Dairy cow grazing on natural pastures. (Betty Adoch)

Reclamation of indigenous pastures for dairy farming (Uganda)

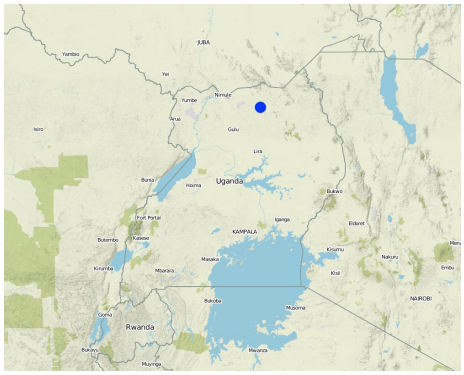
Lum pi dyang cak

DESCRIPTION

Dairy cattle (Friesian) are grazed on indigenous pastures to promotes conservation of the indigenous grass species (guinea grass), which protects the soil against soil erosion and promotes biodiversity.

Indigenous pasture-based dairy farming is a balance between managing the pasture and the cows to maximize sustainable profit and promotes conservation of the indigenous grass species which protects the soil against soil erosion and promotes biodiversity. Northern Uganda has tropical savannah climate which receives moderate amount of rainfall ranging from 750-1000mm per annum. This is sometimes characterised by prolonged dry spells which hamper other economic activities like crop production. Therefore, to avoid the climatic shocks, this technology was introduced by the land user to diversify his economic activity other than only relying on crop production. The land user is a typical subsistence farmer whose major source of income depends on dairy farming to support his livelihood.
In this SLM technology, indigenous pastures are conserved for dairy farming. This is due to the existence of savannah grassland vegetation which provide abundant pastures for cattle grazing. This has favoured the rearing of Friesian cow on a flat landscape. A 30x40meters land was highly preserved for this technology. Five (5) cows are kept on this grazing field occupied by natural pasture (elephant grass) that the land user conserve. These grass are nutritious and the cows healthily and freely graze on them during wet and dry season. However, their movement is controlled by the headsman to avoid crop damage.
In order to maintain these grasses, during dry season, the land user creates a fire line around the conserved grazing area. This is to prevent the spread of wild fire from the nearby bush since it is a serious occurrence in the community. The conserved grass dries up during dry season but the dairy cows graze on it and can still produce high volume of milk as during the wet season. A cow produces daily 15 to 20 litters, they are milked twice a day and the milk is taken to town for sale. Soda ash are given to the cows to raise their appetite for pastures and water. Cows are source of milk, which is sold to generate revenue to the farmer for school fees, medications and cow dung is applied in orchard gardens and tree plantations to boost soil fertility.
To establish this technology, One Friesian cow were donated to the land user by a government project and a grazing field was secured which used to be for crop growing. Water tank placed on the grazing field. The grasses were conserved for the cow and shrub trees also protected for shade. With the help of artificial insemination, more calves were produce and today the land user have five cows that freely graze the area although their movement is controlled by the headsman.
This technology conserve grasses which cover the soil from the effects of soil erosion, reduce incidence of wild fire in the area, the shrubs trees are also protected to provide shade to the cows in the grazing field which promotes farmer managed natural regeneration and the grazing cows spread dung around the field which boost soil fertility.
During dry spells pasture growth is retarded and also becomes less nutritious that makes the cows to become skinny and water shortages. Besides, these cows are prone to pests and disease attacks that requires constant monitoring and treatment.

LOCATION



Location: Kitgum Municipality, Northern Uganda., Uganda

No. of Technology sites analysed: single site

Geo-reference of selected sites
- 32.95404, 3.29509

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

In a permanently protected area?:

Date of implementation: 2012; 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

Dairy cows grazing on indigenous pastures while headsman controlled their movement. (Betty Adoch.)

