Coastal Dune Stabilisation

A Vietnamnamese Experience

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Coastal Problems in Central Vietnam

Storm & floods:

- Long stretches of riverbank (and some dyke) insufficiently protected
- Heavy flow of dune sand into streams, irrigated farms, housing areas, etc.
Central coastal Vietnam

Quang Binh province
Typical coastal dunes in Central Vietnam, Casuarina plantation to reduce wind erosion
Local community: A Sand Struggle

- Land and houses at risk
- Time spent on maintenance, clearing sand, and damage control (night-watching the dams... )
Some sand is transported ... by wind- and water erosion
... but water-erosion caused by streams is also considerable

Dry bed of Local stream
Livestock is also one of the main source of income
Ineffective Measures

Most measures don’t address the causes:

- **Poorly vegetated sand ‘dykes’**: instable, moving problem downstream
- **Engineers’ hard solutions**: expensive, still moving the problem downstream
- **Agro-forestry tree planting**: expensive, slow, OK to reduce wind erosion, but no impact on erosion from heavy rains, streams
Sand flow fills up local streams and river
Sand dykes with casuarinas and wild pineapple are not effective
Demonstration site
Treatments (no chem. fertiliser)

- 3 kg manure/m
- 3 kg manure/m + 3 kg black soil
- 6 kg manure/m
  - Both bare root slips and potted plants were tried
  - Sub-optimal watering (fast drying sand).
After one month

Some clumps out of line due to sand shift.
Shifting sand buried vetiver 200mm deep in 4 weeks
Unfertilised plot one month after planting

Fertilised plot
After two months

- The plants pushed by sand lag behind in growth (re-establishment of roots)
- Unfertilised grass growing slow, not multiplying
After four months

- Three dry months are over, rain in June
- All rows up to 1.5 m high
- Very good root system
- Clumps have 30-40 tillers
Excellent growth after 4 months, Clumps have 30-40 tillers
Hedges not entirely closed
Farmers put Casuarina branches, as a fence in-between rows: to increase effect of watering, and terracing’
After seven months

- Dense hedgerows, all gaps closed
- Other plants grow between the hedges (grass retains moisture)
- Roots beyond 1m deep
After 7 months, even vegetation in-between looks green
- Roots
>1 m deep
- New shoots
Nursery

- After 2 months: NPK + manure, 10-20 tillers/clump
- After 4 months: 1.5-1.7 m high
- Many tillers matured, lots of nodded culms
One month after planting
Excellent growth after 4 months
Large scale planting

- 1000m planted at 3 sites
- One month later: all grass well established
One month after planting
Open Day
After 11 months: participants’ inspection
Vertical hedges: necessary in flowing stream
Water conservation: Volunteer trees re-established and grew faster behind vetiver hedges
Water conservation: Casuarina trees grew faster, with straight trunk behind vetiver hedges, as compared with twisted trunk due to slower growth.
Thriving even when half of the roots washed away, indicating very deep root and subsurface moisture.
Surviving 10 months without rain
Farmer Adoption: Stream bank stabilisation and tree planting
Cattle grazed heavily, young and old shoots.

Fodder during the dry season.
CONCLUSION

- Vetiver can be established and is effective in stabilising drifting sand dunes in coastal central Vietnam.
- Application of farm manure or chemical fertiliser is recommended.
- Watering is needed when planting during the dry season.
- Bare root slips do just as well as potted plants (and are cheaper).
- Water conservation
- Fodder
COASTAL DUNE STALISATION WITH MARIAM GRASS
SOUTH AFRICA
BEACH SITE BEFORE WORK COMMENCED
Twelve months after planting
Thank You