Outside the live fence a clear indication of overgrazing as indication of neglecting SaLM. (Baraba Godfrey Baraba (C/D DED Bukoba, P.O.BOX 491 Bukoba, Tanzania.))

Range enclosures (Tanzania, United Republic of)

Hifadhi ya malisho

DESCRIPTION

Is the restriction, reseedling of desmodium decoloratum, stylothensis hamata and Stilozobium spps in the demarcated overgrazed land.

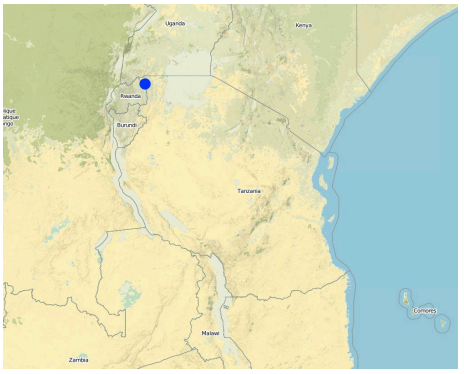
The grazing land enclosure combined with quality pastures' reseeding is the identification and demarcation of the degraded grazing land, reseeding palatable grass species and legumes with application of rotational grazing system. The technology is applied on the grazing land in the tropics, sub humid, gentle undulating upland, seasonal swamps to ensure SaLM with increased quantity and quality of pasture production. The land cultivation is done manually using hand hoes, in the mixed production system. The land ownership is communal and the land use right is organized (grazing land is demarcated) for all livestock keepers to graze their livestock. The establishment procedures includes planting of Euphobia spps along the borders, reseeding palatable grasses spps on the bare spots, plough and drill legume seeds intergraded with grasses. The maintenance procedures require range patrol, paddocks (fences and roads) maintenance. The average cost to establish one hector of the technology is US$ 122.11 while the maintenance of one hector is US$ 41.72 the technology was introduced by Kagera TAMP in 2012 using FFS methodology. Hay making is considered to be supportive technology that can add effectiveness to the main technology.

Purpose of the Technology: The major purpose is to restore soil vegetative cover, increase biomass, increase soil nutrient cycling, reduce soil moisture stress and diversify pasture species, for recommended carrying capacity attainments.

Establishment / maintenance activities and inputs: The establishment activities include; first identification and demarcation of degraded grazing land done in June. Second is broadcasting improved pasture seeds (Chloris gayana and Congo signal) done in late August. Third is establishment of live fence (planting Euphobia spps, sisal seedling and mikwatango) done in September. Fourth is cultivation of bare land spots and drill legume seeds (Stylosthensis hamata, centocema pubences etc) or plant improved legume cuttings (Desmodium coloratum). The maintenance activities includes; first weeding invasive species (sida accuta, Duratura stromonium etc) done manually using hand hoes and machete in June and January. Second is fire break cleaning done manually using hand hoes in May and December. Last but not least to importance is range patrol done routinely.

Natural / human environment: The human environments includes wealthy stutus as 13% poor land user, 50% average land users and 37% rich land users owning the land ownership is communal. The land cultivation is done manually using hand hoes. The production system is mixed in the sense that, live cull cows and steers are for sale while small ruminants and milk are for both domestic consumption and sales of excess.

LOCATION



Location: Kyerwa, Tanzania, Tanzania, United Republic of

No. of Technology sites analysed:

Geo-reference of selected sites
- 30.75093, -1.38103

Spread of the Technology: evenly spread over an area (approx. < 0.1 km2 (10 ha))

In a permanently protected area?:

Date of implementation: less than 10 years ago (recently)

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

Malisho Siina FFS sign post after realization of the technology implimentation to provide heath pastures as well as covered soil surface. (baraba Godfrey (C/O DED Bukoba, P.O.BOX 491 Bukoba, Tanzania.))

CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- [ ] improve production
- [x] reduce, prevent, restore land degradation
- [ ] conserve ecosystem
- [ ] protect a watershed/ downstream areas – in combination with other Technologies
- [x] preserve/ improve biodiversity
- [ ] reduce risk of disasters
- [ ] adapt to climate change/ extremes and its impacts
- [ ] mitigate climate change and its impacts
- [ ] create beneficial economic impact
- [ ] create beneficial social impact

Land use

Land use mixed within the same land unit: Ja - Agro-pastoralism (incl. integrated crop-livestock)

CroplandNumber of growing seasons per year: 2

Grazing land

Water supply

- [x] rainfed
- [ ] 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

physical soil deterioration - Pc: compaction

biological degradation - Bc: reduction of vegetation cover, Bq: quantity/ biomass decline, Bf: detrimental effects of fires, Bs: quality and species composition/ diversity decline

SLM group

- area closure (stop use, support restoration)

SLM measures

management measures - M2: Change of management/ intensity level, M5: Control/ change of species composition

TECHNICAL DRAWING

Technical specifications

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated:
- Currency used for cost calculation: **Tshs**
- Exchange rate (to USD): 1 USD = 1700.0 Tshs
- Average wage cost of hired labour per day: 1.88

Most important factors affecting the costs

n.a.

