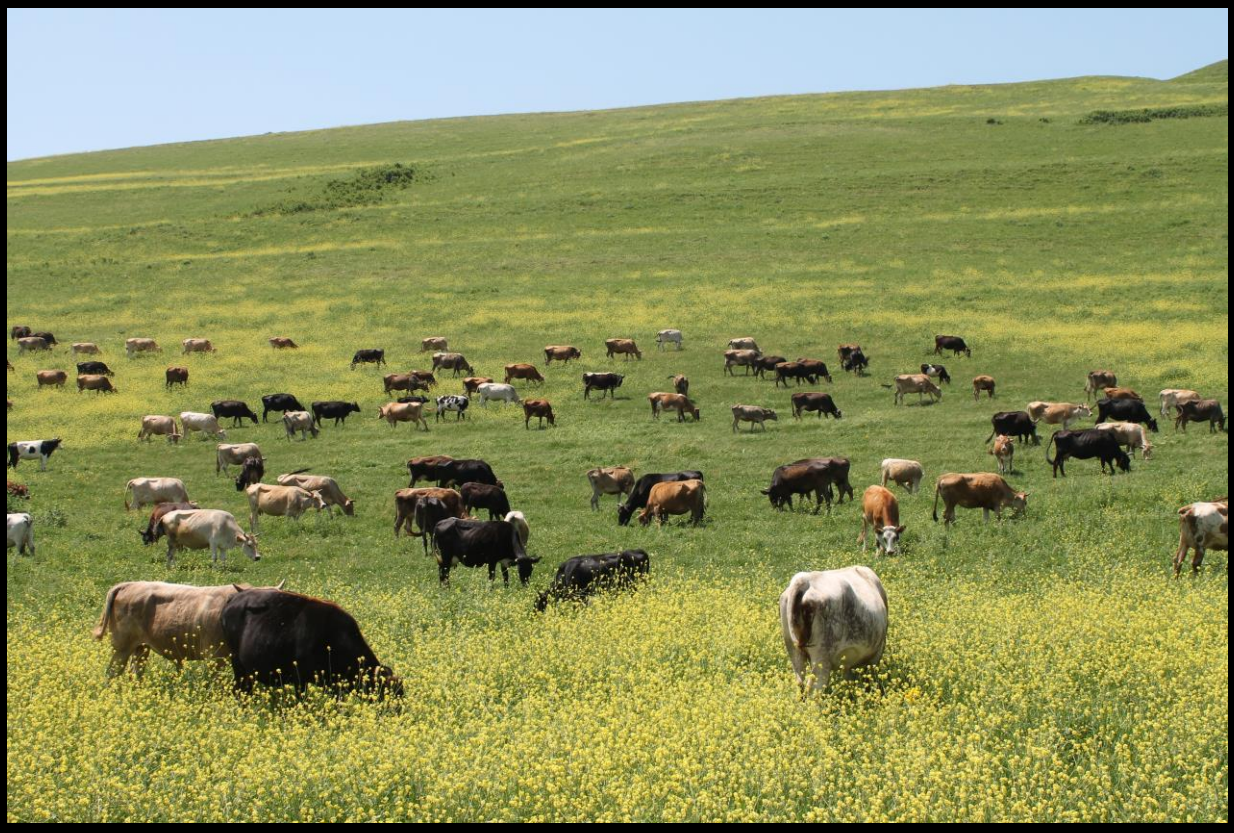

Pasture Management in Georgia

Current situation, frame conditions, potentials of development

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Abstract

A study was conducted with the goal of describing the current frame conditions of pasture use in Georgia and identifying the bottlenecks and obstacles that restrict the productivity of Georgian pastures and limit the income generated by Georgian farmers from pasture related agricultural activities. Whenever possible, findings were elaborated into concrete proposals for action, addressing the legislator, donors, or project implementers.

Legal frame conditions: While privatization of arable land in Georgia is at an advanced stage, most Georgian pastures are owned by the state and are pastured under a regime of free access. Privatization is, since 2008, de facto stopped. Management measures and investments on pasture by pasture users or the state/the municipality as the pasture owners are largely absent.
Pastureland tenure reform has the potential to unleash investments in finance and labour in pastures in the medium altitudes of Georgia. Its efficiency and social sustainability, however, depends as well from advances in the economic frame conditions, the technical knowledge of the actors, and the amendment of legal provisions that ensure that the pasture access and livelihoods of pasture users with low income are not affected. Land tenure reforms will not change the resource use in mountain and dry pastures, because in these ecotopes the return on any investments is insufficient under any land tenure legislation. Eventually, in Georgia, pastureland tenure reform holds a smaller relative importance to other measures compared to the tenure reforms conducted on arable land.
Pasture overuse: Pasture overuse is a regional and local problem in Georgia. It cannot be considered an overreaching cause of reduced pasture productivity. It figures among different issues of inadequate pasture management. As such, it must be individually approached.
Social frame conditions: In many regions of Georgia, the status of livestock-based activities is low, secondary to fruit and crops. Moreover, in most regions of Georgia, pasture-based activities oriented at self-sufficiency rather than at cash generation. Both factors limit the readiness of farmers to invest money or labour and venture in new practices. Moreover, they can limit the potential economic effect of project interventions in pasture and pasture-related livestock production.
Economic frame conditions: Shortage of capital/cash is a common restriction for economic activities of farms and small and medium enterprises in Georgia. Value chain financing can have a great impact on untightening a key bottleneck to rural development.
Know-how: Lack of know-how at different levels limits the productivity of pasture-based agricultural branches. A knowledge system that effectively can retain and convey knowledge is absent.
Technical measures: The study proposes a broad range of simple technical measures aimed at increasing the productivity of pasture-based farming and the farmer's income gained thereof.

Showing how to improve the pasture use and livestock efficiency is the easy part. The challenge is showing why:

- convincing that money and labour invested in pasture and pasture based livestock returns with a profit
- convincing that improved practises regarding pasture and pasture-based livestock lead to prosperity.

Definitions

Ecotope	Ecotopes represent relatively homogeneous, spatially explicit landscape functional units that are useful for stratifying landscapes into ecologically distinct features (including vegetation, soils, hydrology, and other factors)
Equilibrium / nonequilibrium dynamics	In a system under equilibrium dynamics, opposing forces (e.g. in the case of pasture, grass growth and grass consumption) are of constant and equal power and keep the system in a constant state. In a system under nonequilibrium dynamics, the power of opposing forces are not constant, the relative power of the forces varies, and the system changes from an extreme state to another frequently.
Pasture degradation	The animal load per surface of pasture exceeds the long-term production optimum. The plant cover has been impaired irreversibly from excessive biomass consumption or from excessive treading with the feet: Pasture swards don't recover/ recovery takes excessively long time after reducing the animal load/when rains set in.
Pasture overgrazing	The animal load per surface of pasture exceeds the long-term production optimum. A reduced animal load would mean more product (milk, meat) output in the medium or long term. However, the situation is reversible: reducing the animal load allows a return to the optimum situation. The long-term production potential of the pasture is not impaired.
Productive pastures	In the present study, it is used for all pasture land where the productivity is not reduced by climatic conditions, e.g. drought (steppe) or reduced vegetation period (mountain pastures). Most village pastures qualify as productive pastures, but also other pastures at medium altitudes.
Rangelands, marginal pastures	In the present text, the terms are used for land used by domestic animals for grazing under extensive conditions: Due to climatic (temperature, precipitation) or/and pedological factors, the grass biomass growth is reduced compared to more productive farming pastures, the use of fertilizer, irrigation and reseeding is uncommon/uneconomic. No biomass production threshold delimitation to define marginal from productive pastures can be indicated in the present study.
transhumance	Seasonal movement/migration of people with their livestock between summer and winter pastures, or between different pasture grounds according to other climatic imperatives.

Abbreviations

PPA Proposals for Project Activities

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1. Introduction

"*There is much of very good arable land, and it was ploughed in earlier years, now, however, hassle is the only harvest, because the cattle spoil and trample everything. (…) If it were property, it could be improved by fencing and draining."* Citation of a letter sent from the Lesser Caucasus to Switzerland, by D. Moser, 1903, cited by Tschudin, 1990.

"*This tells the farmer Zukov: (…) We built a dairy, but due to lack of funds we couldn't produce cheese ourselves and had to sell the dairy to a Swiss. So that now this Germanic gets the whole profit, we however are in distress."* B. S. Esadze, 1912.

A great part of Georgia's pasture land is used as pasture. The major part of Georgian pastures are either used as common pastures or are owned by the state. State-owned pastures are either rented out at short-term leases or informally used.
Many of these pastures sustain only modest animal performances and provide low incomes for the farmers using them. Moreover, inadequate pasture use, particularly overuse of erosion exposed pastures, can contribute to expose populations, property and infrastructure to natural risk of landslides and inundation. **Improving pasture practices is therefore not only an issue in economic development, but also in Disaster Risk Reduction DRR.**
The aim of this study is to provide information about the reasons for the low productivity of the pastures, the reasons for the failure of farmers to gain better incomes thereof, the reason why proven practices fail in Georgia or are not applied. The study proposes readily implementable measures to improve the productivity of pastures and reduce poverty of the pasture users. The scope of the study includes technical, social, legal and economic frame aspects.
The Swiss Development Office for the South Caucasus (SCO) has invited the study in order to provide a sound base for its ongoing and future activities in the livestock sector. It was conducted between May 1st and July 31st by a team of 2 persons.

The study started with the base hypothesis that the overreaching problem with Georgian pasture is excessive herd size and the resulting overuse due to the inadequate incentives inherent in a common access use environment ("tragedy of the commons"). Consequently, the concept of the study targeted at identifying and describing the incentives leading to ineffectively high animal numbers and to propose solutions how the incentives for excessive pasture loads could be countermanded or lessened. However, the literature consulted conformed with the data collected showing that pasture overuse is rather a local/regional and temporal problem, but not an overreaching issue at national level.
Therefore, the study concept was reformulated to include a broader spectrum of pasture use aspects. Moreover, because an economic benefit of pasture only materializes at the sales of livestock products (milk, cheese, meat, eventually wool) produced on the pasture, it was necessary to include the complete value chain into the revised scope of the study.
In consequence, the methodology shifted from a thematically focussed, method and data based, strictly scientific study towards a broader, more pragmatic, empirical and multi-disciplinary fact-finding report.

In order to facilitate the implementation of the results of the study in development projects and in the development of the legal and economic frame conditions, all findings were formulated in view of a potential application in development projects. For easy recognition of implementation-oriented text elements through the document, these text blocks are distinguishable by a blue background colour.

Many of the presented findings are not new. In contrary: The introducing citations show that land tenure issues and lack of available capital have hampered pasture productivity and caused rural poverty more than 100 years ago.

2. Assignment

The assignment for the study included

- a review of the literature, particularly regarding
  - the current knowledge on commonly used pasture
  - an assessment of the relevant elements of the Georgian legal practice and administration of pasture tenure
  - a summary of the currently practiced pasture management and access regulation of pastures
  - inform about pasture management practices currently applied in comparable ecosystems
- assessing the level of pasture stocking in Georgia and the influence of free pasture access to the stocking rate
- an assessment of the current pasture situation in Georgia, particularly regarding
  - current practices, current obstacles to productivity and
  - hypothesis regarding underlying causes, e.g. originating in the economic, social, legal or ecological frame conditions
- formulating proposals for non-exclusive, socially acceptable and readily implementable forms of land tenure and pasture management measures that promise increased productivity and reduced ecological threats
- the presentation of the findings towards a relevant expert public to allow their propagation into a policy dialogue directed towards developing the legal land tenure framework in Georgia.

3. Methodology, geographical areas

Data were collected

- by semi-structured interviews with farmers encountered on field trips into the region. The prepared questionnaires are presented in annex A1.
- by interviews with selected experts
- by empiric observations during the field trips / farm visits.

The questionnaire focussed on collecting information about technical, social and economic motives that determine herd size, about management and cooperation of common pastures, and explored the acceptance of cooperative forms of pasture management.

The study concept didn't involve a gender-differentiated approach. In consequence, the persons interviewed were exclusively male. There is no doubt that this limited the outreach of the findings, particularly knowing that many aspects of dairying are part of the household responsibilities of women. A well-founded inclusion of gender aspects into the study, however desirable, would have exceeded the available resources for the study. Gender aspects of dairy/cattle farming remain a relevant topic for future research.

Due to the insufficient number of interviews no statistical analysis of the collected data was possible.

