N.A. (v) Nil. (vi) N.A. (vii) Unirrigated. (viii) N.A. (ix) 49.47". (x) N.A.

2. TREATMENTS :

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

- (1) 3 levels of N : $N_1=80$, $N_2=100$ and $N_3=120$ lb./ac.
 (2) 3 sources of N : $S_1=A/S$, $S_2=$ Oilcake and $S_3=A/S+oilcake$.

3. DESIGN :

(i) R.B.D. (ii) (a) 10. (b) N.A. (iii) 3. (iv) (a) N.A. (b) $9' \times 7'$. (v) N.A. (vi) Yes.

4. GENERAL :

(i) Poor. (ii) Effected by red ants. (iii) Yield of potato. (iv) (a) No. (b) to (c) —. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 8548 lb./ac.
(ii) 2156 lb./ac.
(iii) None of the effects is significant.
(iv) Av. yield of potato in lb./ac.

Control=5387 lb./ac.

	N ₁	N ₂	N ₃	Mean
S ₁	11134	8483	7403	907
S ₂	7216	9679	10557	9151
S ₃	7807	9031	8786	8541
Mean	8719	9064	8915	8900

S.E. of any marginal mean = 718.7 lb./ac.
S.E. of body of table = 124.4 lb./ac.

Crop :- Colocasia.

Ref :- Or. 53(11).

Site :- State Res. Stn. Bhubaneswar.

Type :- 'M'.

Object :- To study the effect of N, P₂O₅ and K₂O alone and in combination.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) N.A. (c) N.A. (ii) (a) Sandy loam. (b) N.A. (iii) N.A. (iv) (a) to (e) N.A. (v) Application of compost for replications II and IV. (vi) N.A. (vii) Irrigated. (viii) N.A. (ix) N.A. (x) N.A.

2. TREATMENTS :

Main-plot treatments :-

All combinations of (1) and (2)

(1) 3 levels of N : N₀=0, N₁=50 and N₂=100 lb./ac.(2) 3 levels of K₂O : K₀=0, K₁=80 and K₂=160 lb./ac.

Sub-plot treatments :-

2 levels of P₂O₅ : P₀=0, P₁=80 lb./ac.Source of N is A/S ; P₂O₅ as Super and K₂O as Pot. sul.

3. DESIGN :

(i) Split-plot. (ii) (a) 9 main-plots/block ; 2 sub-plots/main-plot. (b) N.A. (iii) 4. (iv) (a) 12' x 9' (Sub-plot). (b) 8' x 7'. (v) 1' row all round. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Yield. (iv) (a) 1st year. (b) —. (c) N.A. (v) (a) Nil. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 3656 lb./ac.
(ii) (a) 1710.6 lb./ac.
(b) 901.2 lb./ac.
(iii) Main-plot treatment and sub-plot treatment effects are highly significant. N and P effects are highly significant. K and NP effects are significant. Other effects are not significant.

(iv) Av. yield of colocasia in lb./ac.

	K ₀	K ₁	K ₂	Mean	P ₀	P ₁
N ₀	1762	2625	2679	2356	2228	2483
N ₁	4168	3579	5408	4385	3593	5177
N ₂	3415	4429	4837	4227	3508	4946
Mean	3115	3544	4308	3656		
P ₀	2665	3131	3532	3110		
P ₁	3555	3958	5084	4202		

S.E. of marginal means of N or K	= 285.1 lb./ac.
S.E. of body of table	= 493.8 lb./ac.
S.E. of difference of two	
1. P marginal means	= 212.4 lb./ac.
2. P means at the same level of N or K	= 367.9 lb./ac.
3. N or K means at the same level of P	= 558.1 lb./ac.

Crop :- Groundnut.

Site :- Rice Res. Sub-Stn., Berhampore.

Ref :- Or. 52(6).

Type :- 'C'.

Object :--To study the effect of different cultural practices on Groundnut.

1. BASAL CONDITIONS :

- (i) (a) Nil. (b) Groundnut. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 26.6.52.
 (iv) (a) As under treatments. (b) Dibbling behind plough. (c) 34 lb.6 oz. ac. (d) Line to line 1½'. (e) N.A.
 (v) N.A. (vi) A.H. 685. (vii) Unirrigated. (viii) Earthing, weeding and 3 hoeings. (ix) 31". (x) 26.10.52.

2. TREATMENTS :

- 2 ploughings and one hoeing.
 - 4 ploughings and two hoeings.
 - 6 ploughings and two hoeings.
 - 4 ploughings and three hoeings.
 - 6 ploughings and three hoeings.
- 1st hoeing on 22.7.52, 2nd hoeing on 31.7.52 and 3rd hoeing on 11.8.52.