CLASSIFICATION OF THE TECHNOLOGY

Main purpose

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

Land use

Grazing land

- Ranching
- Improved pastures

Animal type: cattle - dairy, exotic breed (Friesian cattle) for milk productio

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, Wg: gully erosion/ gullying

soil erosion by wind - Et: loss of topsoil, Ed: deflation and deposition

biological degradation - Bc: reduction of vegetation cover, Bh: loss of habitats, Bf: detrimental effects of fires

SLM group

- agroforestry
- pastoralism and grazing land management
- improved plant varieties/ animal breeds

SLM measures

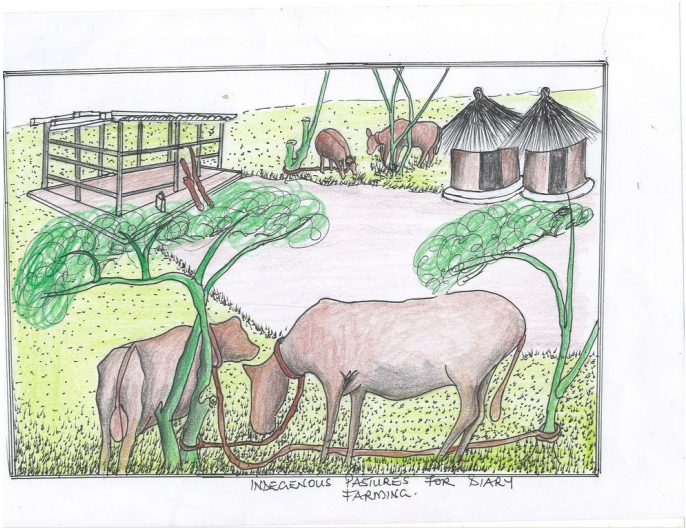
vegetative measures - V1: Tree and shrub cover, V2: Grasses and perennial herbaceous plants

management measures - M1: Change of land use type

TECHNICAL DRAWING

Technical specifications

2 acres of land measuring 30x40 meters secured for grazing the cows. A kraal is constructed on the grazing field to accommodate the cows in the night. Pegging is done to prevent the cows from moving to cropland and after some time like afternoon the cows are shifted to another spot to graze. But also at time the cows are left to graze in the field with controlled movement. A kraal/shade is constructed, roofed with 5 pieces of iron sheet and supported by timbers that stands at a height of about 4meters.



Author: Betty Adoch.

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated: per Technology area (size and area unit: **2acres**)
- Currency used for cost calculation: **UGX**
- Exchange rate (to USD): 1 USD = 3718.0 UGX
- Average wage cost of hired labour per day: 3000shs

Most important factors affecting the costs

The labour for firebreaks during dry seasons and maintaining the farm.

Establishment activities

1. clearing thony trees (Timing/ frequency: dry season)
2. regeneration of pastures (Timing/ frequency: dry season)
3. constructing cattle shade (Timing/ frequency: dry and wet)

Maintenance activities

1. Slashing the over grown grass (Timing/ frequency: dry and wet)
2. constant removal of thony trees (Timing/ frequency: dry and wet)
3. Refilling the water tank (Timing/ frequency: wet and dry season)
4. Rotational pegging (Timing/ frequency: Dry and wet seasons)
5. Taking/returing of cows to kraal every evening (Timing/ frequency: dry and wet seasons)
6. Replacing ropes to tie the cows during pegging (Timing/ frequency: dry and wet seasons)

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

Average annual rainfall in mm: 900.0
heavy rain in april, may, june, august, september and october. these reduces in july, november,december january , febuary and march.
Name of the meteorological station: kitgum weather station
savanna climate where rainfall is moderate and unreliable with hot temperatures throughtout the year.

Slope

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

Landforms

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

Altitude

- [ ] 0-100 m a.s.l.
- [ ] 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
- [x] not relevant

Soil depth

- [ ] very shallow (0-20 cm)
- [ ] shallow (21-50 cm)
- [x] 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)
- [x] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Topsoil organic matter content

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

Groundwater table

- [ ] on surface
- [ ] < 5 m

Availability of surface water

- [ ] excess
- [x] good

Water quality (untreated)

- [x] good drinking water

Is salinity a problem?

- [ ] Ja
- [x] Nee

- [x] 5-50 m
- [ ] > 50 m

- [ ] medium
- [ ] poor/ none

- [ ] poor drinking water (treatment required)
- [ ] for agricultural use only (irrigation)
- [ ] unusable

Water quality refers to:

Occurrence of flooding
- [ ] Ja
- [x] Nee

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

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

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [ ] subsistence (self-supply)
- [x] 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
- [x] average
- [ ] rich
- [ ] very rich

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

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

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

Gender
- [ ] women
- [x] men

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

Area used per household
- [ ] < 0.5 ha
- [x] 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
- [x] small-scale
- [ ] medium-scale
- [ ] large-scale

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

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

Water use rights
- [ ] open access (unorganized)
- [x] 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: low
Quantity after SLM: high
Conserved pastures for cows.

water availability for livestock

decreased — increased

Quantity before SLM: low
Quantity after SLM: high
Water is stored in a tank for the animals.

farm income

decreased — increased

Quantity before SLM: low
Quantity after SLM: high
Through sales of milk.

economic disparities

increased — decreased

Quantity before SLM: highl
Quantity after SLM: low
Has his source of income.

