Managed pasture with thistles cut in mid of July 2018 (fenced area). (Hanns Kirchmeir)

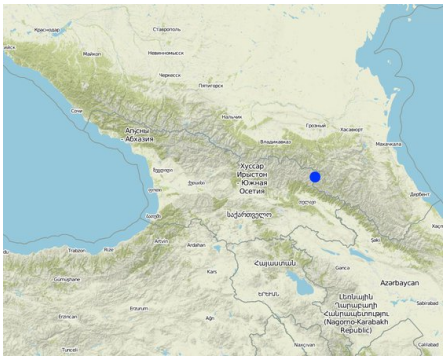
Pasture-weed control by thistle cutting (Georgia)

DESCRIPTION

Thistles invaded massively into village pasture land at 1800m elevation in the Caucasus. By cutting the thistles with a motor-cutter the cover of thistles have been reduced.

The technology was applied in flat sub-alpine pasture land at an elevation of about 1800 m in the village of Shenako in the Tusheti Protected Landscape, Georgia. Precipitation is 750-900mm and mean annual temperature is 2-4°C. Thistles (Cirsium sp.) were invading especially in those sections of the pasture that are rich in nutrients and have medium soil water content. This site conditions can be found mainly at the valley bottom.
There are no big machines available in this mountain villages. So the removal was done by motor-cutters. In this particular case STIHL petrol brush cutters were used with a 3 blade bush knife.
The removal of the thistles, which were covering up to 20% of the pasture land will increase the productivity of valuable fodder grass and herbs. The thistles are growing up to 1m height and taking up significant amount of nutrients from the soil and are shading other grass and herbs in their neighborhood. Because of their spices they are not eaten by cows or sheep, while the grazing pressure is increasing on the remaining grass and herb species. This leads to positive selection of thistles and a permanent increase of the thistles number and biomass in comparison to the high quality fodder plants.
The thistles have been cut in mid-June/beginning of July just at the begin of blossom. At this stage, the thistles mobilized most of the nutrients from their root system and spent them in leaf and blossom biomass. By cutting the thistles at this time, the highest impact on the nutrient balance can be reached and no new seeds will be produced in this year. It was observed, that the thistles have been eaten by the livestock when it was cut and dried up.
The motor brush cutter increases significantly the speed of cutting the thistles compared to hand scythe. The thistle has a powerful root system and is re-sprouting from the roots within the same summer. So it is important to repeat the cutting 2-3 times a year and to continue several years until the amount of thistles is permanently reduced.
The reduction of thistles will give more space, nutrients and moisture to other fodder plants and increase the productivity of the pasture land.
The challenge is the coordination of the work load within the users of the community pasture land. It needs a (written) agreement to share the workload for pasture maintenance between the families according to their number of livestock.

LOCATION



Location: Shenako, Kakheti, Georgia

No. of Technology sites analysed: 2-10 sites

Geo-reference of selected sites
- 45.66814, 42.37466

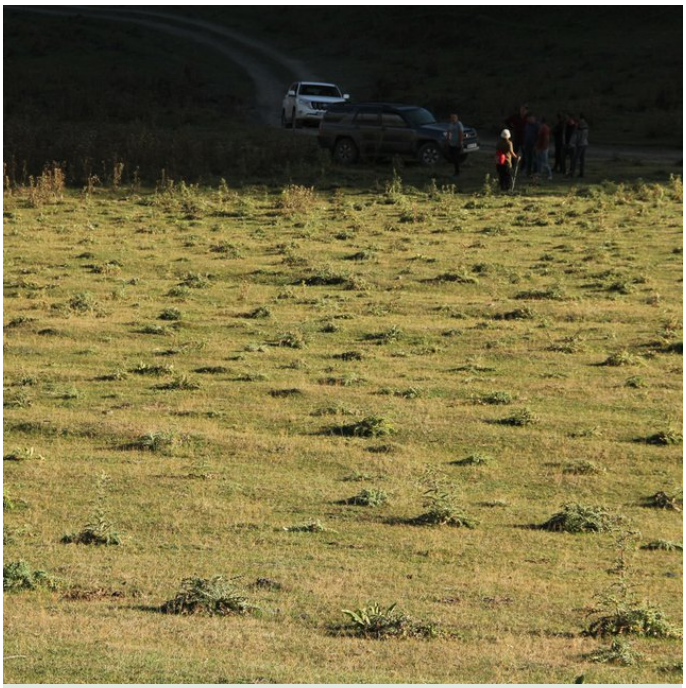
Spread of the Technology: evenly spread over an area (0.02 km²)

