Tusheti mountainous areas.

Integrated Pasture Management Planning in Mountainous Regions (Georgia)

DESCRIPTION

The unsustainable use of pastures and forest areas has led to soil erosion, degradation, desertification and loss of biodiversity in the high mountain areas of the South Caucasus. The development of pasture passports is part of a broader approach to a strategic pasture management plan for Tusheti. This showcase includes results from the spatial planning process applied in a pilot programme for Akhmeta municipality.

Project area and purpose
The project area comprises the Tusheti Protected Areas (PAs) on the northern slopes of the Greater Caucasus Mountains in Georgia. This group of protected areas consists of a strict nature reserve, a national park and a protected landscape with about 40 villages and settlements. Together they form a total protected area of approx. 114,000 ha. In Tusheti, overgrazing has led to soil erosion and biodiversity loss. Especially the intensive use of summer pastures during the Soviet period resulted in a severe deterioration of the mountain slopes. So far, there are no standards or guidelines for the elaboration of sustainable pasture management plans in Georgia. Pasture passports, as a first step towards sustainable pasture management, document the actual grazing capacity for each pasture unit and serve as a guiding document for shepherds and local stakeholders and as a basis to prepare lease contracts.

Data gathering
As a prerequisite for the development of pasture passports and the calculation of grazing capacity, the type of land cover, the erosion risk and the biomass of the pastureland had to be assessed for each pasture unit. This was done using remote sensing tools in combination with data collected in the field for calibration.

Land Cover & Biomass Assessment
The information on land cover and fodder biomass were derived from images of SENTINEL 2. For the calibration of the biomass data, 86 biomass samples (1x1m) were harvested in different gorges and elevations. The old Soviet map of pasture numbers was digitised and corrected using topographic information by the local NGO NACRES. From the biomass samples, a chemical analysis was performed to describe the average fodder quality by raw protein, fibre, fat and ash content.

Erosion Risk Assessment
The Soil Erosion Risk Model developed by experts from the Caucasus with the support of GIZ is one of the available tools to produce erosion risk maps. The model is based on the RUSLE – Revised Universal Soil Loss Equation (Renard et al. 1996) and incorporates a combination of different input factors such as precipitation, soil type, slope, vegetation cover and protection measures. That way, the estimated average soil loss in tons per acre per year can be calculated. In this case, the precipitation data were derived from the CHELSEA project website (1x1km grid of monthly mean precipitation). The digital elevation model was derived from the old Soviet topographic map, and soil data was used from a soil map 1:200,000. Then, the data must be calibrated against reality through some ground-truthing.

Ground Truthing
For the evaluation of the remote sensing results, the method developed by Jonathan Etzold (2013) was used to collect field samples at different locations of Tusheti. This approach is an easy-to-use field toolkit for local resource managers or field staff to

LOCATION

Location: Full teritory of Tusheti Protected Areas (1100 km²), Tusheti, Georgia

Geo-reference of selected sites
- 45.44145, 42.42855
- 45.34308, 42.33225
- 45.39539, 42.38602

Initiation date: 2016

Year of termination: n.a.

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

assess pasture quality and susceptibility to erosion. The approach was first developed in Azerbaijan and then implemented in several projects in the three countries of the South Caucasus. The remote sensing tool and the Etzold approach rate topsoil erosion, vegetation cover, soil parameters and the geomorphological situation as relevant co-variables. The combination of remote sensing with calibration data from the field can be summarised as a very effective method to assess the erosion state in large areas. Neither of the two instruments would be able to provide results in this spatial dimension and quality alone.

Pasture Passports
As part of the spatial planning of Akhmeta municipality, pastureland that can be leased to shepherds was separated from land used as hay meadows, farmland or pastures belonging to the villagers. The resulting map shows land available to the village and land available for lease. To understand the current use of pastureland, farms, livestock numbers and pasture units were assessed. The assessment revealed that one-third of the former Soviet pasture units is still in use. For the maps of the pasture units for leases, the following areas were excluded from grazing or leasing out: All strictly protected areas and zones: the strict protection zones of Tusheti National Park and Tusheti Protected Landscape, all areas covered by forest, all areas classified as highly erosion-prone by remote sensing (steep slopes with low vegetation cover) and village areas and parts that had previously been used for other agricultural activities (e.g. ploughing). In workshops with the local stakeholders and potential users of the results (shepherds, Tusheti Protected Landscape Administration, APA), the design of the pasture passports was developed. Each pasture unit is described on four pages in the pasture passport: Header: the number (code), total area; content: map of the land cover types, the area of each land cover type, map of available biomass and carrying capacity, name of farmers/shepherds and their livestock numbers using the pasture unit.