The study was performed in the geographical areas where the implementers of SDC are active:

- Kakheti
- Kvemo Kartli

- Samtskhe Javakheti
- Adjara
- Racha

4. State of the knowledge

4.1. Common Resources: problem description, solutions

Scientific literature has, under the title "tragedy of the commons", amply described the problematic of resource use under open access. The term "tragedy of the commons" was defined by G. Hardin in 1968. Later, the work of E. Ostrom with the title "Governing the Commons" won the Noble Prize in Economic Sciences in 2009. The issue is not limited to common pastures, it has e.g. has seen ample application regarding ocean fishery. But commonly used pastures serve as the textbook example.
The reflections of Hardin an Ostrom may be amalgamated as follows:

- Resources utilized under unregulated open or common access tend to be overused, undermaintained and underinvested. This can go as far as to the point of destruction of the resource. The reason for this potentially destructive behaviour is to be found in perverse incentives: individuals bear the full costs of resource sparing, conserving, providing maintenance or investment. However, the beneficial effect of sparing, maintenance etc. are shared equally among the group, and freeriding cannot be excluded.
- Complete knowledge of the negative effect of unsustainable and sustainable practices alone does not cure the tragedy of the commons. Only when it can be assured that the majority of the other users comply and take the same measures, sustainable management brings no negative individual results to the individual who acts sustainably.
- E. Ostrom showed that only the ungoverned commons are "tragic". She documented that, by a regulated common approach, common management can be practiced on long term with high acceptance by the users. Among the successful examples of common resource management cited figure common pasturing in the Alps and in Japan.

Sources: Hardin, 1968, Ostrom 1990

Implication for Policy: Unregulated commons are undesirable from a resource use and resource protection point of view. Privatization is not the only alternative to unregulated commons, regulated commons can perform well, too.

4.2. Sustainability of pastoralist's use of rangelands – state of the debate

The understanding of rangelands has evolved dramatically in recent years. In the past it was assumed that most rangelands used by herders were overgrazed and degraded. Current understanding is rather that dry rangelands have nonequilibrium dynamics where precipitation has more impact on vegetation than grazing does. In humid rangelands showing equilibrium dynamics, overgrazing of vegetation is more widespread.
Pastoralism is moreover considered as one of the most efficient ways to turn sunlight into food in marginal lands, often outperforming commercial ranches due to lower costs and lesser economic risk exposure. Keeping large herds is now understood as a sound way to manage the risk of livestock loss rather than as an irrational strategy due to poor system incentives.
Added to the tragedy of the unmanaged commons was the term "tragedy of enclosure", which befalls nomadic herders when common lands become fragmentized by boundaries such as fencing, making it impossible to follow climatic opportunities. Moreover, the risk of the occurrence tragedies of the common is considered mitigated by the finding that true open access is rarely found in rangelands.
Noteworthy is the globally recorded expansion of shrubs on pasture land. This may be explained by the increased CO_2-content of air which favours the growth of plants with a C_3-metabolism such as shrubs, trees and forbs over those with a C_4-metabolism, which are predominantly grasses. Noteworthy is also a trend reported in Australia, a country with a long history of private land use,

where farmers reaggregate fragmented rangeland/grazing paddocks of different pasture owners in order to form commonly used range areas.

Source: Reid et al., 2014

In Georgia, in theory, the relevant parameter determining the pasturing herd size is the available forage on the winter pastures. Overall summer pastures surfaces in both Caucasus chains are vast so forage doesn't get scarce, even in dry years. Winter pasture surfaces, however, are scarce and moreover prone to drought. The effect of drought on herd sizes, however, is offset by feeding purchased hay if necessary (Kobakhidze, pers. communication). Therefore, in Georgia, herd sizes are unaffected by variation of precipitation. Since the dissolution of the Soviet Union, the overall sheep population has, according to public statistic data, been reduced from 2 to 0.8 Mio. animals. The animal load on the summer pastures has thus been greatly reduced. No reduction of the animal load happened on the winter pastures, however, because the available winter pastures have shrunk even more drastically due to the loss of access to winter pastures in Azerbaijan and Dagestan.

4.3. Pasture tenure forms in current use in Western Europe, the USA, and Central Asia

For arable land, private ownership of individual land lots is the predominant tenure form. Pasture, however, have some particularities that are the cause why lotted privatization is not the predominant tenure form:

- Common use of pasture by many smallholders avoids the need of building excessive fences and of providing an excessive number of access paths and allows joint employment of a herder.
- The common use of pastures with different ecotopes (differing in altitude, precipitation levels) allows the sequential use of swards at their optimal stage, resulting in better animal performance and better forage use, and avoiding the "tragedy of enclosure" phenomenon.

The following forms of formalized common use are common on marginal pastures:

- **State ownership** with leases, with clear usage conditions and strict enforcement: USA, Federal Lands, managed by the Bureau of Land Management (holding about 1/3 of the pastureland in 18 western states of the USA).
- **Privatization without lotting**: The common pasture is managed and legally owned by a cooperative body. The pastures are divided into a fixed number of animal pasturing rights owned by individuals. These can be freely bought and sold by their owners, used as collaterals etc. The pasture users/pasture right owners form the corporative body according to the legal requirements of the country (usually: having president, treasurer, an assembly that decides and elects democratically). Every owner of pasture rights is automatically a member of the corporative body. This tenure form is frequent for marginal (mountain) pastures in the Alps and Scandinavia.
- **Ownership by a user group**: The common pastures is managed and legally owned by the municipality or a corporative body licensed by the municipality. The pastures are divided into animal pasturing rights which are divided under the members of the municipality and cannot be sold: They are being acquired by joining the municipality and lost by leaving it. This tenure form is frequent on marginal (mountain) pastures in the Alps and Scandinavia too.

Implication for Policy: When discussing the resumption of pasture privatization, it makes sense to include tenure forms of formalized common pasture use into the considerations.

4.4. Status quo of knowledge on pasture management strategies

Marginal pastures/rangelands: Extensive research has been carried out regarding grazing strategies in dry areas, particularly in the US. The results can be summed up rather shortly, because most of the sophisticated concepts fail to give sizeable benefits, while the economic performance of simple concepts is comparatively good:

- Continuous grazing (a herd grazes the same big lot continuously during the whole of the season) gives good performances whenever the pasture is homogenous. The access to water should however be controlled/limited. With excessive access times, riparian vegetation may be destroyed.
- Rotational grazing only has advantages in rugged terrain, humid areas, and places where heterogeneity of the plant communities exists.
- Excluding pasture plots near water sources from pasturing, as a "standing forage reserve" for the dry season, can be useful. Also, the so-called "centripetal grazing" strategy which foresees to use lots far away from watering sources preferentially in the humid season and allow grazing closer to watering places the dryer the weather gets, is considered effective. It is based on the sound assumption that in the wet season, animals are in better condition and able to support travelling longer distances to watering places. Moreover, the grass quality declines less quickly on the more humid pastures.

Source: Holechek et al., 2011

On **intensive humid pastures** in Western Europe, the best animal performances are attained with rotational pastures. Pasture rotation allows short times of animal access with high stocking rates and intensive grazing followed by long resting periods of sward growth undisturbed by animal pasture. The high animal yields are caused by high forage uptake combined with low tread losses. Moreover, this concept facilitates the use of animal slurry as fertilizer.
However, also continuous grazing yields entirely satisfactory animal performances combined with low expenditures, provided it is combined with an adequate mineral fertilizing strategy.

Implication for Projects: Simple herd grazing without plot differentiation by fencing, ideally under supervision of a herder, is a sufficiently sound grazing practice. The possible improvements are relatively small and difficult to visualize sufficiently. Projects are advised to focus on measures that yield more striking and more immediately visible effects like fertilization, weed and bush control, complementary feeding, haymaking, genetics. Implementation proposals are found in chapter 9.

5. Social environment

5.1. Status of pasture and cattle

The interrogation of farmers showed that livestock farming in many regions/on many farms is mainly

- a sideline occupation–besides more important/more highly valuated crop or non-farming activities
- an occupation associated with self-supply, or associated with forced saving for a private expenditure goal (e.g. raising a bull to finance a marriage)
- a secondary use of leftover land and feedstuffs, while prime land is assigned to crop production.

These statements qualify primarily the priority given by the economic decision makers on the farm, and give only indirect indications to their economic importance. The high importance of livestock to cover the daily basic needs of farming households is undisputed. Moreover, in regions which don't dispose of arable land and production alternatives are scarce, livestock farming remains nevertheless of high economic importance for the regional economy.
It is also true that statements about the low status of livestock production in the priorities of decision makers in the farm household is only true for male decision makers. There are indications that the women in the farm household give a much higher priority to livestock production. However, it seems

that these different priorities of female farmers seldomly materialize in the farm strategy because of the low influence of women in decision taking on the farm.

These circumstances highlight possible obstacles for development projects:

- Farmers, as entrepreneurs in general, usually focus on developing their main business, while the sideline business is rather a fall-back option. Their readiness to invest money and concepts and to take risks in sideline businesses is limited.
- Self-supply doesn't generate cash. Cash is a scarce resource in Georgian farms and households. Spending cash in occupations that are not considered cash generating may have a very low priority – lower than spending to finance directly cash yielding activities, possibly even lower than spending for personal needs.

Examples: Cattle production seems to be a farming activity of secondary importance in Kakheti, while, particularly, vineyards and crops are considered prime use for all arable land. In contrast, cattle farming is, along with potato growing, the prime occupation of Adjara farmers.

Implication for Projects: Project activities that assume major involvement, major investments or major reforms of their practices may have better results if the targeted activities enjoy high social status in the local communities. If target activities have a low social status, good results can only be expected if no major involvement of the target beneficiaries is required.

5.2. Influence of result visibility on the motivation to invest money and labour

As stated in chapter 5.1, Georgian farmers are reluctant to invest in pastures (for fertilizer, seeds, irrigation). However, they do invest in the same items for crops (potatoes, cereals) or fruit (grape).
Contrary to crops, grass grows also without planting, fertilizing, weeding etc., even though, with lower yields. Cows also give milk when just let for pasturing by themselves. A potato field, however, will not yield any potato if not planted, and hardly a potato if not fertilized and sprayed. A vineyard will not yield a liter of wine if not planted and hardly a liter if not trimmed and sprayed.

Implication for Projects: Effects/returns of action/inaction on pasture are merely qualitative: more or less grass, more or less milk. In contrary, in crop production, the returns have an almost binary character (potatoes or no potatoes, grapes or no grapes) and are therefore very drastically visible. This may further explain the reluctance observed in many Georgian regions against investments in finance or labour for pasture-related economic activities.
This phenomenon may call for caution regarding ambitious development goals in pasture related livestock activities and advocate preference for branches where effects are more drastic and easily visible like fruit or crops.

5.3. Estimation of pasture quality and productivity by the pasture users themselves

In the interviews, farmers unanimously judged the quality and productivity of their pastures as entirely satisfactory, regardless of the season (except winter) and identified no necessary or useful improvement measures (apart from, in few cases, irrigation). In no cases did farmers record trends towards better or worse quality of their pastures. Farmers are unaware of any forgone potential of their pastures or the quality of the forage produced.

Implication for Projects: The possible improvement and the economic consequences thereof must be demonstrated if measures towards improved pasture productivity and quality are to be promoted. Without awareness of currently forgone potential profits/expectations of possible improvement, the motivation to implement improved methods cannot be expected.
Showing why comes before showing how.

5.4. Current pasture and hayfield use practices in Georgia

Apart from irrigation (few cases), no measures of pasture maintenance were reported in the interviews. The interviews yielded little information about pursued practices in pasture use. It appears that there is little formal knowhow being applied about which the inquired farmers could inform. A deeper understanding could be gained by the method of participant observation, i.e. by a researcher staying at a village/with a nomad family during a pasturing season, actively participating in the activities.
The findings of the interviews can be summed up as follows:

- **Village pastures** include unfenced land in and around a village. Cows are left to freely pasture these areas during the daytime. Sometimes, a shepherd is responsible to guard the cows and leads them towards the areas with best forage. Some village pastures may benefit from irrigation. No other activities (such as fertilization, bush and weeds clearing) were reported in the interviews.
- **Pastures outside of villages, mountain pastures**: Pasturing is self-regulated among local and nomadic pasture users. Self-regulated means that shepherds are free to lead their herds to locations with best grass growth, coordinating herd movements and pasturing areas informally among themselves. In some regions, however, (i.e. Adjara) undocumented geographically defined pasture areas attributed to villages or families exist that are being recorded in the community memory.
- **Hayfields:** Hay is made individually by farmers (and businessmen). Hay is made on private hayfields, on surfaces rented from the municipality for that purpose, or as a secondary crop, e.g. in the rows between grape plants. Hay is cut at a very late stage (seed ripening stage, in mountain pasture even later), apparently in order to increase the quantity per harvest. Moreover, farmers avoid cutting hay before the stable dry summer weather conditions have set in, because the limited availability of machinery impedes the timed use of short dry weather windows.

