Coastal Dune Stabilisation

A Vietnamamese Experience

by
Tran Tan Van
Elise Pinners and Paul Truong

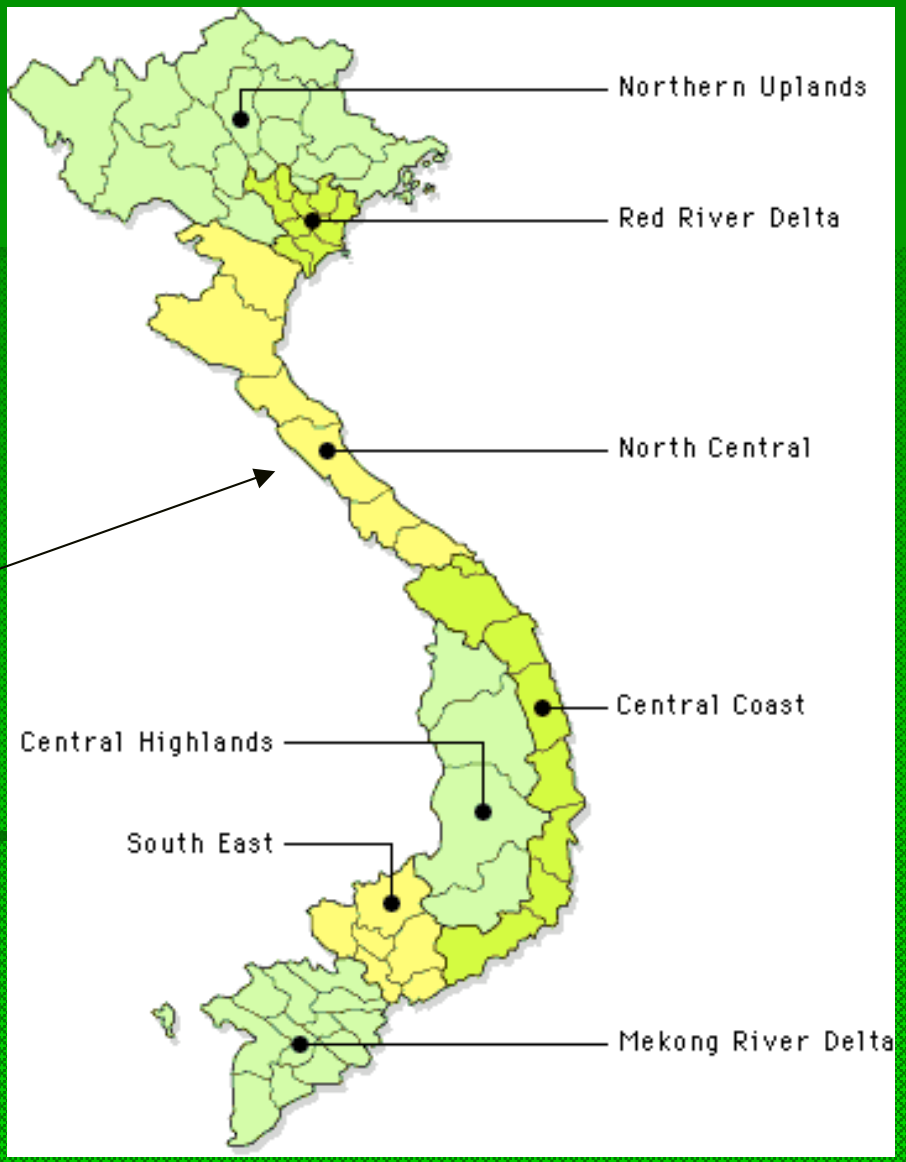
Coastal Problems in Central Vietnam

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



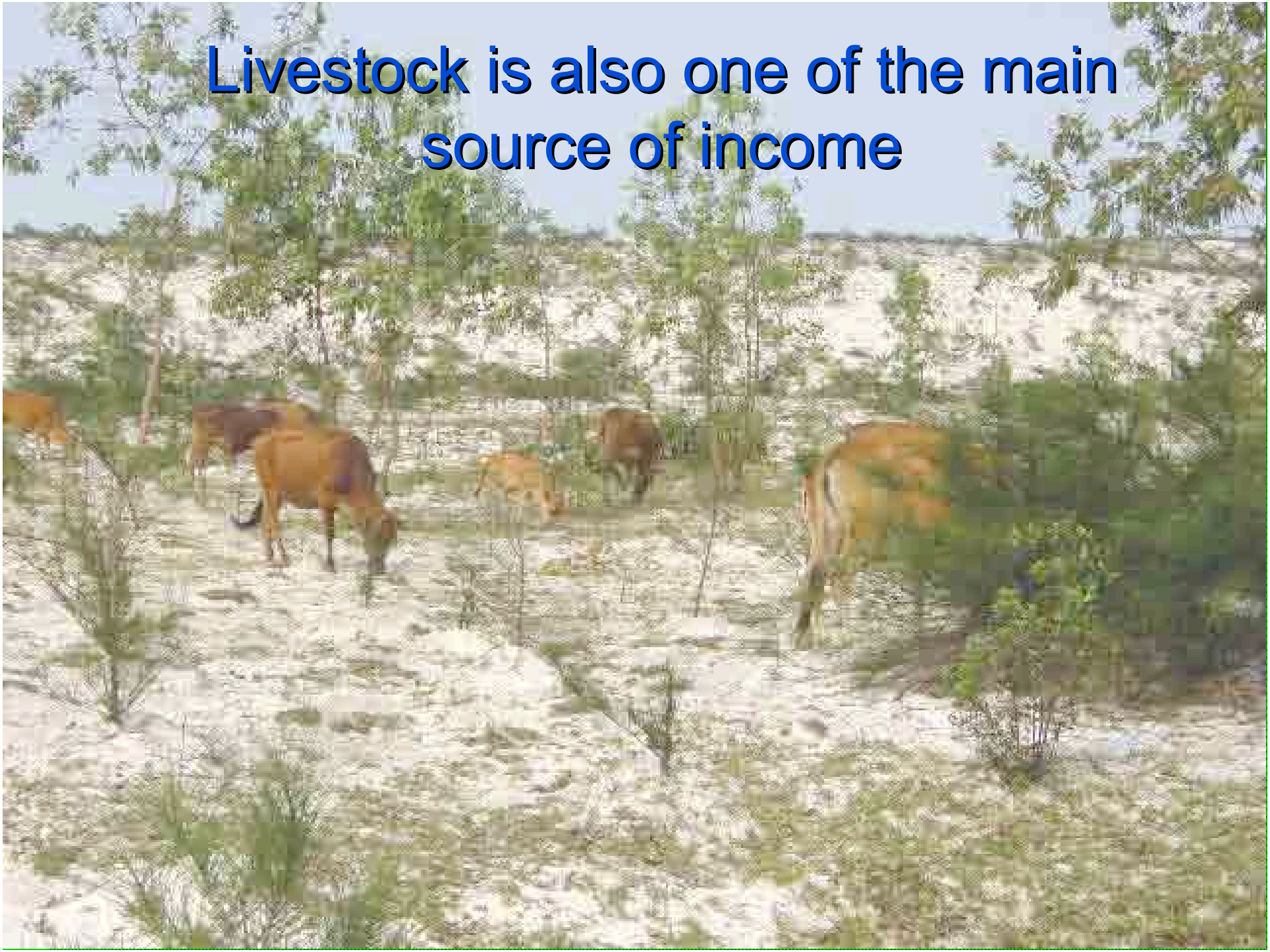
Typical coastal dunes in Central Vietnam,
Casuarina plantation to reduce wind erosion

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 dyke
Steep slope

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).

Planting

After one month

