



Improving grazing land in Ethiopia

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Sustainable Development Goals	Responsible consumption and production and Life on the land

Summary

This practice describes how to address the over grazing of lands to improve its productivity of grazing land and control land degradation through the introduction of productive techniques and improved fodder species, which consequently improve livestock production.

Description

Improving grazing land means the rehabilitation of communal grazing lands, through planting of improved grass and fodder trees and land subdivision, to improve fodder and consequently livestock production.

This practice focuses on the highly populated, humid highland regions of Ethiopia that experience serious shortages of pasture. Due to rapid population growth, communal grazing areas are increasingly being converted into cropland. This has led to enormous pressure on the little remaining grazing land, through overstocking of dairy cows and oxen, and thus overgrazing, resulting in considerably decreased productivity.

Improved grazing land management is vital to increase food security and alleviate poverty, as well as to bring environmental rewards. To address these problems, the national Soil and Water Conservation (SWC) programme in Ethiopia initiated a grazing

land management project in the year 2000. Implementation of the technology includes the initial delineating of the grazing land, and then fencing to exclude open access.

This is followed by land preparation, application of compost (and, if necessary, inorganic fertilizers) to improve soil fertility, then planting of improved local and exotic fodder species, including multipurpose shrubs/trees such as *Leucaena* sp. and *Sesbania* sp. and the local desho grass (*Pennisetum* sp.).

Desho has a high nutritive value and regular cuts are ensured. It is planted by splits, which have high survival rates and establish better than grasses which are seeded. Other grass seeds, as well as legumes, including alfalfa (lucerne: *Medicago sativa*) and clovers in some cases, are mixed with fodder tree seeds and then broadcast. Maintenance activities such as weeding, manuring and replanting ensure proper establishment and persistence.

Fodder is cut and carried to stall-fed livestock. Once a year, grass is cut for hay, which is stored to feed animals during the dry season. Experience shows that such grazing land is best managed when individually owned and used. In the study area, the community has distributed small plots



Crop Production

(<0.5 ha) of communal grazing land to individual users to develop, manage and use.

The overall purpose of the intervention is to improve the productivity of grazing land and control land degradation through the introduction of productive techniques and improved fodder species, which consequently improve livestock production.

Commercialisation of animals and marketing of their products increases the income of farmers. The government provides technical assistance, close follow-up, and some inputs for initial establishment. Land users are trained in compost/manure application, planting of seeds, splits and seedlings, and general maintenance.

1. Land use problems

Population growth has resulted in a substantial reduction in land holdings (<0.5 ha per family) and this in turn has led

inevitably to encroachment onto communal grazing lands for cultivation. Livestock numbers on the other hand have remained unchanged, and this has led to overstocking of the few areas left. Livestock production, which accounts for 40 percent of the average household income, is thus reduced and farmers' income declines correspondingly.

2. Technical specifications for grazing land improvement

Splits of desho grass (*Pennisetum pedecillatum*) are planted in lines, using a hand hoe, after good seedbed preparation. Spacing between grass splits is 10 cm x 10 cm. The white line is a boundary between two households' plots (width of plot: 15 to 20 m). Trees are planted at irregular spacing (around 5 m apart), layout is not specified. (Daniel Danano)