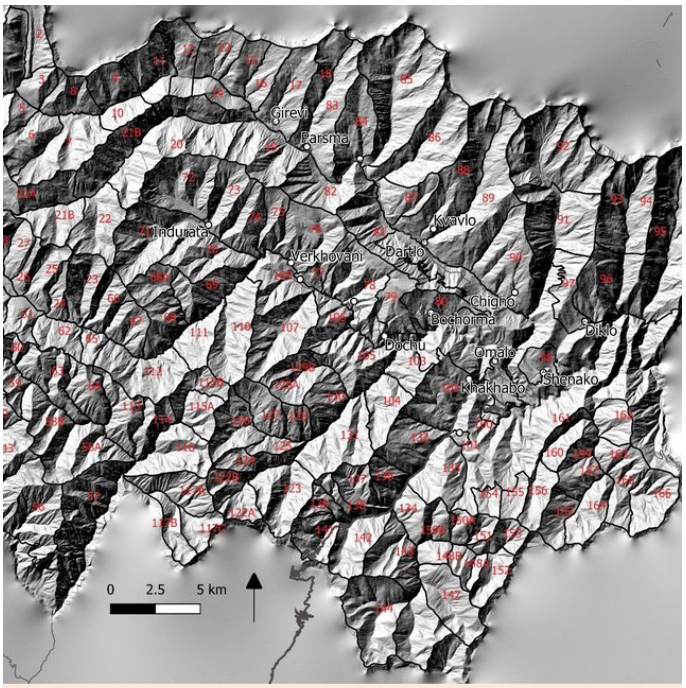


Figure 2: Map of old pasture units from the Soviet period

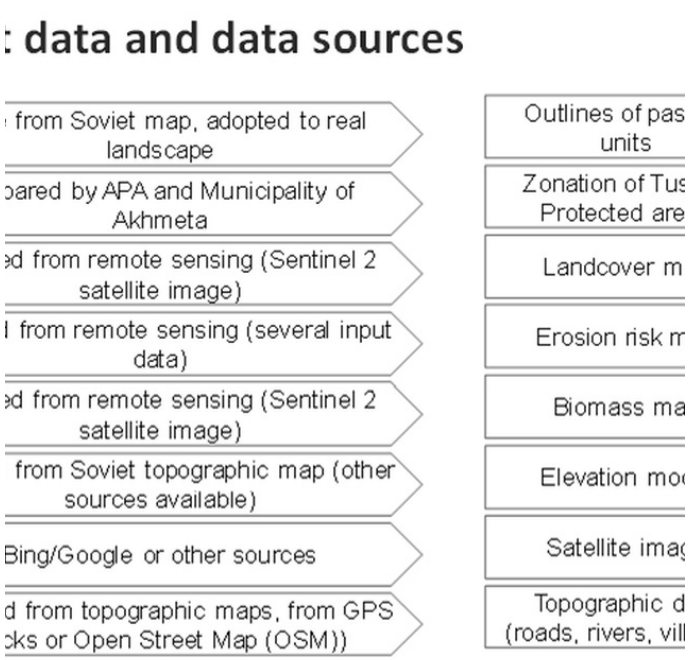


Figure 3: Overview on the data used for preparation of the passports

APPROACH AIMS AND ENABLING ENVIRONMENT

Main aims / objectives of the approach
Support land use planning and decision-making processes for better management of natural resources, especially pastures.

