Barreiras vivas of Leucaena Leucocephala along the slope (Jackes Tavares)

Barreiras Vivas de Leucaena (Cape Verde)

Banqueta de linhaço

DESCRIPTION

Vegetative measure based on the planting of the bush, Leucaena leucocephala, on line along the level curves in the steep slopes

The technique consists of planting rows of Leucaena leucocephala in the level curves along the slopes. This legume has high rate of reproduction and the permanence of their seeds in the soil can reach 10 years before germination. It is very resistant to fire and to pruning. Can reach 4m in height and if not controlled, can invade a field of culture. The plant has great potential for feeding of livestock (protein (21-26% DM), fiber (15-25% of crude cellulose MS) vary depending on the age of the plant)

Purpose of the Technology: The planting in curves level is to achieve the stabilization and restoration of degraded soil. The technique reduces the runoff, retain sediment, solid, incorporates greater quantity of organic matter in the soil, promotes infiltration and covering the soil with vegetation.

Establishment / maintenance activities and inputs: Its installation requires a medium level of technical knowledge to marking the curves level where it will install. Planting is done in a simple way of transplanting a plant nursery to the ground. It is easy to spread a culture, its management after the fruit must be rigorous, ensuring that the fields become invasive. The early harvest fruit is an option to take into consideration when implementing this technique. The bar between the plant is 1m and the distance between the bands is associated with 5m.Sometimes it is ssociated with olds small punch to rehabilitating that structure.

Natural / human environment: The top of the slopes where they practice pluvial agriculture is more susceptible to soil erosion because of its steep slopes and the inappropriate cultivation techniques carried out there, is the area of higher prevalence of this technique. The production of Leucaena is used both for animal feed as a source for energy (firewood).

LOCATION

Location: Ribeira Seca, Santiago / Cabo Verde, Cape Verde

No. of Technology sites analysed:

Geo-reference of selected sites
- -23.58833, 15.07361

Spread of the Technology: evenly spread over an area (4.8 km²)

In a permanently protected area?:

Date of implementation: 10-50 years ago

Type of introduction
- [ ] through land users' innovation
- [ ] as part of a traditional system (> 50 years)
- [ ] during experiments/ research
- [x] through projects/ external interventions

CLASSIFICATION OF THE TECHNOLOGY

Main purpose
- [x] improve production
- [x] reduce, prevent, restore land degradation
- [ ] conserve ecosystem
- [ ] protect a watershed/ downstream areas – in combination with other Technologies
- [ ] preserve/ improve biodiversity
- [x] reduce risk of disasters

Land use

Forest/ woodlands Tree types: Leucaena leucocephala
Products and services: Fruits and nuts, Grazing/ browsing, Protection against natural hazards

Water supply
- [ ] rainfed

- [ ] adapt to climate change/ extremes and its impacts
- [ ] mitigate climate change and its impacts
- [x] create beneficial economic impact
- [ ] create beneficial social impact

- [ ] mixed rainfed-irrigated
- [ ] full irrigation

Purpose related to land degradation

- [x] prevent land degradation
- [x] reduce land degradation
- [ ] restore/ rehabilitate severely degraded land
- [ ] adapt to land degradation
- [ ] not applicable

Degradation addressed

soil erosion by water - Wt: loss of topsoil/ surface erosion, Wg: gully erosion/ gullying

biological degradation - Bc: reduction of vegetation cover, Bq: quantity/ biomass decline

SLM group

- improved ground/ vegetation cover
- cross-slope measure

SLM measures

vegetative measures - V2: Grasses and perennial herbaceous plants

TECHNICAL DRAWING

Technical specifications

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated:
- Currency used for cost calculation: **ECV**
- Exchange rate (to USD): 1 USD = 80.0 ECV
- Average wage cost of hired labour per day: 3.12

Most important factors affecting the costs

The cost of seedlings is the more diterminate cost, but the seedlings is produced by the project in arboretum, before de planting when it,s transplanted to the soil. The cust of the production in arboretum is more less than the seedlings cust.