Establishment activities

1. To identify the degraded grazing land. (Timing/ frequency: None)
2. To plant Euphobia triculi (Timing/ frequency: None)
3. To plat sisal (Timing/ frequency: None)
4. To plat elephant grass (Timing/ frequency: None)
5. To reseed legumes (Timing/ frequency: None)
6. To clear fire break along the demarcated borders. (Timing/ frequency: None)

Establishment inputs and costs

Specify input	Unit	Quantity	Costs per Unit (Tshs)	Total costs per input (Tshs)	% of costs borne by land users
Labour					
Labour	ha	1.0	13.8	13.8	
Plant material					
Seeds	ha	1.0	119.02	119.02	
Seedlings	ha	1.0	3.09	3.09	
Total costs for establishment of the Technology				**135.91**	
Total costs for establishment of the Technology in USD				*0.08*	

Maintenance activities

1. To remove invasive spps (shrubs/weeds) (Timing/ frequency: None)
2. To clean the fire break (Timing/ frequency: June and December)

Maintenance inputs and costs

Specify input	Unit	Quantity	Costs per Unit (Tshs)	Total costs per input (Tshs)	% of costs borne by land users
Labour					
Labour	ha	1.0	41.73	41.73	100.0
Total costs for maintenance of the Technology				**41.73**	
Total costs for maintenance of the Technology in USD				*0.02*	

NATURAL ENVIRONMENT

Average annual rainfall

- [ ] < 250 mm
- [ ] 251-500 mm
- [ ] 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
- [ ] > 4,000 mm

Agro-climatic zone

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

Specifications on climate

800mm bimodol (march to May and November to January)
Thermal climate class: tropics. All months has a temperature above 18°C. LGP is 180 to 210 days

Slope

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

Landforms

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

Altitude

- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [ ] 501-1,000 m a.s.l.
- [x] 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

- [ ] 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)

- [ ] 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%)
- [ ] medium (1-3%)
- [x] low (<1%)

Groundwater table

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

Availability of surface water

- [ ] excess
- [x] good
- [ ] medium
- [ ] poor/ none

Water quality (untreated)

- [x] good drinking water
- [ ] 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

Habitat diversity

- [ ] high
- [ ] medium
- [x] low

- [ ] high
- [ ] medium
- [ ] low

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

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

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

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

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

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

Individuals or groups
- [ ] individual/ household
- [x] 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
- [ ] 1-2 ha
- [ ] 2-5 ha
- [x] 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
- [ ] state
- [ ] company
- [x] communal/ village
- [ ] group
- [ ] individual, not titled
- [ ] individual, titled

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

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

Access to services and infrastructure

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

IMPACTS

Socio-economic impacts

fodder production

decreased ... ✓ ... increased

Quantity before SLM: 1
Quantity after SLM: 1.5
DM yield improved after reducing trampling and bushfires.

fodder quality

decreased ... ✓ ... increased

Quantity before SLM: 3
Quantity after SLM: 17
Legumes intercroping had fixed nitogen in the soil.

animal production

decreased ... ✓ ... increased

Quantity before SLM: 50
Quantity after SLM: 170
liveweight gain per anum improved due to optimum DM - intake and DCP availability. .

risk of production failure

increased ... ✓ ... decreased

expenses on agricultural inputs

increased ... ✓ ... decreased

cost of desmodium, stylothensis hamata and Nappier grass

workload

increased ... ✓ ... decreased

labour demanded for extra activities.

Socio-cultural impacts

food security/ self-sufficiency

reduced ... ✓ ... improved

community institutions

weakened ... ✓ ... strengthened

Quantity before SLM: 0
Quantity after SLM: 3
group members can organize themselves to conserve the rest of the overgrazed area

SLM/ land degradation knowledge

reduced ... ✓ ... improved

Quantity before SLM: low
Quantity after SLM: moderate
a training site shown positve results after six months of implimentation.

situation of socially and economically disadvantaged groups (gender, age, status, ehtnicity etc.)	worsened ✓ improved	FFF group members includes all genders.
Improved livelihoods and human well-being	decreased ✓ increased	The effective duration of technology implimentation is too short to meet technology upscaling to suit the farming scale (medium scale ie. 100-300 cattle) herd size.

Ecological impacts

surface runoff	increased ✓ decreased	grasses impends water run -off
soil moisture	decreased ✓ increased	grasses covered soil surfaces
soil cover	reduced ✓ improved	Quantity before SLM: 50 Quantity after SLM: 90 no bare spot found in the field.
soil loss	increased ✓ decreased	
soil compaction	increased ✓ reduced	cattle restrivted to tramp the soils.
nutrient cycling/ recharge	decreased ✓ increased	planted desmodium and stylothensis hamata
biomass/ above ground C	decreased ✓ increased	
plant diversity	decreased ✓ increased	mixture of grasses and legumes.
pest/ disease control	decreased ✓ increased	snakes and rodents are hinding in tall grasses.
fire risk	increased ✓ decreased	firebreak constructed along the borders.

Off-site impacts

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 short term retuns compared with establishment is negative due to distocking requirement to suit the recommended carrying capacity. The long term return anticipated to be positive due to increased livestock density projecting increased off-take rates. The short term return compared with maintenance is slightly negative as a result of increased costs of restriction. The long run return compared with maintenance is positve due to reduced costs of restriction while rotational grazing can simply suit the technology.

CLIMATE CHANGE

Climate-related extremes (disasters)

drought: not well at all ✓ very well

Other climate-related consequences

reduced growing period: 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%

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

- It is simple to learn and understand.
- In a short period of six months, the change was very distinct ie. grass covered the bare spot on soils, while in the dry spell the standing hay harvested to feed calves.

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

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

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

- Difficult to transfer the knowledge into communal grazing land (overstocked >100LU/sqkm) without grazing land act enforcement. Enforce grazing land and animal feed resources act.
- The restriction of cattle to graze in the enclosure means twice as much land required for a significant short term returns. Educate land users on carrying capacity importance.

REFERENCES

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Full description in the WOCAT database
https://qcat.wocat.net/af/wocat/technologies/view/technologies_1612/

Linked SLM data
n.a.

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Project
- n.a.