Current state of fence and vegetation improvement (Hanns Kirchmeir)

Community-based Erosion Control (Azerbaijan)

DESCRIPTION

The unsustainable use of pastures and forest areas leads to erosion, degradation, desertification and loss of biodiversity in high mountain areas of the South Caucasus. In the village Ehen in the Ismayilli district in Azerbaijan, a community-based approach for erosion control was developed in a participative way. On steep slopes, overgrazing and clearing of forest lead to surface erosion, rockfall and partial flooding in the village. Together with village stakeholders, different measures were developed to stop erosive processes and to rehabilitate vegetation cover.

Pilot activities were implemented in the district Ismayilli, with a focus on the village Ehen near Lahic. The district Ismayilli covers an area of about 2.158 km². Approximately 31% of the territory is covered with forest. The landscape is divided into the lowlands and the Caucasus mountain ridge. The Caucasus ridge is characterised by limestone and slate bedrocks and has higher precipitation than the Kura floodplains. Pasture lands on slopes are particularly exposed to vegetation degradation due to overgrazing. The loss of a closed vegetation cover on mountain slopes can lead to severe soil erosion due to surface water runoff.

The approach chosen for integrated erosion control in Ehen was a community-based approach. Together with stakeholders, the most severe erosion sites were identified, and a list of priorities was developed. In cooperation with international experts, a toolset of different technologies was developed to stop erosion processes. Several preconditions for the development of the toolsets were set: The technologies should be cost-effective and affordable for the villagers, and the villagers should be able to use them without the use of external technicians. In order to achieve this, particular emphasis was placed on the application of bio-engineering measures. There are two different types of sites where measures were applied: degraded pasture lands and erosion gullies.

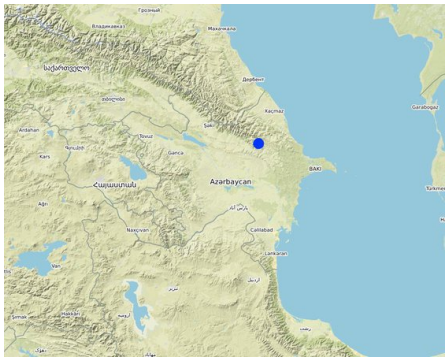
As a first step, the implementation sites were determined through joint field visits by village representatives and experts. The driving factors of deforestation and overgrazing were discussed in the field, and the potential intervention sites were marked with colour spray and wooden poles in the field. The marking in the field instead of only working with printed maps was very important for the recognition, discussion and acceptance of the sites by all villagers. There was a gap of several weeks between marking and implementation, which provided enough time for internal discussion about the site selection and the adaptation of boundaries.

Four degraded pastures and forest land sites were selected. Two sites are located above the village with the risk of increasing rockfall and flooding by surface water runoff. Two sites are located below the village and were selected to ensure the productivity of the land. The following measures were carried out at the sites of degraded pastures:

Fencing of the intervention site to stop grazing impact
Application of a simple pile-wall system to reduce surface water runoff speed
Planting of natural local forest type trees and shrubs
Planting of fruit trees on sites near the village
Setup of 10x10m test plots with the application of hay-mulch, Sainfoin seeding, application of manure in different combinations to increase rehabilitation speed of vegetation cover.

One site was selected to combine effects by establishing a hazelnut plantation to stop

LOCATION



Location: DIstrict Ismayilli, Ehen village, Azerbaijan

Geo-reference of selected sites
- 48.41683, 40.85267

Initiation date: 2015

Year of termination: 2018

Type of Approach
- ☐ traditional/ indigenous
- ☐ recent local initiative/ innovative
- ☑ project/ programme based

erosion, increase vegetation cover and provide an income generation opportunity.

Two sites with gully erosion were selected: a site above the village with the risk of flooding into the village and a site below the village along the road with a high risk of road damage if the deepening process continues. To reduce the erosive power of the water flow and to stop the deepening of the gully, wooden check-dams and gabion check-dams were constructed. For stabilisation of the riverbank, willow fences and willow fascines were installed.
(detailed instructions on measures as mentioned above is attached).

Another essential aspect is the sustainable use of well-managed meadows by different stakeholders (beekeepers, wild herb collectors, orchard owners and others) in the community. This includes the agreement (rule) of the community to share the protected pastures and to consider the needs of all interest groups. A further factor was the establishment of a tree nursery, which led to an increased motivation to plant additional trees in the community.