Figure 1. Land use problems

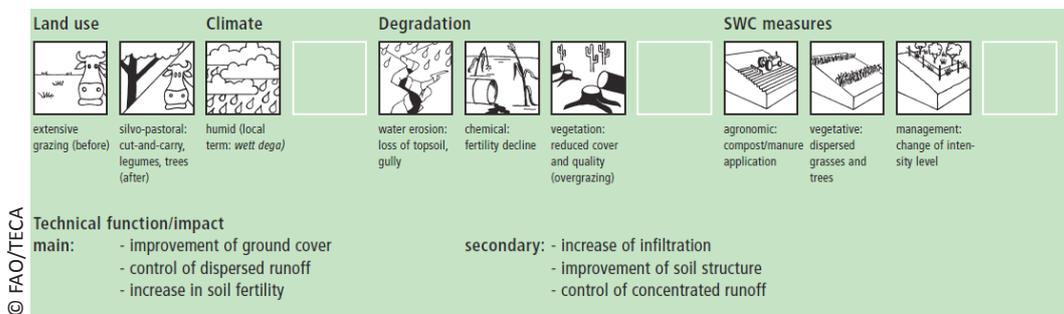


Figure 2. Environment: Natural environment

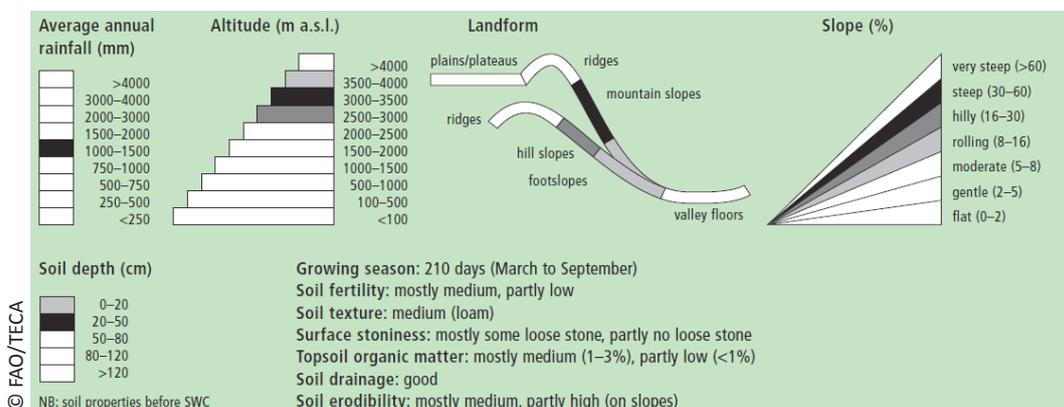




Figure 3. Human environment

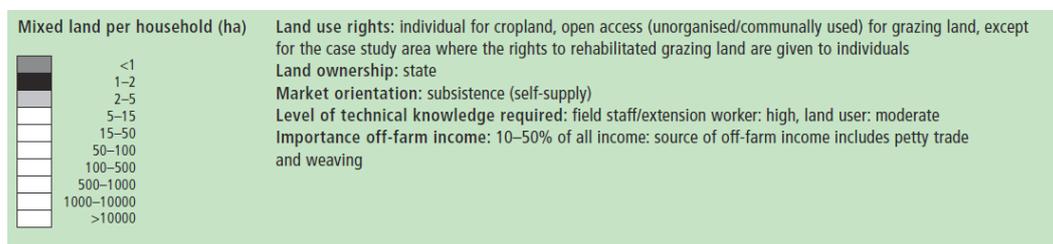


Figure 4. Implementation activities, inputs and costs: Establishment activities

Establishment activities	Establishment inputs and costs per ha		
	Inputs	Costs (US\$)	% met by land user
1. Delineation of the area to be conserved and establishment of a fence (mostly of deadwood, available before the onset of rains).	Labour (450 person days)	320	100%
2. Subdivision of communal land into individual plots of 0.3-0.5 ha.	Equipment		
3. Planting material preparation in nurseries: grass splits (<i>desho</i> : <i>Pennisetum pedunculatum</i>) and tree seedlings (multipurpose trees, eg <i>Leucaena sp.</i> and <i>Sesbania sp.</i>).	- Tools (hand hoe)	5	50%
4. Good seedbed preparation with a hand hoe, sometimes with oxen plough depending on plot size (at the onset of the rains).	- Animal traction (1 pair of oxen, 4 days)	17	100%
5. Compost/manure preparation. Material used includes animal manure, leaf litter, wood ash, soil and water.	Materials		
6. Planting of grass splits and tree/shrub species in lines; sowing of grass seed by broadcasting (early in the rainy season).	- Fencing with dead wood	55	100%
7. Compost application (one month after planting).	Agricultural		
8. Weeding.	- Grass splits (240,000 tillers)	450	0%
Duration of establishment: 1 year	- Tree seedlings (1,000)	5	0%
	- Fertilizers if applied (100 kg)*	60	100%
	- Compost/manure (4,500 kg)	140	100%
	TOTAL	1035	56%

*Farmers usually cannot afford fertilizers

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Figure 5. Implementation activities, inputs and costs: Maintenance/recurrent activities