5.5. Common action on common pastures, dispute settlement

No formalized structures and no structured processes of common pasture management were reported in interviews, with exception of one village where the pasture users are represented by a Nakhiri president. However, informal common decision making and implementation was reported, generally by discussions towards a consensus. Common action in some cases even included common work for irrigation. In one case, a joint decision on how the reduction of the village herd can be implemented after the village pasture was reduced through sale.
The opinion of elder farmers and of the shepherd has an increased weight in decision processes due to their experience.
The benefit of introducing formalized structures was in all cases roundly declined. This was judged incompatible with Georgian mentality.
In some village pasture use conflicts were reported, primarily regarding trespassing nomadic herds, which refused to respect the villagers' user rights and which could not be expelled. On mountain pastures, only minor conflicts that could easily settled were reported.

Implication for Projects: Project ventures that include the necessity for farmers to organize in formal organizations are faced with obstacles related to mentality and lack of a tradition. However, it can be supposed if the forming of formalized organizations is a prerequisite to obtaining an ownership certificate for a pasture, farmers will comply, at least formally.

5.6. Integration into the monetized economy/access to bank saving services

Interview questions about the motives for animal sales decisions aimed at identifying the level of integration of livestock activities into the monetized economy. E.g. members of farming communities not entirely confident with monetary values and/or with limited access/confidence to bank saving services (e.g. encountered in Mongolia) tend to sell animals when they need the money to purchase goods or pay fees, not at the moment when the optimal slaughtering conditions are attained. Keeping non-productive animals as live assets instead of money in cash or on bank accounts can, in consequence, explain excessive herd sizes.

The hypothesis that, in Georgia, sheep herd sizes are bigger than optimal due to keeping animals as live assets could not be supported by the data collected. Fattening sheep are invariably sold in autumn, keeping fattened sheep through the winter as live assets is inexistent.
Sheep herding follows a strictly seasonal cycle: sheep born in spring are sold in autumn, regardless of market prices and cash needs of the farmer. How the number of ewes to be retained/young breeding stock is determined, could not be documented.
Cow herd sizes are limited primarily by the available pasture surface. However, the moment to sell cattle was, in most cases, decided by the need of cash for a purchase. Interestingly, the current market price influenced the moment of sale in no case, either.
Bringing up a bull or a young cow seems to be a way of a "forced saving" for a major investment/expense, a convenient way of accumulating money requiring less discipline than trying to reserve a certain part of the daily income.

Implication for Projects: There is no potential to reduce herd sizes by promoting alternative asset saving schemes to Georgian farmers. However, there may be a potential to improve farmer's income by including the use of market information in a sale strategy.

5.7. Gender/outreach of activities to women

Dairy production is often the field of duty of women. On field trips, women were met who successfully managed a complete value chain from pasture to marketing of dairy products. It seems possible that the low priority of cattle operations in some regions as described in chapter 5.1. is less marked among women. For implementation of activities in the dairy sector, reaching the women is indispensable.

6. Guarding, distributing and transferring know-how

Empiric evidence gained on field visits hinted at a specific deficiencies of knowledge:

- Some improved practices seem not to be implemented because the relevant know-how is unavailable. In some cases, key elements of Western European equipment and know-how were mistunderstood or implemented in ways where the cost/benefit ratio was insufficient.
- Cost-benefit calculations and capital requirement estimates were sometimes absent or not used at their full potential.
- The terms sustainable development and modernization seemed not always clearly demarcated.

Implication: A thorough approach on the topic of knowledge exchange and knowledge management is beyond the scope of this study. Bu there is no doubt that improving the agronomic and economic knowledge base and knowledge distribution is a key to develop the pasture-based livestock sector.

7. The question of land overuse in Georgia

As stated in the introductive chapter, the study started testing the base assumption that, in line with the "tragedy of the (ungoverned) commons" concept, Georgian pastures suffer from a general overuse and pasture degradation since the end of the Soviet area. However, the consulted publications (Jarman, 2011, NACRES, 2013) stated that overuse was only found on a minority of the Georgian surfaces. The humid spring of 2015 showed pastures in excellent condition highlighted the limited value of statements that are not based on long time series.
While it quickly became clear that the study could not present a sizeable contribution to a scientific statement on pasture overuse, empirical evidence showed that it was improbable that overuse was a key factor for reduced pasture productivity:

- Wet conditions in the first half of 2015 provided for ample vegetation growth, highlighting the influence of the sample period to the outcome of measured pasture use levels.
- In most pastures the sward composition was good, therefore no pasture degradation according to the definition of page 2 could have occurred in drier periods before.
- Existing sward deterioration with high proportions of thistles or wild turnip is not primarily caused by overuse.
- Overused and eroded pastures are only documented locally, regionally and temporarily

The base assumption for the study was changed towards pasture overuse being a regional/local or temporal (dry summers, autumn) problem, among other issues of equally relevant inadequate pasture management issues. Specific information about the regions/ecotopes affected with overuse are to be found in chapters 7.5 and 10.3.

Implication for Projects/Policy: There is no general pasture overuse in Georgia, therefore general measures aimed against overuse are inadequate. Overuse, just as other forms of non-optimal land management, can and must be specifically addressed.

8. Legal frame conditions: land tenure, land taxes, current pasture use

8.1. Land tenure, roles of the state, municipalities and the private sector

Until 1991, under the Soviet Regime, there was no private land ownership in Georgia. Land was owned by the state (Gvaramia, 2013). After 1991 the post-communist Georgian state assumed de iure ownership of land in Georgia. Since then, the Georgian state has been engaged in privatization. Many Georgians have received homestead lots (1.25 ha). Mainly arable land has been handed over into private hands. The privatization of pasture land was stopped (Gvaramia, 2013) around 2008. *For further information, a document by S. Svanadze is added in Annex A2.*

Today, the Georgian state owns a sizeable amount of land (pastures, but also forests and unproductive land). The situation of ownership and control seems, in a Western European view, conflicting: The state is the *de iure* owner of the pastures, but the municipalities decide *de facto* about the use of pastures. E.g. municipalities decide which pastures are to be rented out (rents are shared between state and municipality). Municipalities have considerable discretion for enforcement: In Adjara, with consent of the community, private farmers cultivate potatoes and hay on plots that de iure belong to the state considering it as their ancestral land, without paying rents.

Considerable surfaces under state ownership has no proper registration, i.e. borders and surfaces are not defined, land is not mapped. Without documentation and demarcation, privatization is not possible and extorting leases and taxes is hindered. Therefore, particularly mountain pastures are often used informally, free of charge by local or nomadic herders.

Some communities make efforts towards registration of hitherto undocumented pasture land. According to statements made in interview with municipal the experts, mainly fiscal goals are actively pursued. Concepts of improved pasture or intentions to reinvest taxes or leases earned were in no case presented.

The Georgian state intends in the future to take control of all of the land fit for agricultural use and to advance its legislation with the goal of allowing its privatization (Government of Georgia, 2014). Therefore, it can be assumed that the ban on pasture privatization stipulated in 2008 is to be considered rather as a moratorium than a definitive decision.

Proposal for Projects/Donors: In its documentation of legislative strategy and action plan (Government of Georgia, 2014), the Georgian government still identifies the state as the main actor of pasture management. Private actors (i.e. pasture users, private entities) are not included in key operative activities. Possibly, the reason for the lack of presentable results is that the state does not dispose anymore of the needed manpower for such extensive operative activity, while the role of the private sector, which in non-centrally planned economies takes a great part of these activities, is omitted/neglected.

Direct support to the legislative process by donor organizations may be a promising development approach. *Further proposals relevant to land tenure can be found in chapters 7.3-7.7.*

8.2. Taxation of land ownership

Land owners are obliged to pay taxes on land owned. The land tax is differentiated according to the use potential of the land: the tariff of pasture land is considerably lower than the tariff for arable land. By informal use of state-owned land, the land tax is usually by evaded.

Officials of two municipalities stated that, for their municipalities, revenues based on land were the main tax source. Exceptions are municipalities which generate income through hydro energy or mining.

Even though pasture land benefits from a considerably lower tax rate than arable land, pasture users are opposed to the current tax regime and seem to judge evading taxes and leases through informal land use of public land as an irremissible escape from an overwhelming tax burden. They state that even the lower tax rate extorted for pasture land is excessive. Due to the high surface need and low profitability of pasture based livestock, the tax burden is said to be disproportionate compared to the economic performance of the pasture user. The pertinence of these statements is difficult to verify, but can neither be flatly denied. The modernization of Georgia's tax base may lessen the tax burden of pasture users someday.

8.3. Economic implications of land tenure

The discussion and activities around land tenure of pastureland are driven by different goals:

a) **Creating ownership to improve land resource use:** Suboptimal use of common pasture land can be attributed to **lack of ownership**: There is little incentive to avoid land degradation or to invest labour or money in pasture land that is not the actor's property or if there is no prospect that the land can be used over a longer time. Moreover, putting a price to pasture land attributes value to it, which can lead to an upgrade in the perception and the willingness to maintain it and invest in.
b) **ensuring the forage base in order to secure a larger investment** in cattle production (stable, dairy, meat producing)
c) Creating the possibility for the **state and municipality to generate public income** by selling/ leasing land or collecting land tax
d) Making pasture land available as **investment opportunity** for risk-averse investors. This goal is of particular importance in Georgia because investment possibilities other than real estate (e.g. manufacturing) are scarce
e) European donors, moreover, strive to ensure that land tenure reforms don't increase poverty, e.g. by safeguarding that low-income pasture users lose pasture access in the process or face an increased tax load without getting tangible benefits.

It is not surprising that not all the goals cited above are synergistic:

- Goal d) is not easily compatible with goal a). The risk-averse investor will sublease the land to a farmer who has no long-term perspective of land use. Goal d) would only be compatible with goal a) if the leaser could get a lease on very long term and would be given preference to purchase the land at a preferential price when the investor sells it. This, in turn, reduces the attractiveness of the land to the investor and lead to a considerably lowered willingness to pay, affecting goal c).
- Because most small farmers in Georgia are short on liquidity, land that is sold to the highest bidder rarely ends in the hand of small farmers. Unless regulations are introduced that give priority to current land users at considerably preferential prices, the privatization of pastures will, at least on short term, increase poverty in Georgia. These regulations however strongly affect goal c).
- Because currently, poor farmers use public land without paying rent or taxes (village pastures, unregistered/unleased outside pasture land), efforts of municipalities and the state to more thoroughly rent, tax or sell land automatically leads to higher fiscal charges of all pastures users, including poor farmers. This can only be avoided or compensated if municipalities and the state bindingly oblige themselves to protect low income pasture users or to earmark earned means for sole use as investments on the pastures it was collected from.

Implications for policy:

- Georgian politic actors in the land market will have to set priority among the conflicting goals pursued. Possibly, donors and lobby organization will may find it necessary to transparently communicate the interests at stake and the position the politic actors have taken.
- Donor financed projects that facilitate the registration of municipal land must insist that these activities are accompanied by binding obligations that protect the current pasture use conditions of poor farmers or compensate them for it.
- The described land purchase privileges are commonplace in all the countries of Western Europe as far as the authors know. If Georgia makes further steps to align to Europe in legal issues, the mentioned privileges may become an element of this process.

8.4. Attitude expressed by farmers towards pasture privatization

The majority of the farmers interviewed preferred to maintain current free access regimes to (resumed) privatization. Concerns were voiced that privatization may result in the (further[1]) loss of common village pasture surface through sale or renting out.

The directors of the herder's organization voiced two reasons for the opposition of herders to further pasture privatization:

- The need to buy land that has hitherto been used partly free of charge is a financial burden for herders. The investment is followed by the need to pay land taxes on the land newly under property, which in combination may exceed the herder's financial possibilities.
- If no clear preference is offered to pasture users, i.e. the possibility to buy land far below the market price (in line with current West European practice), non-farming investors may crowd pasture users out of the land market.
- Particularly farmers with low income and nomadic herders are not only disadvantaged by a lower spending power. Many of them lack access to internet and are unfamiliar with it. Therefore, they are technically discriminated against by the prevailing e-auctions. Equally, nomadic herders may find it difficult to participate in the pasture registration processes that municipalities in which they are not resident pursue.