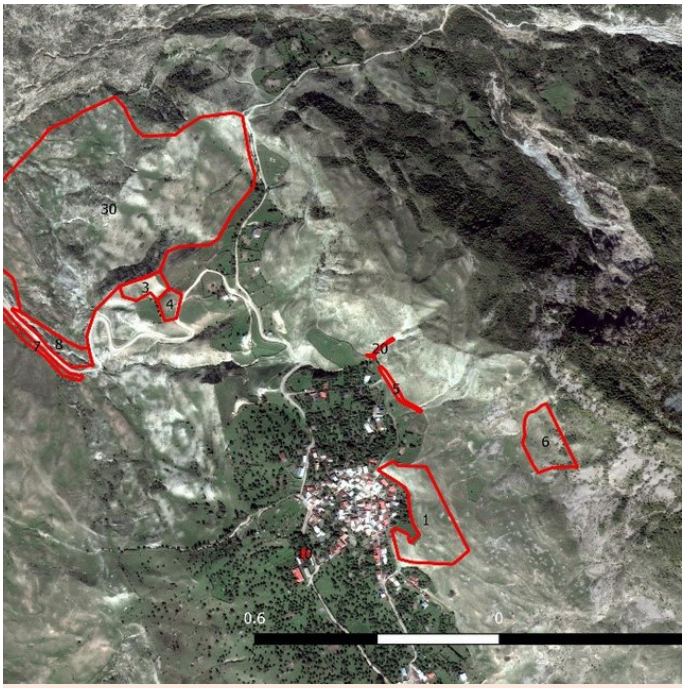


Figure 1. Map sites in Ehen (Hanns Kirchmeir)

Figure 2. Site 1 is located north -east above the village Ehen (Hanns Kirchmeir)

APPROACH AIMS AND ENABLING ENVIRONMENT

Main aims / objectives of the approach
Develop erosion control measures that can be implemented by village population without significant investment. The measures are addressed to rehabilitate vegetation on eroded sites and to slow down water speed and erosive energy where gullies already exist. This should help protect roads and other infrastructure as well as stop soil loss and increase overall productivity.

Conditions enabling the implementation of the Technology/ ies applied under the Approach
- **Availability/ access to financial resources and services**: Most of the activities (fencing, willow fascines, pilewalls, gabion or wooden check dams) only need small-scale financial investments. Only the drip irrigation system for the hazelnut orchard needed significant external investment, and the return of the investment cannot be expected before 10 years. Such an investment would have been impossible for the village community without external support.
- **Collaboration/ coordination of actors**: Pilot activities are implemented in cooperation with local decision makers and communities. The active involvement of the village people in the implementation works was a hands-on training.
- **Policies**: The Azerbaijan policy to establish more than 2000ha of hazelnut orchard in the district of Ismayilli supports the decision to establish hazelnut orchards on eroded sites as a control measure.

Conditions hindering the implementation of the Technology/ ies applied under the Approach
- **Legal framework (land tenure, land and water use rights)**: The forest's legal protection does not allow timber or poles to be taken from the forest for the construction of pile walls or wooden check dams. The poles had to be imported and transferred to the village. A balanced sustainable forest management would enable village people to make use of the local timber and would encourage people to establish forest areas.

PARTICIPATION AND ROLES OF STAKEHOLDERS INVOLVED

Stakeholders involved in the Approach and their roles

What stakeholders / implementing bodies were involved in the Approach?	Specify stakeholders	Describe roles of stakeholders
local land users/ local communities	Livestock farmers, shepherds, smallholder farms and women.	Selection of sites for intervention, providing labour during implementation of measure, local hay residuals provided by farmers for testing the measure, maintenance of drip irrigation and electric fence of the hazelnut orchards.
local government	Ministry of Ecology and Natural Resources, Ismayilli District Administration	Numerous pilot activities (test and demonstrate the most appropriate actions and raise awareness of the community on the long-term socio- economic and environmental benefits of the pilot actions) have been implemented In cooperation with local government in Ehen municipality.

Involvement of local land users/ local communities in the different phases of the Approach

	none	passive	external support	interactive	self-mobilization	
initiation/ motivation	✓					The selection of Ismayilli district was done at Ministry level. The selection of the villages was done with district administration and experts assessment of erosion problems.
planning				✓		The site selection was done with local village stakeholders. The technical planning was done by external experts. Four additional municipalities were assessed for hazelnut plantations where local land users provided data.
implementation				✓		Local stakeholders trained on bioengineering measures. The following measures were applied during hands-on training: 1. Wooden check-dam. 2. Gabion check-dam. 3. Willow-fascines. 4. Electric-Fencing. 5.Pile walls. 6.Drip irrigation system.
monitoring/ evaluation				✓		An external monitoring team (project team) did the monitoring in a participative way. The observations and monitoring results were discussed with the village stakeholders.