Conditions enabling the implementation of the Technology/ ies applied under the Approach
- **Institutional setting**: The Department of Spatial Planning and Construction Policy (within the Ministry of Regional Development and Infrastructure MRDI), and the Agency of Protected Areas APA (within the Ministry of Environmental Protection and Agriculture MEPA), are key stakeholders to use the pasture passports and to further develop and upscale this approach to other protected areas in Georgia. Beside APA, the Tusheti Protected Landscape Administration (TPL), located within the Akhmeta municipality administration, is the second important user of pasture passports. Both institutions, APA and TPLA, are responsible for contracting lease agreements with shepherds and should not only be able to understand the technology behind the passports but should also have the capacity to handle the technology to be able to adapt the passports if needed (e.g., by changing boundaries of pasture units). For this issue, training workshops with decision-makers and technicians from the MoEPA, APA and TPL have been implemented.
- **Collaboration/ coordination of actors**: All relevant national and local authorities that are dealing with spatial or environmental data participated in the workshop to discuss the approach and institutional suitability to host the sensitivity model.

Conditions hindering the implementation of the Technology/ ies applied under the Approach
- **Knowledge about SLM, access to technical support**: There is a high need for technical infrastructure and strong human capacity development.

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	National Park management and APA (Agency for Protected Areas); local staff and experts from FATPA (Friends Association of Tusheti Protected Areas); national ecologists from universities and local NGO NACRES;	Participation at the workshop/meeting and making contributions through comments, suggestions and sharing their analytical point of view.
local government	Municipality of Akhmeta and Tusheti Protected Landscape Management	Participation at the workshop where they have given input and made contributions to the topic of technical aspects of the approach.
international organization	National GIS, remote sensing experts from GIS-LAB; GIZ IEC/IBiS program staff & international experts	Investigations, development of the approach.

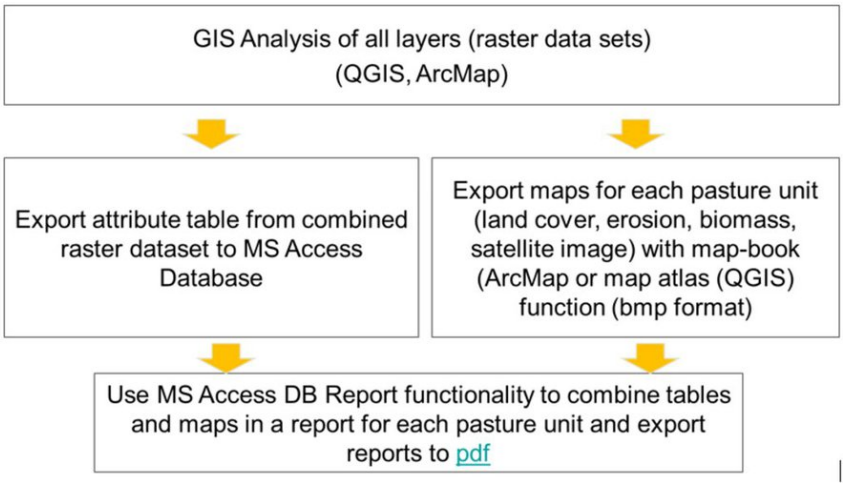
Lead agency
Agency of Protected Areas (APA - Akhmeta Municipality)

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

	none	passive	external support	interactive	self-mobilization	
implementation				✓		Organized meetings, workshop where stakeholders, local communities discussed different technical methodologies, visited the project communities and evaluated the preliminary result maps of erosion risk in the field.

Flow chart

The process of generating pasture passports consists of several phases, and in the pilot area, the following measures were implemented:
•Preparation of catalogues on the amount of the shepherds/flocks located in Tusheti; number of cattle/sheep/goats/horses grazing; areas used;
•Identification of productivity level of different types of vegetation (pasture) and areas at high erosion risk due to overgrazing;
•Assessment of available grasslands, fodder-biomass and erosion risk;
•Digitisation of old pasture units;
•Separation of village management areas from potential lease-areas;
•Integration and alignment of the protected areas categories and zoning;
•Preparation of maps and tables for each pasture unit in a standardised format ("Pasture
•Passports")
•Conduction of remote sensing and field surveys with all data stored in the GIS system and a database.