In a permanently protected area?: Yes

Date of implementation: 2018

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

Dense population of thistle on pasture land (Hanns Kirchmeir)



Thistles cut at begin of July (Hanns Kirchmeir)

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
- 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: No

Grazing land

- Transhumant pastoralism

Animal type: cattle - dairy, horses, sheep
Is integrated crop-livestock management practiced? No
Products and services: meat, milk

Species	Count
cattle - dairy	70
sheep	400
horses	30
cattle - non-dairy beef	35

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

biological degradation - Bs: quality and species composition/ diversity decline

SLM group

- pastoralism and grazing land management

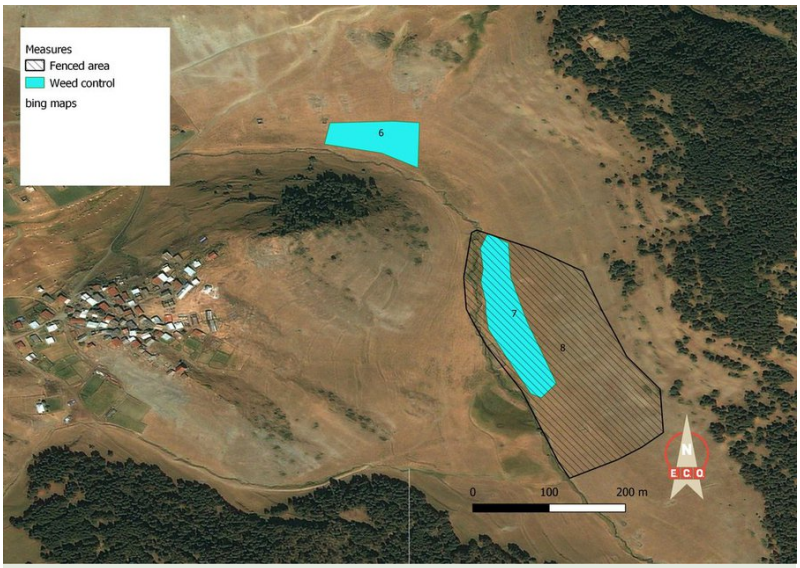
SLM measures

management measures - M5: Control/ change of species composition

TECHNICAL DRAWING

Technical specifications

The activity was applied on two plots. Plot 6 is 0.7 ha of size and located in the unfenced area. Plot 7 is 1.3 ha of size and located inside an electric fence. The hatched area (8) is indicating the fenced area.



Author: Hanns Kirchmeir

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs
- Costs are calculated: per Technology area (size and area unit: **2 ha**)
- Currency used for cost calculation: **USD**
- Exchange rate (to USD): 1 USD = n.a
- Average wage cost of hired labour per day: n.a

Most important factors affecting the costs
The investment in the brush cutter will only pay off if large parts of pastures are managed.

Establishment activities
1. Prepare machinery and organize people (Timing/ frequency: June)
2. Select pasture plots were the measure will be applied (Timing/ frequency: June)
3. Cut the thistles on the selected pasture plots (Timing/ frequency: End of June - Mid of July)

Establishment inputs and costs (per 2 ha)

Specify input	Unit	Quantity	Costs per Unit (USD)	Total costs per input (USD)	% of costs borne by land users
Labour					
Selection of sites, preparation of materials and people	person-days	3.0	37.0	111.0	
Labour for cutting thistles on 2 ha	person-days	10.0	20.0	200.0	
Equipment					
High quality brush cutter	pieces	1.0	800.0	800.0	
Patrol (20l) and diesel (30l) for brush cutter (6 days, 8h/day, 1l/h)	liter	50.0	1.0	50.0	
Total costs for establishment of the Technology				**1'161.0**	
Total costs for establishment of the Technology in USD				*1'161.0*	

Maintenance activities
1. Repeat cutting of thistles 2x per year (Timing/ frequency: June/July and September)

