Reclamation of indigenous pastures for dairy farming (Uganda)
Lum pi dyang cak

**DESCRIPTION**

Dairy cattle (Friesian) are grazed on indigenous pastures to promote 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 a 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 rather 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

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**
- ✓ improve production
- ✓ reduce, prevent, restore land degradation
- ✓ conserve ecosystem
- ✓ protect a watershed/ downstream areas – in combination with other Technologies
- ✓ preserve/ improve biodiversity
- ✓ adapt to climate change/ extremes and its impacts
- ✓ mitigate climate change and its impacts
- ✓ 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 production

**Water supply**
- ✓ rainfed
- ✓ mixed rainfed-irrigated
- ✓ full irrigation

**Purpose related to land degradation**
- ✓ prevent land degradation
- ✓ 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.
## ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

**Calculation of inputs and costs**
- Costs are calculated: per Technology area (size and area unit: 2 acres)
- 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 thorny 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 thorny 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
- Less than 250 mm
- 251-500 mm
- 501-750 mm
- 751-1,000 mm
- 1,001-1,500 mm
- 1,501-2,000 mm
- 2,001-3,000 mm
- 3,001-4,000 mm
- More than 4,000 mm

### Agro-climatic zone
- humid
- sub-humid
- semi-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, February and March.
- Name of the meteorological station: Kitgum weather station
- savanna climate where rainfall is moderate and unreliable with hot temperatures throughout the year.

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

### Landforms
- plateau/plains
- ridges
- mountain slopes
- hill slopes
- footslopes
- valley floors

### Altitude
- 0-100 m a.s.l.
- 101-500 m a.s.l.
- 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.
- More than 4,000 m a.s.l.

### Technology is applied in
- convex situations
- concave situations
- not relevant

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

### Soil texture (topsoil)
- coarse/ light (sandy)
- 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%)
- low (<1%)

### Groundwater table
- Availability of surface water
- Water quality (untreated)
- Is salinity a problem?

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### Species diversity

- high
- medium
- low

### Habitat diversity

- high
- medium
- low

### CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

<table>
<thead>
<tr>
<th>Market orientation</th>
<th>Off-farm income</th>
<th>Relative level of wealth</th>
<th>Level of mechanization</th>
</tr>
</thead>
<tbody>
<tr>
<td>subsistence (self-supply)</td>
<td>less than 10% of all income</td>
<td>very poor</td>
<td>manual work</td>
</tr>
<tr>
<td>mixed (subsistence/ commercial)</td>
<td>10-50% of all income</td>
<td>poor</td>
<td>animal traction</td>
</tr>
<tr>
<td>commercial</td>
<td>&gt; 50% of all income</td>
<td>average</td>
<td>mechanized/ motorized</td>
</tr>
</tbody>
</table>

### Sedentary or nomadic

- Sedentary
- Semi-nomadic
- Nomadic

### Individuals or groups

- individual/ household
- groups/ community
- cooperative
- employee (company, government)

### Gender

- women
- men

### Age

- children
- youth
- middle-aged
- elderly

### Area used per household

- < 0.5 ha
- 0.5-1 ha
- 1-2 ha
- 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
- medium-scale
- large-scale

### Land ownership

- state
- company
- communal/ village
- group
- individual, not titled
- individual, titled

### Land use rights

- open access (unorganized)
- communal (organized)
- leased
- individual

### Access to services and infrastructure

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

- poor
- good

### IMPACTS

<table>
<thead>
<tr>
<th>Socio-economic impacts</th>
<th>Quantity before SLM: low</th>
<th>Quantity after SLM: high</th>
</tr>
</thead>
<tbody>
<tr>
<td>fodder production</td>
<td>decreased</td>
<td>increased</td>
</tr>
<tr>
<td>water availability for livestock</td>
<td>decreased</td>
<td>increased</td>
</tr>
<tr>
<td>farm income</td>
<td>decreased</td>
<td>increased</td>
</tr>
<tr>
<td>economic disparities</td>
<td>increased</td>
<td>decreased</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socio-cultural impacts</th>
<th>Quantity before SLM: low</th>
<th>Quantity after SLM: high</th>
</tr>
</thead>
<tbody>
<tr>
<td>food security/ self-sufficiency</td>
<td>reduced</td>
<td>improved</td>
</tr>
<tr>
<td>SLM/ land degradation knowledge</td>
<td>reduced</td>
<td>improved</td>
</tr>
<tr>
<td>conflict mitigation</td>
<td>worsened</td>
<td>improved</td>
</tr>
</tbody>
</table>

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Reclamation of indigenous pastures for dairy farming
Ecological impacts

- **soil moisture**
  - Quantity before SLM: low
  - Quantity after SLM: high
  - Grass cover soil from the effects of evaporations retaining more soil moisture.

- **soil cover**
  - Quantity before SLM: low
  - Quantity after SLM: high
  - Grass protects the soil.

- **soil loss**
  - Quantity before SLM: high
  - Quantity after SLM: low
  - Prevents soil erosion.

- **vegetation cover**
  - Quantity before SLM: low
  - Quantity after SLM: high
  - Conservation of trees and grass for the animals.

- **plant diversity**
  - Quantity before SLM: low
  - Quantity after SLM: high
  - Conservation of trees and grass for the animals.

- **emission of carbon and greenhouse gases**
  - Quantity before SLM: high
  - Quantity after SLM: low
  - Plants acts as carbon sink.

Off-site impacts

- **water availability** (groundwater, springs)
  - 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)**
  - 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**
  - **seasonal temperature increase**
  - **annual rainfall decrease**
  - **seasonal rainfall decrease**
  - **Climate-related extremes (disasters)**
    - **local rainstorm**
    - **local thunderstorm**
    - **local hailstorm**
    - **heatwave**
    - **drought**
    - **land fire**
    - **epidemic diseases**
    - **insect/ worm infestation**

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**
  - 05 household

- **Has the Technology been modified recently to adapt to changing conditions?**
  - Yes
  - No

  **To which changing conditions?**
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.
- Vegetation modifies the micro climate through the conserved pastures.
- Land protections from degradation by erosion.

Strengths: compiler’s or other key resource person’s view
- Conservation of soil and improved soil fertility.

Weaknesses/ disadvantages/ risks: land user’s view → how 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 view → how 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 aduch

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

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Resource persons
Olum Geoffrey - land user

Full description in the WOCAT database
Video: https://player.vimeo.com/video/254823649

Linked SLM data
n.a.

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