Implications for projects/policy:

As further detailed in chapters 7.5.-7.7, the study assumes that land tenure reforms can only lead to improved pasture resource use on productive pastures (see definition in chapter 7.7.). In any case, negative effects on low-income local and nomadic populations should be prevented. Ongoing activities regarding pasture registration and, possibly at a later stage, privatization, can supported in the case of productive pastures and can be considered neutral to the goal of poverty reduction in the case of winter pastures and summer mountain pastures, provided the following conditions are fulfilled:

- Binding regulations at municipal level ensure that low-income users of current public pastures don't lose pasturing possibilities due to sales or renting out of municipal land
- Binding regulations at municipal level ensure that low-income farmers who currently use public pastures free of charge will, in the future, not be charged fees unless they directly benefit from improvements in comparable value.
- Binding regulations at municipal level ensure that new land tenure practices don't have elements that can exclude vulnerable populations from access to land.

8.5. Potential effects of land tenure reform on winter pastures

Georgian herders use winter pastures on low altitudes in Eastern Georgia. The climate there is moderately cold in winter, while in summer a hot and dry steppe climate prevails. Due to draught, the overall productivity of these pastures is relatively low. However, in winter some grass is available for the pasturing animals.

On winter pastures, overgrazing is documented (Jarman et al., 2011, NACRES 2013). Degradation, however, is limited to narrow strips along movement routes or drinking spots (NACRES, 2013).

The inherent risk of overgrazing materializes easily by comparing the surface of summer and winter pastures. Practically all the ewes of transhumant farmers grazing with their offspring on the vast summer pastures of Eastern Georgia must pass the winter on a relatively small area of the lowland pastures of Kakheti and Kvemo Kartli. Moreover, anecdotal evidence shows that migrant sheep farmers are opposed to feeding animals in winter with purchased hay, except as emergency measure.

Changes of land tenure can hardly change these base facts. Registration of land and appropriating it to a land owner may only have the consequence that the new land owners will allow the same animal load as before by extorting a fee to herders who don't own winter pastures, rather than relegating a part of the ewes to wintering on feedlot-type parcels using purchased hay.

[1] In Tsnori municipality in 2013, part of a commonly used pasture was reclassified as arable land and sold to a private farmer.

Relieving pasture pressure can only happen by mandatory action from a public body (municipality, region or state), based on a sound legal base and executed by a force with police authority. Whether a sufficient legal base for such actions for pasture land in general or for pastureland in a National Park exist, could not be clarified.

Proposed Measures:

- Changes in land tenure cannot relieve the pressure of animals to be wintered on a limited land resource. Changes in land tenure may, however, bring undesirable income transfers from land owners to non-owners.
- **Mandatory actions,** e.g. decreeing and implementing maximum pasture load thresholds, may be indispensable in order to reduce pasture overuse.

8.6. Migratory routes

Along animal migration routes, pasture overuse and pasture degradation can be observed (Jarman et al., 2011). Taking into account the high number of animals migrating from summer to winter pastures, damage on the pasture along these routes is unavoidable, regardless of the land tenure form. It seems that only the extent of the problem can be reduced, but that the problem cannot be cured altogether. It makes sense to separate two fundamentally different aspects:

- **Herders need to migrate from summer to winter pastures, through areas unfit for transhumant pasture.** The possibility to use even secondary public roads is limited because traffic perturbations are severe and of long duration. Predefining geographically precisely defined rights of way as legal easements imposed to lots may be an appropriate measure to ensure transhumance in long term. Alternatively, a migration route network in legal analogy to the Georgian highway network may also be spared out from privatization. Both measures originate rather from the area of transport and public communication law than from resource/pasture use.
- **Herds need to be fed while migrating:** A general right of free foraging on adjacent fields and pastures while migrating for migrating herders seems difficult to justify under any legal system. Therefore, free foraging on private fields/pastures and pastures where local communities have user rights cannot be assured. It may be unavoidable that municipalities restrict access of transiting herders to public pastures if they are threatened by overuse. Herders may have to buy hay or rent pasture access to feed animals while migrating where no freely available pasture areas can be sustainably pastured upon.

Proposed measures: Migratory routes were no focus of the study, the study team has insufficient information that allow making recommendations to rehabilitate degraded swards and to avoid further degradation. We refer to the entities active in rehabilitation of the migratory route network instead.

8.7. Productive pastures and summer mountain pastures

The term “productive pastures” does not originate from a public pasture classification. In the present study, it is used for all pasture land where the productivity is not reduced by climatic conditions, e.g. drought (steppe) or reduced vegetation period (mountain pastures). Most village pastures qualify as productive pastures, but also other pastures at medium altitudes.

On summer mountain pastures, the vegetation period is considerably shortened, starting as late as in early June in some places. The pasture productivity (in biomass/hectare) is considerably reduced, and the area necessary to feed an animal unit considerably greater than on the productive pastures. It can be concluded that most measures to improve productivity will not be implemented under any land tenure form because of the insufficient cost-/benefit ratio.

Proposed Measures: A positive cost/benefit ratio can be expected for measures to improve productivity on productive pastures, provided land tenure reforms provides ownership rights to the users, not to absentee owners, and the owner/users are motivated to invest. Therefore, land tenure reforms for productive pastures can, at certain preconditions, be recommended.

On mountain summer pastures, no measures for pastures improvement are known to have a positive cost-/benefit ratio. Therefore, no recommendation is made.

9. Value chain finance

Shortages of cash are a common bottleneck impeding farmers from purchasing needed and inputs like fertilizer, feed ingredients, animals, AI semen, hay making equipment, grass seeds, tractor services etc. Liquidity constraints are common in agriculture all over the world. They are addressed by value chain financing: A potent partner in the value chain finances the purchase of clearly defined inputs or investments and keeps the sales contract for the finished product as collateral. Alternatively, a bank can do the same.

Azerbaijani dairy entrepreneurs widely engage in trilateral agreements (e.g. a feed manufacturers provides feed to farmers, but gets paid by the dairy who carries the amount back to the farmer's account). However, due to the weak financial endowment of Georgian dairies it may be necessary that the capital base for value chain financing has to be provided by donors or projects.

Proposals for Project Activities PPA: A **simple value chain financing scheme** may be structured as follows: A rolling fund is endowed with project funds and administrated by dairies or input providers. Farmers procure specified dairy production enhancing inputs (e.g. feed additives, AI semen, …) from specified providers. The providers are reimbursed through the rolling fund. The dairy refinances the funds by deductions of a certain percentage from subsequent milk delivery payments.

A key element for the sustainability of rolling funds is the monitoring of proper practices through a joint committee of dairy stakeholders and project implementers.

Beyond livestock, the need for value chain finance has been voiced in crop production: After droughts, seeds could not be purchased, farmers see themselves compelled to sell crops in the harvest at very poor financial conditions etc.

Value chain finance is known as a crucial task in market-oriented farming in the Western world. It is usually addressed by rural banks providing liquidity backed by assets in kind or a business plan. In the case of the meat value chain, financing is sometimes provided by a value chain partner (feed manufacturer, slaughterer/retailer).

In Georgia, banks seem to be unable to provide the financing services mentioned above, potentially because of their inability to accept assets in kind (e.g. wheat, animals) as collaterals. This restricts the production potential of small farms and hampers rural development and reducing rural poverty severely. The absence of Western European Banks in Georgia, who could provide needed know-how, aggravates the bottleneck further. It may be useful that donor agencies take functions in rural finance.

10. Proposed actions at technical / agronomical level

10.1. Improving forage quality

Silage is an efficient way to transfer excess forage (grass, maize) into a highly nutritious forage conserve. However, the high weight that needs to be hauled, the high cutting and pulling forces involved in taking it out of storage are difficult to be performed without adequate machinery and equipment. Therefore, improvements regarding hay production (quantity and quality) represent the main potential for improved productivity.

Improvements of forage quality in general: The notion that hay is not uniform, but that quality differences of hay translate in higher milk yield seems not fully understood.

PPA: Promote demonstration experiments. Experiments must primordially show the production effect of the improved forage quality (**knowing why comes before knowing how**). Demonstration effects are best in milk production because, contrary to fattening, effects are visible within days or weeks.

Other conceptual aspects of the demonstration experiments (e.g. number, possible outreach, PR concept) must be developed by a project implementer.

Improvements of hay storage: In Georgia, hay storage is often suboptimal, e.g. in bails or small heaps under open sky, allowing the hay to lose nutritive value due to moisture and rot. Improved storage forms (under roof, covered with Tarpaulins, as haystacks in optimum form, see photo) are easy to implement.

PPA: demonstration experiments with milking cows; intra-Georgian knowledge exchange: The Benchmark region for intensive hay production and optimal storage is Adjara.

Moment of hay cut: Hay is cut when it stops growing, not when the nutritional value is optimal.

Earlier cuts improve quality and increase total harvest quantity, because the grass never approaches climax where biomass growth decreases. While the effects of quality differences can be shown through feeding experiments with dairy cows, the effects on harvested quantities are difficult to visualize.

PPA: demonstration experiments with milking cows

10.2. Potential of complementary feeding

When hay or mature grass is used as main forage for dairy cows, soluble protein in the rumen is the limiting factor for milk production. Adding urea (=carbamide) or, eventually, ammonium-nitrate, to the rations increases milk production with an excellent cost/benefit ratio: 50g, costing 0.05 GEL, increase the milk yield by 2 kg. Moreover, the best production increase potential happens times of low production and high milk prices (winter feeding, summer drought).
Urea and ammonium-nitrate are cheaply available as fertilizer and are readily eaten by cows. The best way of administrating is mixing with grain, bran, salt, mineral mixtures or calcium blocks. Caution must be given to not allow consumption of the pure product (risk of poisoning).

PPA: performing demonstration experiments with milking cows, organize and fund prefinancing by dairies through value chain financing funds schemes (see chapter 8)

10.3. Improvement of animals genetics

Animals of local descent are well adapted to the local conditions, but have low milk production and react poorly on improved pasture and improved feeding. The most straightforward way to combine improved performance with local adaptation is artificial insemination with imported rustic races (e.g. Brown Swiss, Abondance, Norwegian Red, …). AI is preferable to intra-race selection due to the much greater production increase. AI is also preferable to cattle imports because of the much lower costs and the absence of adaption issues.

PPA: Promoting the use of Artificial Insemination AI is already part of current implementers' projects (e.g. ALCP, Moli). AI use could be further enhanced by a financing through a value chain financing scheme as described in chapter 8.

10.4. Management of seasonal variability of forage growth

In Georgia, forage growth varies greatly between seasons. Additional to the vegetation rest in winter, there is a depression in summer due to drought. Accordingly, milk production varies greatly, and milk prices show a strong opposite variation.
In dairy, there are several possible strategies to deal with seasonal variations in forage growth:

a) Adapting the milk production to the forage resource, balancing the market supply through storage: For production of storable dairy products (cheese, butter, milk powder) this is often the most

efficient strategy. The extra costs for storing and lesser capacity utilization in processing are offset by lower production costs at farm level. For the dairy, selling cheese and butter produced with cheaper summer milk expensively in winter can be very profitable. The higher demand for summer milk will increase the depressed milk price.
The main challenges are the following:
Liquidity: Storing cheese for up to 6 months means blocking considerable amounts of capital. Small farmers in Georgia notoriously lack liquidity and need immediate milk payment. Banks seem unable to accept cheese stock as collateral. Providing capital (through a rolling capital stock or a bank warrant) may be an efficient measure / an adequate entry point for projects, respectively.
Technology and equipment: Butter and Sulguni cheese can be stored by refrigerating. With Imeruli cheese, storing is a 2-step-process including refrigeration after the first production step and conducting the second step before the intended moment of sale. Storing in a cellar with controlled temperature and humidity and vacuum packaging will also extend the consumable life span of cheese. The required capital investment provides an adequate entry point for development projects.

PPA: Providing a complete development package to enable dairies to go into long term storage:
- Access to storage equipment and technology, including training and coaching in the initial phase
- Facilitate cofinancing of the necessary equipment
- Providing solutions to finance the stored cheese, e.g. by providing a rolling fund

A key element for the sustainability of rolling funds is the monitoring of proper practices through a joint committee of stakeholders and the project implementers.
Enabling cheese storage is part of the activities of RED project.

b) Flattening the milk production curve through improved forage and feeding rations in summer and winter: Improving summer and winter feed rations lessen the summer and winter depression. The respective measures are discussed in detail in chapter 9.2.

c) Improving forage availability during the summer: Strategic fertilizing can improve forage growth in the summer (see chapter 9.5.). Reducing the animal herd or excluding certain parcels from pasturing in spring can create a reserve of “standing” forage for the summer. However, forage digestibility is severely reduced.

d) Shifting the milk production curve towards summer: By delaying the calving time from spring to summer, the milk production in the summer months can be increased. This however requires improved summer forage, otherwise nutrient deficits can endanger animal health.