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 >1m 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

Twisted trunk

Upright and straight trunk


Thriving even when half of the roots washed away,
indicating very deep root and subsurface moisture


Very steep slope

Surviving 10 months without rain

Farmer Adoption: Stream bank stabilisation and tree planting

Fodder during the dry season

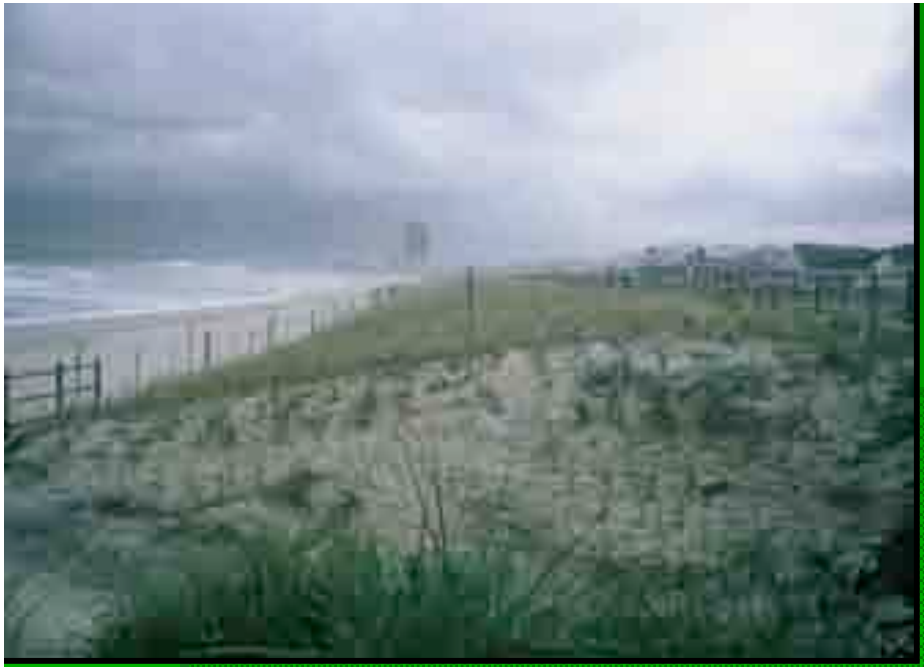
Cattle grazed heavily, young and old shoots

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