3. DESIGN :

- (i) R.B.D. (ii) (a) 5. (b) 44' x 53'. (iii) 4. (iv) (a) N.A. (b) 4' x 9'. (v) N.A. (vi) Yes.

4. GENERAL :

- (i) N.A. (ii) N.A. (iii) Weight of kernels. (iv) (a) No. (b) and (c) —. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 1821 lb./ac.
 (ii) 255.0 lb./ac.
 (iii) Treatments do not differ significantly.
 (iv) Av. yield of kernels in lb./ac.

Treatment	Av. yield
1.	1550
2.	1839
3.	1829
4.	2009
5.	1880
S.E./mean	= 127.5 lb./ac.

Crop :- *Arhar* and Groundnut.

Ref :- Or. 52 (7).

Site :- Rice Res. Sub-Stn., Berhampore.

Type :- 'X'.

Object :- To study the effect of mixed cropping experiment on A.H. 477 and Big *Arhar*.

1. BASAL CONDITIONS :

(i) (a) Nil. (b) Groundnut. (c) N.A. (ii) (a) Clay loam. (b) Refer soil analysis, Berhampore. (iii) 27.5.52. (iv) (a) Ploughing more than 6". (b) Dibbling in lines 8/10 lines in G.N. and 3/1 line in *Arhar* in a Strip of mixed cropping. (c) N.A. (d) Line to line 1½' and plant to plant 9" in case of groundnut 1½' in case of *Arhar* (e) N.A. (v) N.A. (vi) A.H. 477. (vii) Irrigated. (viii) Weeding and hoeing. (ix) 31". (x) 29.12.1952. and 14.1.1953.

2. TREATMENTS :

1. *Arhar* alone.
2. Groundnut alone.
3. *Arhar* one line, Groundnut 2 lines.
4. *Arhar* one line, Groundnut 5 lines.

3. DESIGN :

(i) R.B.D. (ii) (a) 4. (b) N.A. (iii) 4. (iv) (a) N.A. (b) 44½ × 15½. (v) N.A. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) N.A. (iii) Weight of *Arhar* and Groundnut pod taken separately. (iv) (a) Not continued. (b) Nil. (c) N.A. (v) (a) N.A. (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 409.3 lb./ac.
 (ii) 95.16 lb./ac.
 (iii) Treatments differ significantly.
 (iv) Av. yield in lb./ac.

Treatment	Av. yield
1.	270.6
2.	414.6
3.	498.7
4.	453.3
S.E./mean	= 47.56 lb./ac.

Crop :- Nagpur Santra.

Ref :- Or. 53(2).

Site :- Fruit Res. Stn. Angul.

Type :- 'M'.

Object :- To study the response of N, P₂O₅ and K₂O separately and in combination on the yield of Santra.

1. BASAL CONDITIONS :

(i) Fallow. (ii) (a) Black cotton soil. (b) Refer soil analysis, Angul. (iii) Budding. (iv) Nagpur Santra. on Khandia Local root stock. (v) July 1950, 28' × 28' spacing. (vi) 1 year. (vii) G.M. with *Dhaincha* at 30 lb./ac. of seed applied before rains. (viii) 3 ploughings a year. (ix) Nil. (x) Irrigated. (xi) 45.51". (xii) No harvest.

2. TREATMENTS :

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

- (1) 3 levels of N as A/S : N₀=0, N₁=50 and N₂=100 lb./ac.
- (2) 3 levels of P₂O₅ as Super : P₀=0, P₁=40 and P₂=80 lb./ac.
- (3) 3 levels of K₂O as : K₀=0, K₁=40 and K₂=80 lb./ac.

3. DESIGN :

(i) 3³ Partially Confd. (ii) 3 blocks/replication ; 9 plots/block. (iii) 2. (iv) 4. (v) One tree on all sides. (vi) Yes.

4. GENERAL :

(i) N.A. (ii) Termites. No treated plants replaced.* (iii) Diameter of stock and seion and height. (iv) (a) 1953-54 (I yr.). (b) to (c) N.A. (v) (a) and (b) N.A. (vi) and (vii) Nil.

5. RESULTS :

- (i) 10.90".
- (ii) 1.02".
- (iii) None of the effects is significant.
- (iv) Av. girth in inches.

	P ₀	P ₁	P ₂	Mean	K ₀	K ₁	K ₂
N ₀	10.81	10.50	11.61	10.97	10.94	11.33	10.64
N ₁	10.58	11.23	10.77	10.86	10.70	11.11	10.77
N ₂	11.34	10.74	10.54	10.87	10.73	11.04	10.85
Mean	10.91	10.82	10.97	10.90			
K ₀	10.62	11.10	10.64	10.79			
K ₁	11.44	10.81	11.24	11.16			
K ₂	10.68	10.55	11.04	10.76			

S.E. of any marginal mean = 0.24".
 S.E. of body of tables = 0.42".