The project team used raster datasets for the land cover types, the biomass and the inclination (erosion risk). Erosion risk and the pasture units were also converted to a raster dataset to improve performance. All raster sets were combined into one (all information comprised in the raster attribute value) with a raster size of 10x10m. In GIS, the maps of each of the 168 pasture units were created using a map book or map atlas functionality. A Microsoft Access database was used to produce the reports by integrating the information of the database tables for each pasture unit as well as the maps stored as bitmaps in the file system. The reports were exported as a pdf file.

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
- [x] field staff/ advisers

Form of training
- [ ] on-the-job
- [ ] farmer-to-farmer
- [x] demonstration areas
- [ ] public meetings
- [ ] courses
- [x] workshop with field mission

Subjects covered

Evaluation of model results, preliminary result maps of erosion risk in the field, technical implementation of the SM in Georgia, external evaluation of SM-Results.

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 results of the approach implementation in Georgia has been summarized by the Programme "Integrated Biodiversity Management, South Caucasus" and distributed to the experts in Azerbaijan for the further implementation.
Approach and results have been handed over to the local municipality responsible for the lease contracts in the Protected Landscape and to APA, which is responsible for the land use in the national park to integrate them into their pasture management plans.

Type of support
- [x] financial
- [x] capacity building/ training
- [ ] equipment
- [x] sharing the concept, approach

Further details

The concept and approach has been shared with local municipalities and other related experts.
Pilot study financed by GIZ.

Monitoring and evaluation

Filed evaluation in 2018.

Research

Research treated the following topics
- [ ] sociology
- [ ] economics / marketing
- [ ] ecology
- [x] technology

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: n.a.

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

Other incentives or instruments

National fund.

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? Through the field visits and workshops, it has involved both experts and authorities, where they have assessed, analysed and given input.				✓
Did the Approach improve knowledge and capacities of land users to implement SLM? The perception of the key stakeholders and management towards the importance of biodiversity and ecosystem services has become more positive.				✓
Did the Approach improve knowledge and capacities of other stakeholders? The implementation capacity of line ministries, their subordinate bodies and of training institutions regarding the management of biodiversity and ecosystem services is improved at the national level.				✓

Main motivation of land users to implement SLM
- [x] increased production
- [ ] increased profit(ability), improved cost-benefit-ratio
- [x] reduced land degradation
- [ ] reduced risk of disasters
- [ ] reduced workload

Sustainability of Approach activities

Can the land users sustain what hat been implemented through the Approach (without external support)?
- [x] no
- [ ] yes
- [ ] uncertain

- payments/ subsidies
- rules and regulations (fines)/ enforcement
- prestige, social pressure/ social cohesion
- affiliation to movement/ project/ group/ networks
- environmental consciousness
- customs and beliefs, morals
- enhanced SLM knowledge and skills
- aesthetic improvement
- conflict mitigation

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- Opportunities: Further activities could be developed in two areas:
  - Institutional integration and accessibility of the sensitivity model,
  - Technical improvement and up-scaling.

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

- Strength: contribution to the work by local municipalities - the overall results have been handed over to the municipality, responsible for the lease contracts in the Protected Landscape and to APA, responsible for the land use in the National Park.

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

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

REFERENCES

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Date of documentation: Aug. 27, 2019

Last update: Dec. 2, 2019

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Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/approaches/view/approaches_5490/

Linked SLM data
n.a.

Documentation was faciliated by
Institution
- GIZ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Project
- Integrated Biodiversity Management, South Caucasus (IBiS)

Key references

- Kirchmeir H. 12/2018: Implementation of an Erosion Risk Assessment tool on pilot regions in the Southern Caucasus. The Programme „Integrated Biodiversity Management, South Caucasus":

Links to relevant information which is available online

- The European GeoNode system: http://pegasosdi.uab.es/geoportal/
- The Biodiversity Protection Service (BPS) operates a webpage for biodiversity indicators: http://biomonitoring.moe.gov.ge/
- Monitoring Manual for Highland Pastures in the Caucasus: https://biodivers-southcaucasus.org/uploads/files/Monitoring%20Manual%20Draft%20ENG_new%20%20amendments%20for%20Georgia_v9_acc.amend.pdf