PPA: **Cheese as a storable product is the main product of the Georgian dairy branch. If the financing issues can be solved, promoting cheese and butter storage is the most cost-effective way to deal with seasonal variability in milk production.** At the same time, it does not require efforts that small farmers struggle to perform. Improving summer/winter feed rations are more useful when pursued with the goal of increasing overall productivity.

10.5. Fertilization

In Georgia, pastures in general receive no fertilization, neither organic fertilizers (slurry, manure) nor mineral N or P/K fertilizers. The fertilization strategies are possible:

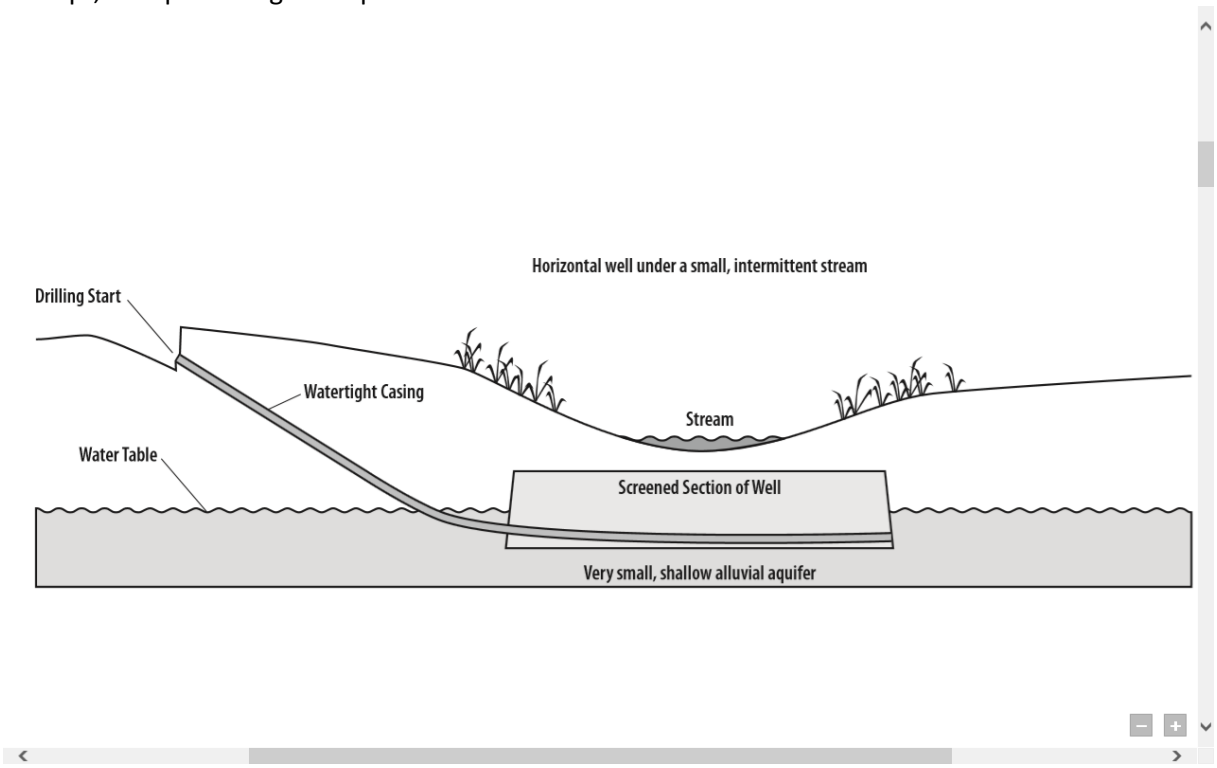
- **General fertilization:** Fertilization of pastures – with organic fertilizers, phosphorus, potassium and nitrogen (ideally based on soil analyses or nutrient balance calculations) can increase pasture growth and, in consequence, animal carrying capacity and animal production considerably. Particularly in deficient soils, the cost/benefit ratio is clearly positive. Propagation may happen through on-farm demonstrations with strong media and PR backing, or by an advisory service incorporated into the agro-input sales network.
- **Strategic N-fertilization to increase pasture growth into the dry season:** Nitrogen fertilizer is applied at the end of spring, in order to increase the growth of a grass stock to be consumed by cattle

during the summer. The direct effect in animal production is considerably smaller than if the fertilizer applied in spring, the increased summer milk quantity can be sold at a higher price. However, it may be difficult to visualize the effect sufficiently.

PPA: performing demonstration experiments on experimental plots, organize and fund prefinancing schemes for fertilizer purchases through value chain financing funds (see chapter 8.1.)

10.6. Strategic positioning of animal watering installations

Lack of water limits animal production on pastures in several ways: through direct production limitation (particularly milk production), reduced feed uptake, time lost for grazing and energy losses due to trekking to drinking places and back, overuse and swath degradation near drinking places and underuse of pastures where no drinking water is available. The strategic positioning of drinking places can increase animal productivity through better pasture use and higher animal production. Innovative, cheap and low-tech solutions for drinking places can be found in the document "Waterers and Watering Systems: A Handbook for Livestock Producers and Landowners" (Blocksome et al., 2006). As an excerpt, four promising concepts are cited.



Horizontal well under an intermittent stream, seized by a subsoil drain

Watering basin made of a tractor tire filled in with a concrete floor

Rain water harvester

Animal-activated water pumping system

PPA: install pilot watering units, facilitate co-financing according to current project co-financing rules or through a value chain financing scheme

10.7. Elimination of bushes

No statistical data are available, but field visits in Georgia left no doubt that great surfaces of Georgian pastures are lost to bush and forest growth. The public perception of this resource loss seems is low or inexistent, which is typical because the slowness of the process. The consequences are considerable: Apart from the general loss of agriculturally productive surface, reduced available pasture in the productive lowlands means that sheep stay longer on winter pastures, which increases the existing pasture overuse/reduces the time for recovery. Moreover, sheep and cattle move earlier to the summer pastures, which increases the pressure in the moment most critical to erosion (see chapter 8.7.)
Pasture surface loss to bush growth happens only on productive pastures in low or medium altitude. Why in earlier times, these pastures have remained free from bush growth is unclear. Paid efforts by Soviet institutions, different climatic frame conditions (less precipitations, lesser CO_2-content of the atmosphere) can be possible causes.

Manual pasture clearing is relatively simple, and the high availability of low-cost labour in Georgia allows a rather easier cost-benefit ratio than in Western Europe. However, no one of the farmers interviewed mentioned to have ever engaged in bush clearing. This may be explained by the slow payback of labour investments/long time elapsing before the pasture loss occurs (1 generation).

Contrary to belief, controlled wildfires are allowed by the Kyoto protocol. Even whether CO_2-emissions generated by controlled wildfires must be included into the national CO_2-balance has not yet been concludingly determined (Narayan, C., 2007).

Wildfires need to be coordinated, particularly with municipalities, in order to assure professional planning and safety measures.

PPA:

- **Awareness rising:** Bush clearing is currently inexistent. This increases the importance of awareness rising. Municipal bodies may have to take an important role, particularly regarding public pastures.
- **Controlled fire, chemical and mechanical methods:** Adequate techniques have been developed, but need to be adapted to Georgian conditions and condensed to easy-to-understand practical manuals usable for farmers/ responsible persons for pasture management at municipal level. Model examples are: https://futurebeefnew-daff.netdna-ssl.com/wp-content/uploads/fire_management_guidelines_for_southern_shrubland_and_pilbara.pdf, http://oaktrust.library.tamu.edu/bitstream/handle/1969.1/87710/pdf_57.pdf?sequence=1&isAllowed=y

10.8. Elimination of infesting weeds

Some pastures suffer from great amounts of unwanted species/infesting weeds, e.g. thistles, wild turnip. There seems to be a lack of knowledge on how to reduce or contain the unwanted species.

PPA: Condense measures to contain unwanted species/weeds into easy-to-understand practical manuals usable for farmers. Model examples are: http://www.liebegg.ch/pdf/1339740758-mb_ackerkratzdistel12c.pdf. The know-how must be propagated by well publicised demonstration pasture improvements. In order to assure sustainability and perpetuation, the know-how should be implanted into an advisory service which may be incorporated into the existing agro-inputs sales network or created from scratch.

10.9. Improved sales prices of export lambs

Fattened Georgian lambs, along with animals brought across borders from Armenia and Russia, are sold in the autumn to customers in Muslim countries. Sales on the Georgian meat market seem to be insignificant. In recent years, the Islamic holidays, which depend on the lunar calendar, were in autumn and matched well with the fattening period. Now, however, Islamic holidays will be in summer and, in future, in spring, too early for Georgian lambs. The future will show whether this will impair animal sales, or if the Georgian and Central Asian lamb offer will enter into a cyclic division of lamb offer with other producer regions with differing climatic cycles (Oceania, Latin America, Africa).

Currently, only three countries import sheep from Georgia: Azerbaijan, Iran and Jordan (Gonashvili, personal information). The dominance of the Azerbaijan export market creates a dependency which leads to depressed prices. The following reasons are cited why other countries have stopped from importing directly from Georgia:

- Veterinary status
- Quality issues (underweight animals, lack of uniformity, impossibility of procuring to standards defined by the buyer)
- Carcass properties: The market for tail fat seems to have disappeared.

PPA:

- **Genetic improvements:** Hybridisation breeding and suppression breeding with sturdy foreign meat genetics can improve performances and increase the part of animals reaching the weight threshold estimated at 30 kgs of live weight (Kochlamazashvili et al., 2014). However, the amount of breeding rams to be imported must not be underestimated; a financing solution may be needed. The imported breeds will have to prove their robustness before widespread acceptance can be expected. Moreover, discussing imagined and economically relevant qualities of traditional Georgian breeds vs. imported breeds in a non-emotional way may be challenging.
- **Selective marketing:** On the long trek from the summer pastures to the main markets (Marneuli, Rustavi) where unsufficient pasture forage is available along the migration route, fattened animals lose weight. Interviewed experts did not doubt that the value of the weight loss exceeds the cost of truck transport. Sales out of the herds or improvised short-time markets in the summer pasture areas may yield a higher share of animals above the weight threshold. Also, selective animal buying according to quality standards may offer the possibility of satisfying the demand of countries with higher quality thresholds. However, the acceptance for both measures may not easily be won, taking in account conservative attitudes, the reported aversion of herders towards a protracted animal sales process, and the difficulty to access nomadic populations with campaigns and vocational education. Absentee owners of large scale herds may provide an entry point.

11. Measures proposed for specific regions

11.1. Adjara (Khulo municipality)

Farming in Adjara/Khulo municipality is fundamentally different from other parts of Georgia visited. Agriculture activities seem to be an essential part of the identity of the farmers in the visited Khulo municipality. Cattle and potato farming are the main income sources. In cattle farming, income from selling bulls for fattening seems (somewhat surprisingly) to be of equal economic importance as dairy production. Milk is being transformed on-farm to local cheese and butter. Complementary non-farming activities seem not to be sought after, Adjaran farmers seem to privilege rather the expansion of their cattle herd, e.g. through purchase of hay.

Farming techniques are well developed: hay is stored in the dry, irrigation (gravity) for hay- and potato fields, is maintained, potato fields are being planted at levels beyond 2000 m.a.s.l., artificial insemination is being applied.

In interviews, farmers stated that the limited interest in dairy production is due to limits regarding processing facilities and marketing channels. The project ALCP includes activities that support dairy processing facilities in Khulo municipality.
Up to now, no commercial dairy seems to exist in Khulo, therefore families make cheese and butter themselves. Neither seems there to be a formal marketing channel. Dairy products are individually sent to markets in Batumi. The high transaction costs involved reduce the profitability of dairy production. Moreover, prices may collapse in spring when production outpaces demand.
According to oral information of the municipal authorities, land in the Khulo municipality remains unregistered. Only high mountain pastures are in common use. All other land is mainly used as hay- and potato fields and is privately owned and privately cultivated by individual families. Land titles and land borders are not publicly documented, but acknowledged through the community. The municipality doesn't extort land taxes or land leases, nor does it allow land leases or land sales through the public e-auction. The municipality finances itself mainly by the transfer funds of Georgia's national treasury and (probably, the municipality didn't refer to this income source) by tax income from hydro energy.
Development activities implemented among others by ALCP, include:

- Support to the of dairy products processing facilities
- Facilitated access to AI and improved local cattle genetics
- Animal registration
- Facilitating of veterinary services
- Providing access to protein components (brewer's grains)

PPA: The high status that cattle farming enjoys in the social life of the region and the high professionalism that the farmers prove allow the expectation that further measures related to cattle farming are keenly implemented. Such further measures could be:

- Increasing hay quality by earlier cuts (see chapter 9.1.)
- Demonstrate/advise case-specific measures to improve forage growth: adapted fertilization, sward improvement measures, combatting weeds.
- Introducing cheap artificial feeding (urea/carbamide, see chapter 9.2.)
- Supporting milk processing/storing/marketing structures in Khulo.