Maintenance/recurrent activities	Maintenance/recurrent inputs and costs per ha per year		
	Inputs	Costs (US\$)	% met by land user
1. Cut-and-carry, to stall-fed animals, begins when fodder is ready (after 2-3 months growth). A sickle is used for cutting. In good seasons two to four cuts are possible (in April, June, August and October).	Labour (50 person days)	35	100%
2. A final cut for hay is taken early in the dry season (end of October) when the grass has matured well.	Equipment		
3. Weeding each year.	- Tools (hand hoe, sickle)	4	100%
4. Compost/manure application, mixed with soil, during seedbed preparation (only where plants have died and need replacement and fertilisation).	Materials		
5. Enrichment planting and gap filling after a year, repeated each year.	- Fencing with dead wood	5	100%
	Agricultural		
	- Seeds (25 kg of <i>desho</i>)	30	100%
	- Tree seedlings (250)	2	100%
	- Fertilizers (25 kg)	15	100%
	- Compost/manure (1,000 kg)	35	100%
	TOTAL	126	100%

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3. Remarks

Seedlings are given by the government for initial establishment. For further extension of area and replanting, the land users set up their own nurseries.

After 2 to 3 years maintenance costs decrease substantially as the grass cover closes up and maintenance activities such as replanting/enrichment planting and compost application are reduced or cease.

The local daily wage is about USD 0.70 a day, but varies depending on the intensity of the work. In this calculation the standard rate has been applied.

4. Validation of the practice

In Ethiopia, the 50 households who accepted the technology in the initial phase, did so with incentives. They were provided with planting materials (seeds, seedlings, grass splits) and hand tools.



Figure 6. Benefits/costs according to land user

Benefits/costs according to land user	Benefits compared with costs	short-term:	long-term:
		establishment	slightly positive*
	maintenance/recurrent	positive	very positive

*Milk production compensates for some of the high investment costs (previously, production was low).

Figure 7. Impacts of the technology

Production and socio-economic benefits + + + increase in livestock production + + + increase in fodder production + + increase in fodder quality + + increase in income (selling animals and their products) + wood production increase	Production and socio-economic disadvantages - - - initial dependence on incentives such as free seeds, seedlings, tools - - decrease in size of grazing plots due to land fragmentation - - labour constraints
Socio-cultural benefits + + + community institution strengthening + + + national institution strengthening (increased willingness of the national institution to assist and support organised farmers groups, ie community institutions) + + + improved knowledge SWC/erosion	Socio-cultural disadvantages none
Ecological benefits + + + soil cover improvement + + + increase in soil fertility + + + soil loss reduction + + increase in soil moisture + + biodiversity enhancement	Ecological disadvantages none
Other benefits + + + improvement in household diets (milk), improve health + + increase in the availability of livestock products on the market lowers prices to the consumer	Other disadvantages none
Off-site benefits + + + reduced transported sediments + + increase in stream flow in dry season + + reduced downstream siltation + + reduced downstream flooding	Off-site disadvantages - - grazing pressure has increased on remaining open access grazing land

Figure 8. Concluding statement

Strengths and → how to sustain/improve Availability of fodder (grass, hay, shrubs) in sufficient quantities, and all year round → Increase the area under such development. Reduction in soil loss and land degradation → Maintain adequate cover by planting more grass. Introduction of high yielding species as well as increase in land productivity and livestock production → Introduce bigger variability of quality species and improve maintenance activities such as weeding and cultivation. Improved diet: livestock by-products such as milk, butter and cheese are essential food items required by the households → Keep on increasing/improving quantity/quality of livestock feed. Increased income through commercialisation and marketing of animals and their by-products. Meets financial needs for paying taxes, school fees, clothes etc. Increased national income due to export of animals and their products.	Weaknesses and → how to overcome At the initial stage of establishment it is very labour intensive → Use of improved land preparation methods such as oxen ploughing. Substantial cash for inputs, particularly seedlings, is required → Produce seedlings of improved species and making compost in backyards. Needs high fertilizer application → Focus more on organic fertilizers. High pressure on remaining grazing areas → Keep animals in stall (stable) or park, at least part of the day and during the night, and introduce cut-and-carry more widely.
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The rate of spontaneous adoption is very high. At present over 500 households have taken up the technology and the total area covered is about 20 km².

5. Agro-ecological zones

Tropics, warm

6. Objectives fulfilled by this technology

- Labour-saving technology

- Resource use efficiency
- Pro-poor technology