Flow chart

Decision-making on the selection of SLM Technology

Decisions were taken by
- land users alone (self-initiative)
- mainly land users, supported by SLM specialists
- all relevant actors, as part of a participatory approach
- ✓ mainly SLM specialists, following consultation with land users
- SLM specialists alone
- politicians/ leaders

Decisions were made based on
- evaluation of well-documented SLM knowledge (evidence-based decision-making)
- ✓ research findings
- ✓ personal experience and opinions (undocumented)

TECHNICAL SUPPORT, CAPACITY BUILDING, AND KNOWLEDGE MANAGEMENT

The following activities or services have been part of the approach
- ✓ Capacity building/ training
- ✓ Advisory service
- ✓ Institution strengthening (organizational development)
- ✓ Monitoring and evaluation
- Research

Capacity building/ training

Training was provided to the following stakeholders
- ✓ land users
- ✓ field staff/ advisers

Form of training
- ✓ on-the-job
- farmer-to-farmer
- ✓ demonstration areas
- public meetings
- courses

Subjects covered

Construction of willow fascines, pill walls, wooden check dams, gabion check dams, tree planting, fence construction (electric fence, mesh wire fence), construction and maintenance of drip irrigation system.

Advisory service

Advisory service was provided
- ✓ on land users' fields
- at permanent centres

The field trip provided advice and training on afforestation and tree species selection.

Institution strengthening

Institutions have been strengthened / established
- [ ] no
- [ ] yes, a little
- [x] yes, moderately
- [ ] yes, greatly

at the following level
- [x] local
- [x] regional
- [x] national

Describe institution, roles and responsibilities, members, etc.
The implementation capacity of line ministries, their subordinate bodies and of training institutions regarding the management of biodiversity and ecosystem services is improved. The regional exchange on sustainable management of biodiversity and ecosystem services is improved.

Type of support
- [ ] financial
- [x] capacity building/ training
- [ ] equipment

Further details
Capacities in project planning, implementation and monitoring have been developed. Awareness raising on erosion-caused land degradation and effective, cost-efficient erosion control measures have been applied.

Monitoring and evaluation
In 2018, monitoring was carried out on the implemented measures in order to assess if additional interventions would be required or if measures had been damaged. Permanent monitoring plots have been established to assess the rehabilitation of vegetation.

FINANCING AND EXTERNAL MATERIAL SUPPORT

Annual budget in USD for the SLM component
- [ ] < 2,000
- [ ] 2,000-10,000
- [ ] 10,000-100,000
- [ ] 100,000-1,000,000
- [ ] > 1,000,000

Precise annual budget: 10.4843

In the framework of the GIZ-program "Integrated Biodiversity Management, South Caucasus" (2015-2019), implemented on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ). the amount covers: fencing, electric fensing, hay, pile walls, aforestation, wooden check dams, gabion check dams, other materials and labour on the sites of Ehen.

The following services or incentives have been provided to land users
- [x] Financial/ material support provided to land users
- [ ] Subsidies for specific inputs
- [ ] Credit
- [x] Other incentives or instruments

Financial/ material support provided to land users
Land users were provided materials for erosion control measures and tree nursery.

Other incentives or instruments

For the implementation of the pilot measures in Ehen, material and payment for labour was provided. There have been some follow up activities in neighboring villages where only the material was provided, as the work was done voluntarily.

IMPACT ANALYSIS AND CONCLUDING STATEMENTS

Impacts of the Approach

	No	Yes, little	Yes, moderately	Yes, greatly
Did the Approach empower local land users, improve stakeholder participation? The application of easy-to-use measures for erosion control enabled local land users to arrange land management and erosion control measures by themselves without relying on significant external support. The pilot actions in the village Ehen are used as a showcase for the neighbouring villages.			✓	
Did the Approach help land users to implement and maintain SLM Technologies? As a result of the on-the-job training, most of the activities (fencing, pile walls, hay mulch application, wooden and gabion check dams) can now be implemented by the local village stakeholders without external support.				✓
Did the Approach improve knowledge and capacities of land users to implement SLM? The involvement of local stakeholders in all stages of planning, site selection and implementation improved capacity and knowledge. It was very important that the work was done mainly by local village people and not by external companies.			✓	
Did the Approach improve knowledge and capacities of other stakeholders? University experts and district-level technicians participated in the planning and implementation. They can act as knowledge hubs.		✓		
Did the Approach mitigate conflicts?	✓			
Did the Approach lead to improved food security/ improved nutrition?		✓		
Did the Approach improve access to markets?	✓			
Did the Approach lead to improved access to water and sanitation?	✓			
Did the Approach lead to more sustainable use/ sources of energy? The approach helps to mitigate land degradation by surface erosion. Hay making, forestry and hazelnut production have been supported as alternative land use on the rehabilitated land. Up until now, only pilot measures have been implemented on limited areas of the village area.			✓	
Did the Approach lead to employment, income opportunities? Villagers have reported that the improved vegetation in the fenced areas led to significantly higher honey				✓

harvest and herb collection for marketing on the bazaar of Lahic village.