Socio-cultural impacts

food security/ self-sufficiency

reduced — improved

Quantity before SLM: low
Quantity after SLM: high
Milk provide food to the land user.

SLM/ land degradation knowledge

reduced — improved

Quantity before SLM: low
Quantity after SLM: high

conflict mitigation	worsened ✓ improved	Aware of the importance of soil conservation. Quantity before SLM: low Quantity after SLM: high The grazing zone is secure from land disputes.

Ecological impacts

soil moisture	decreased ✓ increased	Quantity before SLM: low Quantity after SLM: high Grass cover soil from the effects of evaporations retaining more soil moistures.
soil cover	reduced ✓ improved	Quantity before SLM: low Quantity after SLM: high Grass protects the soil.
soil loss	increased ✓ decreased	Quantity before SLM: high Quantity after SLM: low Prevents soil erosion.
vegetation cover	decreased ✓ increased	Quantity before SLM: low Quantity after SLM: high Plants and trees exists.
plant diversity	decreased ✓ increased	Quantity before SLM: low Quantity after SLM: high Conservation of trees and grass for the animals.
emission of carbon and greenhouse gases	increased ✓ decreased	Quantity before SLM: high Quantity after SLM: low Plants acts as carbon sink.

Off-site impacts

water availability (groundwater, springs)	decreased ✓ increased	Quantity before SLM: low Quantity after SLM: high Water source has been secured to constantly supply water for the animals during wet and dry seasons and also for other domestic activities.
buffering/ filtering capacity (by soil, vegetation, wetlands)	reduced ✓ improved	Quantity before SLM: low Quantity after SLM: high Plants roots filters the underground water.

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

Dairy cows produces a calf once a year after artificial insemination.

CLIMATE CHANGE

Gradual climate change

annual temperature increase	not well at all ✓	very well	
seasonal temperature increase	not well at all ✓	very well	Season: dry season
annual rainfall decrease	not well at all ✓	very well	
seasonal rainfall decrease	not well at all ✓	very well	Season: wet/ rainy season

Climate-related extremes (disasters)

local rainstorm	not well at all ✓	very well
local thunderstorm	not well at all ✓	very well
local hailstorm	not well at all ✓	very well
heatwave	not well at all ✓	very well
drought	not well at all ✓	very well
land fire	not well at all ✓	very well
epidemic diseases	not well at all ✓	very well
insect/ worm infestation	not well at all ✓	very well

ADOPTION AND ADAPTATION

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

☐ single cases/ experimental

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

☑ 0-10%

- [x] 1-10%
- [ ] 11-50%
- [ ] > 50%

- [ ] 11-50%
- [ ] 51-90%
- [ ] 91-100%

Number of households and/ or area covered
05 household

Has the Technology been modified recently to adapt to changing conditions?
- [x] Ja
- [ ] Nee

To which changing conditions?
- [x] climatic change/ extremes
- [ ] changing markets
- [ ] labour availability (e.g. due to migration)

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view
- Soils are protected from the effects of erosion.
- Cow dungs are used as manure on orchard gardens.

Strengths: compiler's or other key resource person's view
- Conservation of soil and improved soil fertility.
- Vegetation modifies the micro climate through the conserved pastures.
- Land protections from degradation by erosion.

Weaknesses/ disadvantages/ risks: land user's viewhow to overcome
- Pests and diseases that affects the cows. Spraying and treatments.
- Inadequate pastures during dry seasons. Supplement with maize brands,banana leaves, and hey.

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's viewhow to overcome
- Water shortage during dry season. Planning to build a better and larger tank.
- Failure of artificial insemination. Need to acquire a Friesian bull.

REFERENCES

Compiler
betty adoch

Editors
JOY TUKAHIRWA

Reviewer
John Stephen Tenywa
Nicole Harari
Renate Fleiner
Stephanie Jaquet
Rima Mekdaschi Studer
Alexandra Gavilano

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Resource persons
Olum Geoffrey - land user

Full description in the WOCAT database
https://qcat.wocat.net/af/wocat/technologies/view/technologies_2321/
Video: https://player.vimeo.com/video/254823649

Linked SLM data
n.a.

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