11.2. Racha

Racha suffers from rural exodus and abandon of agricultural and non-agricultural activity. Outside of regional centers like Ambrolauri the exodus of the younger generation seems to be nearly complete. A considerable number of villages seems to only have a sizeable population during summer. In others, the all year remaining population is elderly. In large areas of Racha, the exodus seems not to be something that can be prevented. It has happened already. The remaining questions are

- can the exodus in the remaining central parts (e.g. around Ambrolauri) be prevented?
- can seasonal population / farming be assured?
- can exodus that has happened be reverted?

Commercial farming at a major scale and commercial haymaking are hampered by the fact that pasture are small, unshaped, difficult to be worked with machinery. The ongoing bush growth aggravates the problem continuously.

Reasons for emigration: Emigration movements of population from peripheral to central regions are being described in the migration theory (E.S. Lee) by push/pull factors. For Racha, the following push/pull factors are relevant:

Economic push/pull factors: Particularly the employment possibilities created by economic growth and low unemployment in Tbilisi exert a great pull to young people of all levels of professional formation. The possibilities of employment are limited in the Racha region. However, good income possibilities in independent activities in farming (and possibly also in lumber) are documented and are not fully used.

- The ample available pasture surface allows free pasturing of considerable herds in many villages. Interviews were made with (male and female) farmers owning 10-20 cows, allowing them incomes

that considerably exceed salaries paid for employed labour. Income generated during summer on a mountain village (with rented cows) was reported by a farmer to be enough to sustain his livelihood during the rest of the year.

- During summer, the local market for selling dairy products is profitable. During the rest of the year, sales are considerably lower. However, freight transport of cheese by Marshrutka to Tbilisi seems to be reliably functioning. Therefore, market access is not considered a bottleneck.
- Racha has ample forest surfaces. There are a few small, but adequately equipped saw mills. They only seem to produce for the region's lumber needs. Even the low available capacity is underutilized.
- Living costs are much lower in Racha than in Tbilisi, particularly for people owning house property in Racha.

Lack of entrepreneurial potential: Interviewed farmers mentioned the lack of employment offer in Racha as explanation for the emigration of their sons. People in Racha seem to show a strong preference for employment. Available steady employment by the locally based Blauenstein meat producer are readily accepted and have even lead to remigration. Other employment, e.g. in the lumber sector, seems to be rather scarce and merely intermittent. Possibilities to generate income from independent activities are often overlooked.
The meanwhile good economic perspectives due to the ample pasture surfaces allowing to keep big herds fail to attract young people to take up farming in Racha. Also, the sawmills in the region seem to lack the entrepreneurial capabilities to operate a marketing network beyond the borders of Racha.

Social and cultural factors: There are no demographic factors that limit the pull of Tbilisi as a centre: A common language, a common religion, and possibly already a considerable community of emigrated people from Racha allow good integration. The remaining demographic factors that may incite young people to stay in Racha (family, friends) may disappear quickly the more emigration proceeds.

Political factors: National policy can influence migration by directing the establishment of processing factories to certain regions through incentives. However, in Georgia, the processing sector is of small size. Service jobs in contrary are not mobile (services mainly have to be provided at the location of the customer), the possibilities for regional steering of job creation are therefore low in Georgia.

PPA: Make the best possible use of the job potential in the region by taking in account the very low level of entrepreneurial activity in the region:

- Promoting investments and publicity in green tourism (focus on tourist from Eastern, possibly also Western Europe)
- Facilitating the implantation of lumber transforming companies – Georgian or foreign – to open the national market to Racha's enormous lumber resources
- Exploiting the job creation potential of the Blauenstein meat facility fully: through expanding (into pork, as planned), increasing capacity utilization (increasing meat output beyond the current 3 animals/week), increasing processing depth (transferring meat dressing, sausage production etc. from Tbilisi to the Racha plant). Concepts promoting that Blauenstein's hay consumption can, to the highest possible extent, be met by local farmers or seasonal haymakers are useful, too.
- However, with advancing bush growth and emigration, haymaking for export is hardly possible. Most pastures cannot be worked with machines anymore, and for manual haymaking, the remaining local labour force may be insufficient.

Supporting the remaining farmers with in investments, with loans etc. can slow down the rural exodus in Racha. Also, facilitating seasonal migration of farmers from the Ambrolauri region and surrounding regions to Racha's mountain pasture is useful.
Facilitating the seasonal immigration of sheep herders from other regions may at the same time combat overgrowth of Racha's pastures and lessen the erosion problems elsewhere. Equally, the seasonal or permanent immigration of Adjaran farmers may combat overgrowth, revive Racha's economy and relieve the currently high animal load in Adjara.

11.3. Pastures/regions directly threatened by erosion

Ongoing erosion in Tusheti (left) and near Gudauri (right)

While pasture overuse is not a generalized problem in Georgia, it cannot be overlooked that erosion caused by excessive and inadequate pasturing threatens, in specific regions, pastures and sometimes complete mountainsides. The regions and pasture types affected differ, such as the season of exposure. In Tusheti, erosion threats are visible throughout the region, already affecting public infrastructure such as the road network. In the foothills of the Greater Caucasus, locally, steep moraine slopes used as sheep pastures are eroded. In the lesser Caucasus, the erosion threat seems to be seasonally concentrated to the first weeks after snow melting, when arriving animals pasture on the still very sparse pasture cover.
Contributing factors are:

- intensive pasture by sheep and horses
- brittle base geology, shale/slate type bedrock, common in many parts of the Greater Caucasus
- glacier moraines made of sand/stones of small diameter.

The pasturing strategy of shepherds influences erosion as follows:

- Mountain pastures are pastured too early, just after snow melting, probably because of exhausted winter pastures or in order to avoid pasture leases charged for the temporary use of pastures in the Georgian lowlands
- Poor pasture choices of herders: excessive pasturing time on steep slopes with thin sward covers while plots with lesser erosion risk exposure (good sward cover, flatter topography) are available
- Apparent preference of sheep/herders for young grass/thin vegetation cover compared to high vegetation cover/mature grass
- Apparent aversion of herders towards excessive herd movement

Better choice of pastures sites often enough to significantly reduce erosion risks, reduction of animal numbers is often unnecessary. It is doubtful whether land tenure changes can lead to changes in the pasturing strategy. Improved pasturing strategies may have to be enforced by police measures or encouraged by forms of contract farming.
More profound information about causes and protective action can be found in the documentation of the GIZ project “Integrierter Erosionsschutz in Gebirgslagen im Südkaukasus”.

Conclusions

Pasture overuse is a regional and local problem in Georgia. It cannot be considered an overreaching cause of reduced pasture productivity, but figures rather among different issues of inadequate pasture management which must be individually approached. Improved use of pasture resources requires applying a broad line-up of different measures in a situation- and solution-specific way, such as:

- Ease bottlenecks in capital availability, e.g. by implementing simple forms of value chain financing at farm and processor level

- Create awareness for possible productivity and financial gains through improved practices, use of inputs, investments in labour and capital. **Showing why comes before showing how.**
- Prepare technical advice on issues that are easy to implement and promote it through different channels (demonstration experiments with full PR coverage, VET, media, advisory services, product providers, intra-Georgian knowledge exchange etc.).
- Support activities for documentation and registration of productive pastureland in the medium altitudes. Promote that the user rights of current pasture users with low income and of nomadic pasture users will not be severed, that efficient common pasture use will remain possible in a future pasture tenure and that in a possible subsequent privatization, pasture ownership will not be mainly past to non-farming absentee individuals.
- Support state and municipal authorities in establishing and implementation of regulative edicts and police measures to prevent or correct unsustainable or disaster-risk-increasing pasture practices.

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Heining, Rüdiger, UNDP Georgia, Project Manager Skills for Agriculture
Municipality officials in Dedoplitskaro (Kakheti), Dmanisi (Kvemo Kartli) and Khulo (Adjara)
Kobakhidze, Levan, Project Leader Regional Economic Development RED Programme
Kochlamazashvili, Irakli, International School of Economics at Tbilisi State University
Phularani, Tornike, UNDP Georgia: Project Manager; Sustainable Management of Pastures in Georgia to Demonstrate Climate Change Mitigation, Adaptation Benefits and Dividends for Local Communities
Schulz, Carsten, Project Leader Market Opportunities for Livelihood Improvements MOLI
Svanadze, Sofia, National Programme Officer, Swiss Cooperation Office, Tbilisi
Prof. Toutladze, Agricultural University of Georgia

Field excursions undertaken:

Sagarejo (Kakheti): interviews with farmers and herders, inspection of pastures
Tsnori (Alasani valley, Kakheti): interview with farmers and Nakhiri responsibles, inspection of pastures
Udabno (Kakheti): inspection of a project of pasture improvement (project undertaken by Moli)
Dmanisi (Kvemo Kartli): interviews with farmers
Georgiashvili (Kvemo Kartli): inspection of a dairy farm and cheese factory
Uraveli, Tsnisi (Samtskhe Javakheti): inspections of a dairy farm and a cheese factory
Khulo (Adjara): interviews with farmers, a municipality official, a veterinary
Oni (Racha): visit of a beef production farm, slaughterhouse, beef pasture; interviews with farmers

Annexes

A1: Questionnaire
A2: Assessment of the legal status quo regarding pasture land and the legislative programme on pastures of the Georgian State
A3: Feedback/comments of the implied partner projects

Annex A1: Questionnaire

Questionnaire Pasture Study

Address: _____
Region: ☐ Racha ☐ Kakheti ☐ Kvemo Kartli ☐ Samtskhe-Javakheti ☐ Adjara
Age: _____
Ethnicity: ☐ Georgian ☐ Azeri ☐ Armenian ☐ Other: _____
Occupation: _____
Number of family members: _____
Pasture type user: ☐ Specialized herder ☐ Mixed farm ☐ Business with employees ☐ Subsistence farm
Proportion of income generated by livestock activities:
☐ 15% ☐ 25% ☐ 50% ☐ 75% ☐ 100%
What is your main income source other than livestock? _____

1. Type/ Number of livestock owned (indicate number in the box):

Milking cows	
Young milking cows	
Cattle for fattening	
Breeding bulls	
Sheep	
Other: _____	

Do you have animals in your herd which currently do not produce milk or gain weight? If yes, why?
No ☐ Yes ☐, if yes, why? _____
_____

2. Access to pastures:

Do you have access to public pastures:	Yes ☐ No ☐
Do you rent a pasture:	Yes ☐ No ☐
Could you rent a pasture:	Yes ☐ No ☐

Pastures owned/rented: _____ ha
Hay fields owned/rented: _____ ha

Decisive factors for the herd size/animal sales

3. What determines the size of your herd? (set priorities)
Available summer fodder ☐ Available winter fodder ☐ Money ☐ Space/ Barn ☐
3.1. Would you like to increase number of stock, why, why not?
_____
3.2. What determines the size of the village herd / the herd that goes to the municipal pasture?
_____
3.3. What kind of stock is the village herd / the herd that goes to the municipal pasture composed of?
_____
3.4. When do you sell an animal destined for slaughtering (not milking cows/goats)?
Lack of fodder ☐
Optimal state of fattening ☐
Need cash for an acquisition ☐
When market price is high ☐
When I find a customer ☐

3.5. *(only for sheep farmers:)* **If cheap freezing services were available: Would rather store fattened animals you don't want to eat or sell immediately slaughtered in a freezer than keeping them alive in your herd?**
Yes ☐ No ☐ why?