Maintenance inputs and costs (per 2 ha)

Specify input	Unit	Quantity	Costs per Unit (USD)	Total costs per input (USD)	% of costs borne by land users
Labour					
labour for cutting thistles (2ha)	person-days	6.0	20.0	120.0	100.0
Equipment					
Patrol for brush cutter	liter	96.0	1.0	96.0	
Total costs for maintenance of the Technology				**216.0**	
Total costs for maintenance of the Technology in USD				*216.0*	

NATURAL ENVIRONMENT

Average annual rainfall
- ☐ < 250 mm
- ☐ 251-500 mm
- ☐ 501-750 mm
- ☑ 751-1,000 mm
- ☐ 1,001-1,500 mm

Agro-climatic zone
- ☐ humid
- ☑ sub-humid
- ☐ semi-arid
- ☐ arid

Specifications on climate
Average annual rainfall in mm: 850.0
Main rainfall in spring and autumn, July and August is the dry season.
Name of the meteorological station: Data from CHELSA.ORG
Because of low annual temperature (2-4°C) the

- [ ] 1,501-2,000 mm
- [ ] 2,001-3,000 mm
- [ ] 3,001-4,000 mm
- [ ] > 4,000 mm

evapotranspiration is low and most of the year there is no water shortage. But in August and September drought can occur.

Slope
- [x] flat (0-2%)
- [x] 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
- [x] 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.
- [x] 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
- [x] concave situations
- [ ] not relevant

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

Soil texture (topsoil)
- [ ] coarse/ light (sandy)
- [x] medium (loamy, silty)
- [x] fine/ heavy (clay)

Soil texture (> 20 cm below surface)
- [ ] coarse/ light (sandy)
- [x] medium (loamy, silty)
- [x] fine/ heavy (clay)

Topsoil organic matter content
- [ ] high (>3%)
- [x] medium (1-3%)
- [ ] low (<1%)

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

Availability of surface water
- [ ] excess
- [x] good
- [ ] medium
- [ ] poor/ none

Water quality (untreated)
- [ ] good drinking water
- [x] poor drinking water (treatment required)
- [ ] for agricultural use only (irrigation)
- [ ] unusable

Water quality refers to: both ground and surface water

Is salinity a problem?
- [ ] Yes
- [x] No

Occurrence of flooding
- [ ] Yes
- [x] No

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

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

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [x] 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
- [x] average
- [ ] rich
- [ ] very rich

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

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

Individuals or groups
- [x] 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
- [ ] 5-15 ha
- [x] 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

Comments

Most important of-farm income is tourism (guesthouses, crafts).

IMPACTS

Socio-economic impacts
fodder production — decreased ✓ increased

By reduction of thistles the space for other plant species has increased.

Socio-cultural impacts

Ecological impacts

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

The productivity of the pastureland is 2-3t/ha per year. The removal of thistles can lead on the long term to an increase of fodder by 20% (400-600kg/ha per year). This is equivalent to 15-20 hay-bales a 3 USD (total 45-60 USD/ha and year). The amount of time for cutting the thistles and the needed patrol will decrease when during the next years so a positive balance between investment and return is expected.

CLIMATE CHANGE

-

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?
- Yes
- ✓ No

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
- Decreasing the cost for maintanace of cattle
- Reducing the working hours
- Improving the pastures via weed control

Strengths: compiler's or other key resource person's view
- Easy to apply, no specific skills needed
- Visible impact within a few years

Weaknesses/ disadvantages/ risks: land user's view → how to overcome
- Irresponsibility of some members of the community during the maintenance of el-fence

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's view → how to overcome
- No responsibility within the community pasture land for maintenance of pasture land. → A new regulation on how to share the workload of pasture maintenance could be negotiated between villagers.
- Machinery is expensive. → The investment will pay off when the measures are applied to the entire pasture land (100-200 ha).

REFERENCES

Compiler
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Reviewer
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Resource persons
Hanns Kirchmeir - SLM specialist
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Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/technologies/view/technologies_4273/

Linked SLM data
n.a.

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Institution

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Project

- Applying Landscape and Sustainable Land Management (L-SLM) for mitigating land degradation and contributing to poverty reduction in rural area (L-SLM Project)