Deepening of the gully, reduce water speed and to stabilize the riverbed
All gabions at the sites in Ehen are functioning well and show the impact of the gully deepening and the wash out at the lower (downhill) end of the gabion. Reduced water speed and the stabilised river bed helped to save the road.

Main motivation of land users to implement SLM

- [x] increased production
- [x] increased profit(ability), improved cost-benefit-ratio
- [x] reduced land degradation
- [x] reduced risk of disasters
- [ ] reduced workload
- [ ] payments/ subsidies
- [ ] rules and regulations (fines)/ enforcement
- [ ] prestige, social pressure/ social cohesion
- [ ] affiliation to movement/ project/ group/ networks
- [x] environmental consciousness
- [ ] customs and beliefs, morals
- [x] enhanced SLM knowledge and skills
- [ ] aesthetic improvement
- [ ] conflict mitigation

Sustainability of Approach activities
Can the land users sustain what hat been implemented through the Approach (without external support)?

- [ ] no
- [x] yes
- [ ] uncertain

Local stakeholders trained on building and applying measures. The measures (fencing, pile walls, wooden and gabion check dams) are low-cost and can easily be replicated by village stakeholders. Only the drip irrigation system and electric fencing for the hazelnut orchard needs high investment and might not be up-scaled without external support.

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- The fencing improved vegetation biomass and vegetation cover. The village people reported a positive impact on honey production and herb collection (mainly for tee).
- Hay residuals and hay mulching provide good physical protection against sheet erosion caused by the impact of raindrops. The hay cover allows that the moisture is held by the soil which results in improved seed germination. The village people observed, that the frequent flooding of the village after heavy rainfall was stopped by the significant improvement of the vegetation on site 1 above the village.
- Most of the beneficiaries see the hazelnut plantation area as a potential source of income in the future and at the same time as a useful measurement for rehabilitation of the biodiversity and measure against erosion.
  Land users see the implementation of the measures on the site as contribution to the future tourism perspective of the village.
- The pilot measure is cost-efficient and affordable for local people. It has a positive ratio of cost/benefit.

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

- Measures are easily implemented and materials (mesh wire, willows, seedlings) are available locally.
- The measures are showing significant impacts in a short time. The rehabilitation of vegetation and the gathering of sediments halting gully deepening is already visible in the first year after implementation.
- As there is still enough pasture land available and the areas of intervention have been implemented on degraded land, there was no major conflict with shepherds and farmers.

Weaknesses/ disadvantages/ risks: land user's view → how to overcome

- The management of the drip irrigation and electric fence was limited by the low capacities of the municipality. → Handing over the hazelnut orchard to a private cooperative could increase ownership and personal involvement of local stakeholders in orchard maintenance. A long-term business plan and financing model needs to be developed if the approach is to be up-scaled.
- Current electric fence of hazelnut plantation is not efficient in protecting area from free roaming animals.
  It also reflects on the inefficiency of the overseer`s working time, as he spends entire working hours on the controlling the fence which reduces his time on spending on the additional activities like controlling plant growth and irrigation system.
  → Changing electrical fence to the ordinary mesh fence or wire fence.

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's view → how to overcome

- Because of a general ban on forest management, the timber used for pile walls and wooden check dams cannot be extracted from the local forest. → Timber and logs have to be bought from foreign markets. An adaptation of laws on the legal extraction of local timber for certain purpose would be helpful.
- Hazel needs more than 750 mm annual precipitation. Humidity above 60% in June and July is beneficial. A strong wind is a danger for young trees. Ehen has 500-700m precipitation and significant summer drought. → A drip irrigation system was applied to overcome summer drought in the first couple of years until seedlings have established a sufficient root system to access water from deeper soil layers.
- The electric fencing and the drip irrigation for the hazelnut plantation and fruit tree plantations above the village need expensive investment and specific skills for mounting and maintenance. → Project investment was used for pilot measures as a demonstration site. The hazelnut orchard can show a positive return on investment within 10-15 years if managed well.

REFERENCES

Compiler
Hanns Kirchmeir (office@e-c-o.at)

Reviewer
Rima Mekdaschi Studer (rima.mekdaschi_studer@cde.unibe.ch)

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Resource persons
Samir Abbasov (samir.abbasov@giz.de) - SLM specialist
Markus Koeppler (markus.koeppler@giz.de) - SLM specialist

Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/approaches/view/approaches_5571/

Linked SLM data
n.a.

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Key references

- Planning meetings, site visit and stakeholder meeting, Hanns Kirchmeir, Azerbaijan 2017.: Report based on field vists
- Hazelnut plantations on eroded sites in Ismayilli, Hanns Kirchmeir, 2017: Concept based on surveys and field visits

Links to relevant information which is available online

- Synthesis Report on Erosion control measures 2014-2017: https://biodivers-southcaucasus.org/uploads/files/5b8655b3db452.pdf