3.6. Do you have a bank account?
Yes ☐ No ☐

3.7. Do you trust banks and keep savings on your account?
Yes ☐ No ☐ why?

3.8. What are your future plans for your herd size?
_____

Qualitative, subjective description of pasture situation

4. How do you describe the pastures you use?
During spring: ☐ Productive ☐ Degraded ☐ Overused ☐ Underused ☐ other shortcomings:
During summer: ☐ Productive ☐ Degraded ☐ Overused ☐ Underused ☐ other shortcomings:
During autumn: ☐ Productive ☐ Degraded ☐ Overused ☐ Underused ☐ other shortcomings:
During winter: ☐ Productive ☐ Degraded ☐ Overused ☐ Underused ☐ other shortcomings:

4.1. Does the pasture quality increase or decrease the farther away the pasture is from the village?
_____

4.2. How does the surface of available pasture evolve?
Increase due to cleaning/reclaiming ☐ Decrease due to overgrowing ☐ Decrease due to erosion ☐

4.3. Did the overall pasture situation (available surface, fodder quantity and quality, competition by other herders) improve or worsen? What are the trends?
_____

4.4. Is the situation different whether the pastures are municipal pastures, state owned or private?
_____

4.5. What are the reasons for poor pasture quality?
_____

Management practice / Qualitative, subjective description of pasture organization

5. Please describe how you use the pasture (access and use management)?
_____

5.1. Who decides how to use pastures/ where to graze?
Everyone for himself ☐ Group decision among neighbours ☐ According to written rules ☐ Shepherd ☐ Head of the Nakhiri ☐ Other: _____

5.2. How are decisions implemented? Who enforces/monitors rules?
_____

5.3. Are there disputes over pasture land with neighbouring villages? How are borders defined?
_____

5.4. Who does maintenance work (watering stations, replanting, manuring, clearing bushes)?

All in a common effort ☐ Everybody gets a certain duty he complies with ☐ Everybody does what he thinks is necessary ☐ No one, maintenance work is neglected ☐

5.6. What would you do to improve the management of pastures?

_____

5.7. What needs to be done most urgently to improve pasture quality?

_____

5.8. Do you think that the common pastures with free access should be kept or should their status be changed? Please explain why and how.

_____

5.9. If free access to pasture is to be replaced by a concept of regulated and restricted access, what must be ensured to make this acceptable to you?

☐ All citizens of the municipality have the undeniable right to pasture a minimal number of animals per household
☐ Pasture rights are distributed equally, not sold, all decisions regarding the pasture are taken on a one man, one vote base
☐ Pasture rights may be bought and sold, but not to outsiders of the municipality
☐ Pasture rights may be bought and sold freely
☐ No complicated system of regulated or restricted access is necessary, simple privatization / sale as a whole is preferable
☐ Other, which? _____

State of pasture use practices

6. Are the following practices current?

Spreading of mineral fertilizer? Yes ☐, which?_____ No ☐
Elimination of weeds (manually, chemically)? Yes ☐ No ☐
Elimination of bushes? Yes ☐ No ☐
Reseeding with valuable grasses? Yes ☐ No ☐
☐ Other, which? _____

Qualitative, subjective description of hayfield situation/ organization

7. How do you make hay (when, where, how)?

_____

Making hay on municipal or state land:

7.1. Who decides when to cut hay and what surface to cut?

The municipality decides ☐ The head of Nakhiri decides ☐ Everyone decides for himself ☐ Informal group decision process ☐ Formalized decision process ☐

7.2. Is the hay harvest done by every family alone or is there and form of cooperation?

_____

7.3. Can the harvested hay be freely sold by the one who cuts it?

_____

7.4. Was last year all available hay cut? If not, what are the reasons for leaving hay uncut?

_____

7.5. Is the hay cut sufficient to feed your stock throughout the winter? Did you buy additional hay, if yes, from which region/ supplier?

_____

Seasonal pasture rotation

8. Where do your animals graze throughout the year?

_____

8.1. How many kilometres does your livestock walk between the most distant pasture?
_____ Km

8.2. Do you give animals away with a shepherd to distant summer pastures? If yes, what kind of stock?

_____

Subjective description of a potential optimal pasture access regulation/pasture use organization

10. Describe the optimal pasture and hayfield management practice in your view.

_____

10.1. What would be the organisational structure?

_____

10.2. How would you ensure access security for all village members?

_____

10.3. How can benefits of improved pasture management practice be divided equally among all village members?

_____

Annex A2: Pastures and land resources for common use

S. Svanadze, National Programme Officer, Swiss Cooperation Office, Tbilisi

The issue of pastures in Georgian legislation is not regulated with any specific regulation. Law of Georgia on Public Registry[2] defines pasture as one of the categories of agricultural land plot. There is no other definition of pasture in the legislation of the country. Moreover, legal issues related to pastures are scattered in various laws of the country. Article 4 of the Law of Georgia on State Property stipulates that "pastures, except the ones granted on lease before July 30, 2005 and the ones that are attached to construction-buildings standing on it, that are either in private property of natural persons and/or legal entities or/and in state property on the basis of an act issued by respective state or local government body with observance of relevant rules and procedure, shall not be subject to lease." In accordance with Article 7 of the same law agricultural land (including pasture) granted on lease shall be subject to lease in accordance with the procedures of direct selling.
Article 12 of the Law sets out that May 1, 2011 shall be set as a deadline for privatization of agricultural lands. If a lessee does not act as stated above, lease agreement will be repealed and the land will be privatized in accordance with the generally established rule, similar to the rule on privatization of the land under state ownership and granted on lease in the form of either auction or direct selling.
Article 47 of the Organic Law of Georgia on Regional Development adopted in 2005, stipulated that agricultural land that was not subject to privatization (i.e. pastures that were not granted on lease) should be transferred under the ownership of a self-government unit. Part of self-government units used this right and registered pastures under the ownership of the unit. However, the amendment made to the Organic Law in 2010 set forth that pastures should not be transferred under the ownership of self-government units. Consequently, pastures have not been transferred to self-government units since 2010.

Paragraph 2 of Article 107 of the Local Self-Government Code of Georgia adopted in 2014, indicates that agricultural land, including pastures that are under private property or registered as state property shall not be considered as the property of a municipality. Paragraph 3 of the same Article allows municipalities to apply to the Public Registry to register agricultural land (including pasture) which is not under registration and is within the territory of the municipality under its ownership. However, the same paragraph stipulates that such request of the municipality "does not strip the state from the right to register non-registered agricultural lands under the state ownership".
As for common use of pasture and land resource, the only regulation on this issue is given in paragraph 3 of Article 4 of the Law of Georgia on the Property of Land of Common Use[3]. According to the paragraph, "land may be under private, community or state ownership in mountainous regions." However, neither this nor any other law of the country defines the term "community ownership" and why should it exist only in mountainous regions. Civil Code of Georgia does not say anything about community property, as well. Thus, this type of property does not bear any legal implication without definition from the Civil Code.

" 2014-2020 Biodiversity Strategy and Action Plan of Georgia[4]" approved by Decree N343 of May 8, 2014 of the Government of Georgia also emphesises on the gaps in terms of pasture management. The document says that "the legislation and state programs do not regulate institutional frameworks for sustainable use of common pastures which, subsequently results in disorganized and haphazard grazing.

[2] https://matsne.gov.ge/ka/document/view/20560
[3] https://matsne.gov.ge/ka/document/view/32998
[4] https://matsne.gov.ge/ka/document/view/2342057

In addition to the lack of relevant knowledge on the part of farmers, degradation of pastures was also caused by incorrect privatization and granting on lease, as well as absence of mechanisms necessary for management of pastures in common use. Currently the state does not employ relevant regulations and mechanisms to ensure control of use of pastures under private as well as common use, promote observance of sustainable management principles of pastures and planning-implementation of complex measures directed to increase fertility of pastures."
The above-mentioned Decree sets forth strategic goals (including in regard with pastures) and action plan for accomplishing the goals. The action plan specifies the measures to be implemented within 2014-2020 with the purpose of introducing pasture management system. The measures are as follows:

Extract from Decree N343 of the Government of Gerogia on Approval of "2014-2020 Biodiversity Strategy and Action Plan of Georgia "

Overgrazing and degradation of natural pastures

Legislation and state programs do not stipulate institutional frameworks for sustainable use of common pastures, which results in disorganized and haphazard grazing. In addition to the lack of relevant knowledge on the part of farmers, degradation of pastures was also caused by incorrect privatization and granting on lease, as well as absence of mechanisms necessary for management of pastures in common use. Currently the state does not employ relevant regulations and mechanisms to ensure control of use of pastures under private as well as common use, promote observance of sustainable management principles of pastures and planning-implementation of complex measures directed to increase fertility of pastures."

Strategic approaches

- Environmental and economic conditions of agrarian biodiversity and natural pastures shall be valuated.
- A strategy on sustainable use of agrarian eco-systems and natural pastures and relevant measures shall be reflected in the action plans of local self-governments;
- Complete stocktaking and assessment of winter and summer pastures under the state ownership is necessary; State shall develop the conditions for privatization and/or granting on lease the winter and summer pastures under the state ownership;
- Legislative and institutional base for conservation of agro-eco systems and natural pastures as well as for mitigation of environmental pollution in agricultural form shall be improved;
- Biological agriculture shall be promoted and sustainable management and certification system shall be introduced in the field of agriculture and use of pastures;

Strategic goals, national goals and objectives and actions

B.1–o2.6. Introduction of sustainable and modern systems of pasture management on pilot territory and demonstration of the ways of mitigating grazing level on nearby forests; promotion of increasing the scale of successful systems to nationwide.	2014-2020	Ministry of Environment and Natural Resources Protection of Georgia, LEPL – National Forestry Agency, LEPL – Agency of Protected Areas, Ministry of Agriculture of Georgia, Non-governmental organizations	International Donors
Objective B.4-o1. Improvement of legislative institutional frameworks related to agriculture and food for conservation of agro-eco systems and natural pastures and their sustainable use.			
B.4-o1.1. Making relevant amendments to the legislation of Georgia with the purpose of establishing the principles of sustainable management of pastures of common and responsible bodies.	2015	Parliament of Georgia, Ministry of Agriculture of Georgia, Regional Administrations	State budget

B.4.-o1.2 Development of procedures for privatizing or granting on lease of pastures under the state ownership	2014	Ministry of Economy and Sustainable Development, LEPL – National agency for State Property Management, Ministry of Agriculture of Georgia, Local self-governments, Non-governmental organizations, experts	State budget
B.4.-o1.3. Development and approval of action plan for various sectors on the issues of sustainable management of agriculture and restoration of especially degraded and polluted zones.	2015	Ministry of Agriculture of Georgia, Non-governmental and Scientific-Research organizations	Donors
B.4.-o1.4. Development of a model for integrating the issues related to agrarian ecosystem and natural pasture management in strategic documents of regions and annual action plans of municipalities.	2015	Ministry of Agriculture of Georgia, Non-governmental and Scientific-Research organizations, Regional Administrations and Municipalities	Donors
B.4.-o1.5. Reflection of issues related to sustainable management of agrarian ecosystem and natural pastures in at least 3 (three) regional strategies and annual action plans of 6 municipalities.	2018	Regional Administrations and Municipalities Ministry of Agriculture of Georgia	Donors, local budgets
B.4.-o1.6. Development of sustainable management systems for pastures on protected areas.	2014-2020	Ministry of Environment and Natural Resources Protection of Georgia, LEPL – Agency of Protected Areas, Ministry of Agriculture of Georgia, local municipalities.	Donors
Objective B.4 – o2. Introduction of programs for promoting sustainable agricultural production and developing systems of certification and marking (including bio-agriculture, sample agriculture and sustainable systems of collection in the wild)			
B.4.-o2.1. Implementation of pilot project on sustainable management of natural pastures in at least 6 municipalities through using specially developed systems of certification/marking	2015-2020	Ministry of Agriculture of Georgia, LEPL – Agency of Protected Areas, Non-governmental organizations, private sector	State and local budgets, donors, private sector
B.4.-o3.3. Stocktaking of pastures under state ownership	2014-2017	Ministry of Economy and Sustainable Development of Georgia, LEPL – National Agency for State Property Management, Ministry of Agriculture of Georgia, Local self-governments, Non-governmental organizations, experts	State budget, donors

Annex A3: Feedback/comments of the implied partner projects

Moli project / Carsten Schulze, project leader:

My feedback to the study document – and as well to the study elaboration process – is as follows:

- Good to read, very comprehensive, conclusions are – in general terms – well thought through and formulated
- From the "point of view" that MOLI is working in 5 districts in Kakheti with quite specific ecological conditions, we cannot agree with all findings and the general conclusion drawn by the study, because the situation of pastures in Georgia is extremely heterogeneous, and very much changing from one to the other year. To make 1 example: in our region, we see a clear tendency of overuse, especially in those years with less precipitation (e.g. the quite difficult situation in 2014). Having seen pastures in 2015, I would never believe that there is a problem in this country, or in our specific region. - But since the study is not focusing on one specific area, I have to accept the above mentioned statement – but makes the study not really useful for our specific region. – This doesn't mean, that I want to criticize the study document provided.
- I very much regret, that the study team was not composed by Georgian pasture specialists, but this is not a feedback to the study document, this is a statement on the design of the study.
- I regret, that the study was not meant to specifically work on the situation in selected target regions of SDC funded projects, and to involve the projects in an appropriate way to sense more ownership to the study – and to self-formulate their pathways and ideas for future interventions – and exchange and discuss them with all actors involved. But, maybe, I have too high objectives towards such a study.
- I could have imagined, that out of all aspects shown in the study, 2 or 3 key elements would have been identified, to focus on and to elaborate further. I am still of the opinion, that the legal framework, the cadastral and pasture owner issue is "the" key underlying constraint on sustainable pasture management in this country. But the study is providing only general solutions for the next steps further by each of the projects – or by SDC as the donor agency. Here I see potential to be used as a follow-up based on the information provided.

