

SOIL & WATER MANAGEMENT

SAND DUNES STABILIZATION



Shifting sand dunes

More than half (about 58%) of the area of arid zone in the western Rajasthan is covered by drifting or semi-stabilized sand dunes. Due to high wind velocity, the sand dunes engulf agricultural fields, canals, wells, railway lines, highways, buildings, etc., and thus cause immense losses. Some of the dunes are highly active and are thus a major menace to the inhabitants. The Central Arid Zone Research Institute (CAZRI), Jodhpur has developed technology for sand dunes stabilization. This technology involves the following steps:

- Protection from the biotic interference,
- Establishment of micro-wind breaks (mulching) on the dune surface to reduce sand movement, and
- Afforestation of treated dunes.



Sand dunes stabilization through micro-wind breaks

PROTECTION FROM BIOTIC INTERFERENCE

Due to high human and livestock population, whatever vegetation grows on the dunes is either harvested by the inhabitants or grazed by animals. This leads to barren dunes. These areas must be protected from biotic pressure. On the dunes angle-iron-barbed wire fencing is most effective.

ESTABLISHMENT OF MICRO-WIND BREAKS

The locally available brushwood materials should be effectively used for construction of windbreaks. The brushwood materials should be buried upside down on the dunes, keeping one feet height on the dune surface in parallel rows or in a chess board design. The brushwood of following bushes can be used:

- Senia (*Crotalaria burhea*)
- Bui (*Aerva persica*)
- Kheep (*Leptadenia pyrotechnica*)
- Thorns of Bordi (*Ziziphus nummularia*), and
- Khejri (*Prosopis cineraria*)

AFFORESTATION OF DUNES

After construction of micro-wind breaks, these dunes must be revegetated by suitable grasses/creepers/trees or shrubs, sown on the leeward side of micro-wind breaks. Some the grasses/creepers/trees suitable for afforestation of dunes are:

Grasses	Sewan (<i>Lasiurus indicus</i>), Anjan (<i>Cenchrus ciliaris</i>), Murat (<i>Panicum turgidum</i>).
Creepers	Tumba (<i>Citrullus colosynthes</i>), Kachri (<i>Cucumis</i> sp.)
Trees/shrubs	Israeli babul (<i>Acacia tortilis</i>), Nubica (<i>Acacia nubica</i>), Kumat (<i>Acacia senegal</i>), Bhu-bavali (<i>A. jaquimontii</i>), Bavenosa (<i>A. bavenosa</i>), Angrezi babul (<i>Prosopis juliflora</i>), Phog (<i>Calligonum polygonoides</i>), Bordi (<i>Ziziphus nummularia</i>), Ami (<i>Clerodendrum phlomoidis</i>).



Acacia senegal - a tree suitable for afforestation of dunes

GUIDELINES FOR REVEGETATION

Sow grass and creeper seeds directly. In case of trees/shrubs, transplant nursery-raised 5 month old seedlings. Trees should be planted at a spacing of 5 × 5 m.

It is necessary to follow all these operations as a time-bound activity. It is recommended that fencing work should be completed by the end of June, the micro-wind breaks establishment should be done before July, i.e. onset of monsoon. Tree-shrub nursery should be raised in February or March and transplanting of trees/shrubs should be done at the onset of monsoon. By proper adoption of the above steps, it is possible to effectively stabilize the dunes.

YIELD AND OTHER ADVANTAGES

Once the trees are established, the under-storey of grass/creepers start to regenerate, and after 15 years of establishment, the wood yield of *Acacia tortilis* is expected between 33 to 53 t/ha. Recently, the CAZRI has also developed technology of gum extraction from *A. tortilis*, thus it was possible to harvest about 400–500 gm of gum from each tree.

This technology got a very wider acceptance by the State Government Forest Department for community participatory management and stabilization of sand dunes.

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