



## Improved grazing land management Ethiopia - Gitosh masheshal

### Rehabilitation of communal grazing lands, through planting of improved grass and fodder trees and land subdivision, to improve fodder and consequently livestock production.

This case study 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 SWC programme in Ethiopia initiated a grazing land management project over a decade ago. 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 (<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.


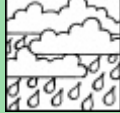

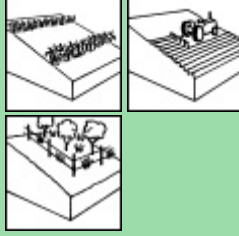
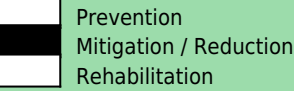
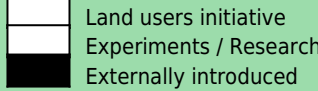
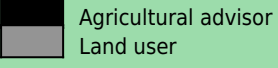
**left:** Desho grass (*Pennisetum pedicellatum*) and multipurpose trees established to increase productivity of grazing lands. (Photo: Daniel Danano)  
**right:** Cut and carry of grass for stall-feeding from improved pasture. (Photo: Daniel Danano)

**Location:** Chencha  
**Technology area:** 20 km<sup>2</sup>  
**Conservation measure:** agronomic, vegetative, management  
**Stage of intervention:** mitigation / reduction of land degradation  
**Origin:** Developed externally / introduced through project,  
**Land use type:**  
**Mixed:** Silvo-pastoralism  
**Land use:**  
**Grazing land:** Extensive grazing land (before) (after)  
**Climate:** humid  
**WOCAT database reference:** T\_ETH026en  
**Related approach:** Local level participatory planning approach (LLPPA) (ETH25)  
**Compiled by:** Daniel Danano, Food and Agriculture Organization of the United Nations - FAO  
**Date:** 2003-07-01

## Classification

### Land use problems:

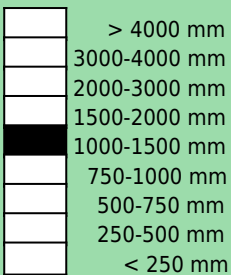
- Population growth has resulted in a substantial reduction in land holdings (<0.5 ha per family) and this in turn has led inevitably to encroachment onto communal grazing lands for cultivation. Livestock numbers on the other hand have remained unchanged, and this has led to overstocking of the few areas left. Livestock production, which accounts for 40% of the average household income, is thus reduced and farmers' income declines correspondingly. (expert's point of view)

Land use	Climate	Degradation	Conservation measure
 Silvo-pastoralism Grazing land: Extensive grazing land (before) mixed rainfed - irrigated extensive grazing land, mixed grazing land rainfed	 humid	 Soil erosion by water: loss of topsoil / surface erosion, gully erosion / gullying, Chemical soil deterioration: fertility decline and reduced organic matter content, Biological degradation: reduction of vegetation cover, quality and species composition /diversity decline	 Agronomic: Organic matter / soil fertility Vegetative: Tree and shrub cover Management: Change of management / intensity level
<b>Stage of intervention</b> 	<b>Origin</b> 	<b>Level of technical knowledge</b> 	
<b>Main causes of land degradation:</b> <b>Main technical functions:</b> <ul style="list-style-type: none"> <li>- improvement of ground cover</li> <li>- control of dispersed runoff</li> <li>- increase in soil fertility</li> </ul>			
<b>Secondary technical functions:</b> <ul style="list-style-type: none"> <li>- increase of infiltration</li> <li>- improvement of soil structure</li> <li>- control of concentrated runoff</li> </ul>			

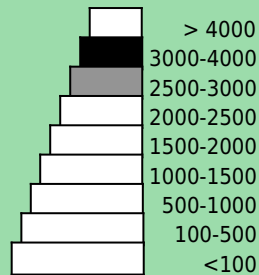
## Environment

### Natural Environment

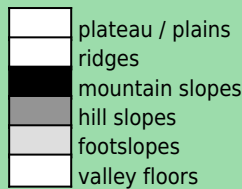
#### Average annual rainfall (mm)



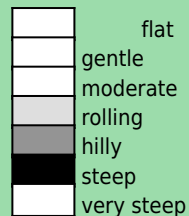
#### Altitude (m a.s.l.)