Establishment activities

1. Market of the level curves(5 to 5m) (Timing/ frequency: June)
2. Planting (Timing/ frequency: end July)

Establishment inputs and costs

Specify input	Unit	Quantity	Costs per Unit (ECV)	Total costs per input (ECV)	% of costs borne by land users
Labour					
Labour	ha	1.0	171.85	171.85	
Equipment					
Tools	ha	1.0	62.5	62.5	100.0
Plant material					
Seedlings	ha	1.0	3750.0	3750.0	
Total costs for establishment of the Technology				**3'984.35**	
Total costs for establishment of the Technology in USD				*49.8*	

Maintenance activities

1. Harvest of the leucaena fruits before theirs ripening (Timing/ frequency: 1 time, in November)
2. Pruning (Timing/ frequency: 1 time in April to May)

Maintenance inputs and costs

Specify input	Unit	Quantity	Costs per Unit (ECV)	Total costs per input (ECV)	% of costs borne by land users
Labour					
Labour	ha	1.0	6.24	6.24	100.0
Equipment					
Tools	ha	1.0	5.0	5.0	100.0
Total costs for maintenance of the Technology				**11.24**	
Total costs for maintenance of the Technology in USD				*0.14*	

NATURAL ENVIRONMENT

Average annual rainfall

- [ ] < 250 mm
- [ ] 251-500 mm
- [x] 501-750 mm
- [x] 751-1,000 mm
- [ ] 1,001-1,500 mm
- [ ] 1,501-2,000 mm
- [ ] 2,001-3,000 mm
- [ ] 3,001-4,000 mm

Agro-climatic zone

- [x] humid
- [x] sub-humid
- [x] semi-arid
- [x] arid

Specifications on climate

Average annual rainfall in mm: 800.0
Thermal climate class: tropics. average temperature around 26 ° C. The exposure and altitude are factors diterminantes for agroclimatic estratização. the higher areas and targeted to the SE are more humid.

- [ ] > 4,000 mm

Slope
- [ ] flat (0-2%)
- [ ] gentle (3-5%)
- [ ] moderate (6-10%)
- [ ] rolling (11-15%)
- [x] hilly (16-30%)
- [x] steep (31-60%)
- [ ] very steep (>60%)

Landforms
- [ ] plateau/plains
- [x] ridges
- [x] mountain slopes
- [ ] hill slopes
- [ ] footslopes
- [ ] valley floors

Altitude
- [ ] 0-100 m a.s.l.
- [x] 101-500 m a.s.l.
- [x] 501-1,000 m a.s.l.
- [ ] 1,001-1,500 m a.s.l.
- [ ] 1,501-2,000 m a.s.l.
- [ ] 2,001-2,500 m a.s.l.
- [ ] 2,501-3,000 m a.s.l.
- [ ] 3,001-4,000 m a.s.l.
- [ ] > 4,000 m a.s.l.

Technology is applied in
- [ ] convex situations
- [ ] concave situations
- [ ] not relevant

Soil depth
- [x] very shallow (0-20 cm)
- [x] shallow (21-50 cm)
- [ ] moderately deep (51-80 cm)
- [ ] deep (81-120 cm)
- [ ] very deep (> 120 cm)

Soil texture (topsoil)
- [x] coarse/ light (sandy)
- [x] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Soil texture (> 20 cm below surface)
- [ ] coarse/ light (sandy)
- [ ] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Topsoil organic matter content
- [ ] high (>3%)
- [x] medium (1-3%)
- [x] low (<1%)

Groundwater table
- [ ] on surface
- [ ] < 5 m
- [x] 5-50 m
- [ ] > 50 m

Availability of surface water
- [ ] excess
- [ ] good
- [ ] medium
- [x] poor/ none

Water quality (untreated)
- [ ] good drinking water
- [x] poor drinking water (treatment required)
- [ ] for agricultural use only (irrigation)
- [ ] unusable

Water quality refers to:

Is salinity a problem?
- [ ] Ja
- [ ] Nee

Occurrence of flooding
- [ ] Ja
- [ ] Nee

Species diversity
- [ ] high
- [x] medium
- [ ] low

Habitat diversity
- [ ] high
- [ ] medium
- [ ] low

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [x] subsistence (self-supply)
- [x] mixed (subsistence/ commercial)
- [ ] commercial/ market

Off-farm income
- [ ] less than 10% of all income
- [ ] 10-50% of all income
- [x] > 50% of all income

Relative level of wealth
- [ ] very poor
- [x] poor
- [x] average
- [ ] rich
- [ ] very rich

Level of mechanization
- [x] manual work
- [ ] animal traction
- [x] mechanized/ motorized

Sedentary or nomadic
- [ ] Sedentary
- [ ] Semi-nomadic
- [ ] Nomadic

Individuals or groups
- [x] individual/ household
- [ ] groups/ community
- [ ] cooperative
- [ ] employee (company, government)

Gender
- [x] women
- [x] men

Age
- [ ] children
- [ ] youth
- [ ] middle-aged
- [ ] elderly

Area used per household
- [ ] < 0.5 ha
- [ ] 0.5-1 ha
- [x] 1-2 ha
- [x] 2-5 ha
- [ ] 5-15 ha
- [ ] 15-50 ha
- [ ] 50-100 ha
- [ ] 100-500 ha
- [ ] 500-1,000 ha
- [ ] 1,000-10,000 ha
- [ ] > 10,000 ha

