Vegetative Approach in Controlling Wind and Water Erosion in Sand Dune Areas

Philippines

Using vegetative approach to stabilize sand dune areas along the coast.

Aim/objectives: The approach uses forest species like Casuarina equisetifolia and lately Acacia auricoliformis to stabilize the sand dunes which is constantly being eroded by wind and water. Grasses are also allowed to be stabilized by fencing. Fruit trees are becoming more important component of the approach. Mango and cashew can be raised successfully by employing special soil treatment and provision of adequate water supply during the long dry season which lasts for about seven (7) months. The approach is implemented by various sectors. Afforestation is taken care by the Department of Environment and Natural Resources (DENR) and the Local Government Unit (LGU). The establishment of fruit tree plantation was pioneered by the Mariano Marcos State University (MMSU). The university established Techno-Demo Farms using mango and cashew as test crops. These species are well adopted to dry condition. Cashew is well known to strive under conditions of severe water stress and low nutrient supply. The establishment of orchard was successful using a technique called 'resoiling'. A hole of about 1 x 1 x 1 meter is dug in the sand and natural soil and organic fertilizer is put into it. This will provide better anchorage for the crop and will also supply the needed nutrients and moisture during the early stage. Because the demonstration trial was a success, farmers in the locality adopted the approach. It is capital intensive, however, which is a limitation for farmers short of financial resources. Gliricidia planting is also an important conmponent. It thrives well in droughty and fertile-poor soil. Gliricidia is used as fuelwood.

left: Map of the Philippines showing Ilocos Norte province (Source: BSWM-SCMD).
right: Unstable sand dunes is stabilized using Casuarina equisetifolia, a drought resistant, needle leaf specie.
Location: Ilocos Norte,
Approach area: 2.00 km^2
Type of Approach: traditional/indigenous
Focus: mainly on conservation with other activities
WOCAT database reference: A_PHI005en
Related technology(ies):
Compiled by: Not registered
Date: Before 1992
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Problem, objectives and constraints

Problems

Unstable and constant erosion by wind and water of the sand dunes; low water holding capacity and very droughty condition; very low soil fertility and productivity

Aims/Objectives

1) Stabilizatin of highly erodible sand dunes. 2) Make the sand dune areas productive for forest and various fruit tree species.

Constraints addressed		
	Constraint	**Treatment**
technical	high erodibility, low soil fertility, droughty, high infiltration and percolation rates	resoiling, frequent fertilization, irrigation and planting of drought resistant crops
financial	capital and labour intensive	financial assistance and government to undertake afforestation and subsequent maintenance

Participation and decision making

Stakeholders / target groups


planners


land users, individual


SLM specialists / agricultural advisors

Approach costs met by:

government (national)	50%
local community / land user(s) (-)	50%
Total	**100%**

Annual budget for SLM component: US$ 2,000-10,000

Decisions on choice of the Technology(ies) mainly by land users supported by SLM specialists

Decisions on method of implementing the Technology(ies): Government

Approach designed by: national specialists,

Implementing bodies: other (State university for the pioneering of fruit tree production), local community / land users (Local population for the growing of fuelwood), government (For afforestation activities)

Land user involvement		
Phase	**Involvement**	**Activities**
Initiation/motivation	Interactive	Mainly:Personal Contact; partly: public meetings; For commercial tree crop production; initiation is more on a personal contact with individual farmers
Planning	Interactive	Mainly: personal contact; partly: public meetings; Private land-users made land use plans through personal contact with technologists.
Implementation	Interactive	casual labour; Casual labor was employed during planting
Monitoring/evaluation	Interactive	Mainly: measurements/observations; partly: reporting; Periodic observation was done regarding plant/crop performance
Research	Interactive	on-farm; Demonstration trials were established on-farm

Differences between participation of men and women: No
Private farm operation is a family affair where all members of the family participate in decision making.

Involvement of disadvantaged groups: No
NA

Technical support

Training / awareness raising:

Training provided for land user, school children/students, extensionists/trainers (2)
Training focused on Mainly in the form of personal communication with specialist

Advisory service:

Name: Farming System Approach
Key elements:
1. Management/improvement of sand dune area
2. Adaptability testing

1) Mainly: State University Partly: partly: government's existing extension system 2) Mainly: State University Partly: partly: government's existing extension system; Extension staff: mainly government employees 3) Target groups for extension: land users; Activities: Management/improvement of sand dune areas
The extension system is quite adequate to ensure continuation of activities. The State University in the locality and the Local Government Units (LGU's) have extension services

Research:
Yes, great research. Topics covered include technology
Mostly on-farm research.
Research on the productivity improvement of sand dunes was focused on crop adaptability, nutrition and water management.

External material support / subsidies

Contribution per area (state/private sector): .

Labour: Voluntary, paid in cash. Voluntariliy for private farms; paid in cash for afforestation activities.

Inputs:
- Equipment (machinery, tools, etc): hand tools. Not financed
- Agricultural (seeds, fertilizers, etc): seeds, fertiliser, seedlings, biocides. 1 & 2 not financed, 3 & fully financed

Credit: Credit was not available

Support to local institutions: Yes, moderate support with technology generation, training

Monitoring and evaluation

Monitored aspects	Methods and indicators
bio-physical	Ad hoc observations
economic / production	Ad hoc observations
no. of land users involved	Ad hoc observations

Changes as result of monitoring and evaluation:
There were no changes in the approach.

Impacts of the Approach

Improved sustainable land management: Yes, great; Removing the sand in the planting hole and replacing it with fertilie soil

Adoption by other land users / projects: Yes, some; Areas affected by the eruption of Mt. Pinatubo volcano in 1991 adapted the same principle of resoiling to grow high value tree crops.

Training, advisory service and research:

- Training effectiveness

  Agricultural advisor / trainers: good
  Politicians / decision makers: good
  School children / students: good
  Land users*: good
  SLM specialists: good
  Planners: good
  Teachers: good

  Land users adapted the approach, students used the area/approach as a laboratory for research on SWC and SWC specialists learned a lot about the approach/technology which could be introduced to other areas with similar condition

- Advisory service effectiveness

  School children / students: good
  Politicians / decision makers: good
  Teachers: good
  Land users*: good

  Among the land users, technology adoption was encouraging due to extension done mainly by the state university. Decision makers become aware about the potentials of the sand dunes. Students made the area as laboratory for field research.

- Research contributing to the approach`s effectiveness: Greatly
  The techno-demo/research trials were the key in convincing land users to productively utilize the sand dunes

Land/water use rights:
Help - greatly in the implementation of the approach. Security of tenure is important in the practice of SWC

Long-term impact of subsidies:
Negative long-term impact: None

Concluding statements

Main motivation of land users to implement SLM:

Sustainability of activities:

Yes the land users can sustain the approach activities without support.

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
1) It stabilizes unstable areas like sand dunes → Better information education campaign (IEC)	1. High plant mortality due to moisture stress → Improved water harvesting technique; putting up of irrigation system (e.g. drip irrigation)
2) It makes highly constrained area productive → More vigorous involvement of National Government Agencies (NGAs) and LGUs	2. Laborious especially during the 'resoiling' stage → Composting on-site. Look for source if 'fill materials' near the site.
3) It encourages resourcefulness → Subsidize inputs	1. Laborious → Sourcing of fill materials nearby to lessen hauling cost
4) It encourages further research → More funds for research	2. Long gestation period for the crops → Good cultural management (fertilization, irrigation)
It makes idle land productive → Better market for products	3. Lack of capital