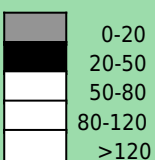
#### Landform



#### Slope (%)



#### Soil depth (cm)



**Growing season(s):** 210 days(March - September)

**Soil texture:** medium (loam)

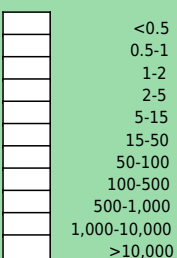
**Soil fertility:** medium

**Topsoil organic matter:** medium (1-3%)

**Soil drainage/infiltration:** good

### Human Environment

#### Mixed per household (ha)



**Land user:** Individual / household, Small scale land users

**Land ownership:** state

**Land use rights:** open access (unorganised)

**Importance of off-farm income:** 10-50% of all income: source of off-farm income includes petty trade and weaving

**Access to service and infrastructure:**

**Market orientation:**



### Technical drawing

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

## Implementation activities, inputs and costs

### Establishment activities

- Delineation of the area to be conserved and establishment of a fence
- Subdivision of communal land into individual plots of 0.3-0.5 ha.
- Planting material preparation in nurseries: grass splits (desho)
- Good seedbed preparation
- Planting of grass splits and tree/shrub species in lines; sowing of grass
- Weeding.

### Establishment inputs and costs per ha

Inputs	Costs (US\$)	% met by land user
Labour	320.00	100%
Equipment		
- animal traction	17.00	100%
- tools	5.00	50%
Construction material		
- fencing with deadwood	55.00	100%
Agricultural		
- seedlings	5.00	0%
- fertilizer	60.00	100%
- compost/manure	140.00	100%
- grass splits (tillers)	450.00	0%
<b>TOTAL</b>	<b>1052.00</b>	<b>56.51%</b>

### Maintenance/recurrent activities

- Compost/manure preparation. Material used includes animal manure,
- Compost application
- Cut-and-carry, to stall-fed animals, begins when fodder is ready.
- A final cut for hay is taken early in the dry season when the grass has matured well.
- Weeding
- Compost/manure application, mixed with soil, during seedbed preparation (only where plants have died and need replacement and fertilisation).
- Enrichment planting and gap filling

### Maintenance/recurrent inputs and costs per ha per year

Inputs	Costs (US\$)	% met by land user
Labour	35.00	100%
Equipment		
- tools	4.00	100%
Construction material		
- fencing with deadwood	5.00	100%
Agricultural		
- seeds	30.00	100%
- seedlings	2.00	100%
- fertilizer	15.00	100%
- compost/manure	35.00	100%
<b>TOTAL</b>	<b>126.00</b>	<b>100.00%</b>

### 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 2-3 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 US\$ 0.70 a day, but varies depending on the intensity of the work. In this calculation the standard rate has been applied. Farmers usually cannot afford fertilizers. Milk production compensates for some of the high investment costs (previously, production was low).

## Assessment

### Impacts of the Technology

#### Production and socio-economic benefits

- +++ increased fodder production
- +++ increase in livestock production
- ++ increased fodder quality
- ++ increased farm income
- + increased wood production

#### Production and socio-economic disadvantages

- +++ initial dependence on incentives
- ++ increased labour constraints
- ++ decrease in size of grazing plots due to land fragmentation

#### Socio-cultural benefits

- +++ community institution strengthening
- +++ national institution strengthening
- +++ improved conservation / erosion knowledge

#### Socio-cultural disadvantages

#### Ecological benefits

- +++ improved soil cover
- +++ reduced soil loss
- +++ increase in soil fertility
- ++ increased soil moisture
- ++ biodiversity enhancement

#### Ecological disadvantages

#### Off-site benefits

- +++ reduced transported sediments
- ++ reduced downstream flooding
- ++ increased stream flow in dry season
- ++ reduced downstream siltation

#### Off-site disadvantages

- ++ grazing pressure on remaining open access grazing land

### Contribution to human well-being / livelihoods

### Benefits /costs according to land user

#### Benefits compared with costs

##### Establishment

##### Maintenance / recurrent

#### short-term:

slightly positive

positive

#### long-term:

very positive

very positive

### Acceptance / adoption:

There is strong trend towards (growing) spontaneous adoption of the technology. 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 km<sup>2</sup>.

### Concluding statements

#### 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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