Scale
- [ ] small-scale
- [x] medium-scale
- [ ] large-scale

Land ownership
- [x] state
- [ ] company
- [ ] communal/ village
- [ ] group
- [ ] individual, not titled
- [x] individual, titled

Land use rights
- [ ] open access (unorganized)
- [ ] communal (organized)
- [ ] leased
- [x] individual

Water use rights
- [ ] open access (unorganized)
- [x] communal (organized)
- [ ] leased
- [x] individual

Access to services and infrastructure

	poor			good
health		✓		
education		✓		
technical assistance	✓			
employment (e.g. off-farm)	✓			
markets	✓			
energy		✓		
roads and transport	✓			
drinking water and sanitation		✓		
financial services	✓			

IMPACTS

Socio-economic impacts

Crop production	decreased	increased	
fodder production	decreased	increased	
fodder quality	decreased	increased	
animal production	decreased	increased	
production area (new land under cultivation/ use)	decreased	increased	It's needed a little area to be implanted the tecnique
expenses on agricultural inputs	increased	decreased	The manegement of the Leucaena have a litle cost
farm income	decreased	increased	

Socio-cultural impacts

food security/ self-sufficiency	reduced	improved	
health situation	worsened	improved	The grass of leucaena become dengerous to the cattle health if it´s used excessive
SLM/ land degradation knowledge	reduced	improved	
Improved livelihoods and human well-being	decreased	increased	Before the establishment of the tecnologie occour education programs to sencibilizate the comuty to agreed to the tecnoogie and it make them more cleared.

Ecological impacts

water quantity	decreased	increased	
evaporation	increased	decreased	
soil cover	reduced	improved	
soil loss	increased	decreased	
soil compaction	increased	reduced	
soil organic matter/ below ground C	decreased	increased	
wind velocity	increased	decreased	
Competition	increased	decreased	Reduces the availability of water and nutrients to crops

Off-site impacts

reliable and stable stream flows in dry season (incl. low flows)	reduced	increased	
wind transported sediments	increased	reduced	

COST-BENEFIT ANALYSIS

Benefits compared with establishment costs

Short-term returns	very negative	very positive	
Long-term returns	very negative	very positive	

Benefits compared with maintenance costs

Short-term returns	very negative	very positive	
Long-term returns	very negative	very positive	

The maintenance costs occur in the some time with the benefits of the tecnique are feeling by the land user

CLIMATE CHANGE

Gradual climate change

annual temperature increase	not well at all	very well	

Climate-related extremes (disasters)

local windstorm	not well at all	very well	
drought	not well at all	very well	Answer: not known
general (river) flood	not well at all	very well	

ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology

- single cases/ experimental
- 1-10%
- 11-50%
- > 50%

Number of households and/ or area covered

375 households and 100% of the area covered

Of all those who have adopted the Technology, how many have done so without receiving material incentives?

- 0-10%
- 11-50%
- 51-90%
- 91-100%

Has the Technology been modified recently to adapt to changing conditions?

- [ ] Ja
- [ ] Nee

To which changing conditions?

- [ ] climatic change/ extremes
- [ ] changing markets
- [ ] labour availability (e.g. due to migration)

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- Stabilizes the soil, and increases the organic matter
- Provides forage green almost all year for cattle. Once dead, produces firewood

Strengths: compiler's or other key resource person's view

- Retencion of sidement
- Soil stabilization and improvement of its structure

Weaknesses/ disadvantages/ risks: land user's viewhow to overcome

- Reduction in of the cultivation area , when the Leucaena invade the field. Be always alert to the operations of Leucaenas punch.

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's viewhow to overcome

- Requires a strict maintenance, so that they are spread and infest the entire agricultural field Technical assistance to farmers, warning them, through community radio stations, the arrival of the harvest season of the pods of Leucaena and the other cultural operations due
- Its control is extremely difficult and costly in terms of resistance to the kind of garden and fire
- It can generate conflict between users of adjacent land , because its propagacion is easy

REFERENCES

Compiler
Jacques Tavares

Editors

Reviewer
Fabian Ottiger
Alexandra Gavilano

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Resource persons
Jacques Tavares - SLM specialist
Larissa Varela - SLM specialist
Jailson Bentub - SLM specialist
Regla Amarós - SLM specialist

Full description in the WOCAT database
https://qcat.wocat.net/af/wocat/technologies/view/technologies_1574/

Linked SLM data
n.a.

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