ALCP Project

Thank you very much for the study and your comprehensive input, we find all the proposed activities reasonable and sensible which is of course the main point of importance.

However I do have a few comments which I think should be seriously considered and which could feed into ameliorating somewhat the background text of the report. In general I totally understand that due to your limited time and such a 'bear' of a subject, there are some areas which would change with more knowledge, a considerable portion of which would have come from documents which have not been consulted which would have further informed some of the background conclusions in particular. All references to documents below can be found on www.alcp.ge. I have detailed specifics below:

- The suggestion that the ALCP looks at dairy processing facilities in Khulo should be amended, all project documentation as well as our 2 hour interview, makes it fully clear that this is one of the central tenets of our programme, has been since 2008 and is underway as we speak and I am slightly surprised this did not come out more in your field visits particularly in relation to dairy work in AJ, KK and SJ.
- The reference to narrowing the AMR is a comment that should be amended. The AMR is a complex multi stakeholder issue and the issue cannot only be represented from the local farmer level. The road has been degraded for years and has considerably narrowed from its Soviet heyday and the Ministry of Economics who owns the route is currently engaged in re-appropriating it where it has been sold or built on. Please see the Annex in the annual report (available on the home page) on the AMR for full information on ongoing activities. Lack of any public government support or administration of the route has led to these sort of opinions from local farmers. Saying that the already sadly denuded route should be further narrowed based on a small number of interviews is like saying a main road should be diverted to take into account peoples' gardens. Mis-managed it is of

course an area of conflict but talking about road narrowing without putting it into full context is mis-representative.

- Municipal pilot in Dmanisi: I also think that the effort from Maia in arranging the two trips to Dmanisi municipality and in explaining our pilot work in municipal pasture dispute resolution and now in capacity building of the group in the municipality for managing municipal pastures did not quite come through. Perhaps it didn't come across to you clearly while you were there and I understand that perhaps had reservations regarding the model (which of course is your prerogative) but the model has been built a) at the request of the municipality itself which in the current context proactivity on the issue is to be heavily encouraged b) in response to a very clear needs analysis from years of research and field work. Please also refer once again to the conclusions of the Land Survey and the expert opinion of the consultant regarding municipal land. You might want to put some more emphasis somewhere on the fact that the process of devolution and decentralization to municipalities is ongoing and inevitable in Georgia and this is one way to look at (imperfect though it may be) a rationalization of pasture in terms of equity and efficiency at a more local level. There has been some success in the pilot too which I am sure Maia made clear and so perhaps a better and clearer reference to the activity as a pilot perhaps in a box as an example of a pilot activity would be appropriate. (Please contact Maia for help with this)
- Relevance of Livestock: It is stated several times in the report that livestock and the livestock sector is not of primary relevance, in such a way that it seems to become a generalization of the situation in Georgia with Ajara as an exception. This should be amended as it is misrepresentative, certainly of the ALCP programme area which covers as you know 3 regions and has been such a mainstay of SDC funding into the dairy and meat sectors. Although of course I completely understand these statements are applicable to certain agro eco systems in Georgia where cropping is more prevalent. The high relevance of meat and dairy in all areas of the ALCP has however been proven by extensive research at the market and farmer level and by results. It is a shame perhaps that you did not find the Focus Group surveys (all available on the downloads page of the ALCP website to which I directed you) which clearly state the importance of livestock activities at the farmer level. I seriously urge you to consult these, they are based on a far broader data set than your limited time allowed for and contain extensive sections on land use. Also and absolutely centrally not having been able to speak to women whose role it is in KK and SJ to produce and sell dairy products inevitably led to the conclusion oft stated in the report that livestock activities are somewhat secondary in many regions and for self-sufficiency rather than cash. Sales of milk are an absolute mainstay of the household economy in the ALCP programme area, milk collection centres as well as programme facilitated factories have been in operation for years. Where HH were/are unable to sell liquid milk, cheese and other dairy products is/was sold or exchanged for goods etc. in a complex web of intermediaries and social networks. For more on this please see any one of our market analyses and on the complex issue of the non cash economy including barter please see the informal economy study on the downloads page. As I said I do not disagree that this is the case in some areas you visited and with some of your interviewees, only that I can categorically state that this is not the general case for the KK and SJ & Ajara regions. In Ajara however you do note that it is different in livestock being the priority, interestingly I think I can explain this for you on a gender basis, in Ajara men have the role of the sale of dairy produce. We ignore gender at our peril.
- Gender continued: In fairness, you have drawn attention in the report to your knowledge that with a properly gender appropriate research strategy you would have had a fuller picture and you partially cover your bases. However I would think it wise here, given the concerted attention that the ALCP and other SDC projects have put into gender mainstreaming over the years under the direction of the SCO, to include at least a gender Roles and Responsibilities Matrix and Access and Control Matrix (see Ajara and KK Market Analyses) which would highlight the importance of the role of women in dairy. Without gender analysis and without diagnosing that women were key to success in the dairy sector our dairy work would have failed. Its importance cannot be overstated. And not only in dairy, understanding that women hold a central role in looking after the animals and diagnosing their illnesses etc. has also added considerably to the success and scale of the veterinary

sector same could be said of breeding etc. It is a subject we feel passionate about on Alliances, if it is of further interest please do see the M and E Manual on the ALCP homepage and Chapter 7 Gender and WEE for how it is systematized in the ALCP. The annual report on the home page will show you the disaggregated impact figures and you can examine these for the dairy and meat sectors in the body of the report.

RED programme

This report provides a great effort in trying to consolidate all Georgian pasture related issues into one document. SDC deserves great gratitude for organising such achievement.
However, some issues might require some more attention. They are listed below according to the chapters and recommendations witihin.

In general, the report is biased towards pastures and grazing by sheep rather than cattle. Statements about not much overuse etc. are valid for mountainous sheep and goat pastures but have less relevance for pastures used for cattle grazing. Pasture degradation and overuse during drought period is a problem in close vicinity of villages causing naghiris of cattle owned by small-scale farmers to walk long distances for better grazing and water. This significantly reduces productivity and yields having also a negative effect on animal health.
Opposite to bias towards sheep regarding pasture grazing the report is biased towards cattle when feeding experiments are concerned in chapter 10.
Potential conflicts between sheep and cattle using the same pastures has not been handled although it is common problem all around the world.
Also the reference to nomadic herders is quite questionable. There are very little truly nomadic families in Georgia. Even those shepherds participating annual transhumance cannot really be considered nomadic but employees of that process.

Chapter 4. The two recommendations for Implications for Policies are good in general. However some statements and Implications for projects might need some more elaboartion.
Implication for Policy: *Unregulated commons are undesirable from a resource use and resource protection point of view. Privatization is not the only alternative to unregulated commons, regulated commons can perform well, too.*
Implication for Policy: *When discussing the resumption of pasture privatization, it makes sense to include tenure forms of formalized common pasture use into the considerations.*
The Statement *' Current understanding is rather that dry rangelands have nonequilibrium dynamics where precipitation has more impact on vegetation than grazing does.'* might be true in literature but no research in Georgia has quantified the importance of too little rain or overgrazing.
Another Staement *'Rotational grazing only has advantages in rugged terrain, humid areas, and places where heterogeneity of the plant communities exists.'* might require the U.S. experiences to be compared with recent experience of movable fencing from Australian dry grasslands.
The recommendation for Implication for Projects are issues which have been tried a couple of times in Georgia. It would be very useful if some practical examples and experience explaining why farmers have not started crowding these demonstrated ideas. Some of the proposed Implications for Projects are not practical for mountainous pastures
Implication for Projects: *Simple herd grazing without plot differentiation by fencing, ideally under supervision of a herder, is a sufficiently sound grazing practice. The possible improvements are relatively small and difficult to visualize sufficiently. Projects are advised to focus on measures that yield more striking and more immediately visible effects like fertilization, weed and bush control, complementary feeding, haymaking, genetics. Implementation proposals are found in chapter 9.*

Chapter 5. This chapter summarises quite well the situation in Georgia regading pasture and hayfield usage practices. The informal 'Naghiri' system with cattle is common in every village but is so informal that only villages having had long contacts with donor projects realize that the informal spokesperson can be called 'president'.
However, the Implications for Projects give little practical advise.

Implication for Projects: *Project activities that assume major involvement, major investments or major reforms of their practices may have better results if the targeted activities enjoy high social status in the local communities. If target activities have a low social status, good results can only be expected if no major involvement of the target beneficiaries is required.*
Implication for Projects: *Effects/returns of action/inaction on pasture are merely qualitative: more or less grass, more or less milk. In contrary, in crop production, the returns have an almost binary character (potatoes or no potatoes, grapes or no grapes) and are therefore very drastically visible. This may further explain the reluctance observed in many Georgian regions against investments in finance or labour for pasture-related economic activities. This phenomenon may call for caution regarding ambitious development goals in pasture related live-stock activities and advocate preference for branches where effects are more drastic and easily visible like fruit or crop.*
Implication for Projects: *The possible improvement and the economic consequences thereof must be demonstrated if measures towards improved pasture productivity and quality are to be promoted. Without awareness of currently forgone potential profits/expectations of possible improvement, the motivation to implement improved methods cannot be expected. Showing why comes before showing how.*
Implication for Projects: *Project ventures that include the necessity for farmers to organize in formal organizations are faced with obstacles related to mentality and lack of a tradition. However, it can be supposed if the forming of formalized organizations is a prerequisite to obtaining an ownership certificate for a pasture, farmers will comply, at least formally.*
Implication for Projects: *There is no potential to reduce herd sizes by promoting alternative asset saving schemes to Georgian farmers. However, there may be a potential to improve farmer's income by including the use of market information in a sale strategy.*

Chapter 6. This chapter and its recommended Implication could have included some more practical examples regarding disseminating and transferring knowledge and skills.
Implication: *A thorough approach on the topic of knowledge exchange and knowledge management is beyond the scope of this study. Bu there is no doubt that improving the agronomic and economic knowledge base and knowledge distribution is a key to develop the pasture-based livestock sector.*

Chapter 7. This chapter has some statements and conlusions, which relate to the expectionally favourable spring 2015 of the study period. Some of these are quite hasty and might need more studies during late summer and autumn time. For example '*While it quickly became clear that the study could not present a sizeable contribution to a scientific statement on pasture overuse, empirical evidence showed that it was improbable that overuse was a key factor for reduced pasture productivity'* leads to very strict recommendation for Implication for Projects and Policies which can be interpreted many ways. Should Georgia do something against pasture overuse in those areas where it exists or not?
Implication for Projects/Policy: *There is no general pasture overuse in Georgia, therefore general measures aimed against overuse are inadequate. Overuse, just as other forms of non-optimal land management, can and must be specifically addressed.*

Chapter 8. This chapter tries to cover all legal implications and succeeds quite well. However, the unclear ownership and responsibilities for management and control of migration routes is not handled in the report. Roles of the Ministries of Economy and Sustainable Development, Agriculture, and Regional Development and Infrastructure, as well as local municipalities and National Food Agency's veterinary services require more attention before transhumance issues can be improved.
Also the issue of potential taxation of unused land is not discussed at all.
The productivity of mountain pastures can be increased with very low costs by rotational grazing but most literature regarding 'productive pastures' handle issues of fertilizing, introducing grass varieties etc. which are not relevant for high mountain pastures. Therefore such cost/benefit calculations are not relevant either.
Proposal for Projects/Donors: *In its documentation of legislative strategy and action plan (Government of Georgia, 2014), the Georgian government still identifies the state as the main actor of pasture management. Private actors (i.e. pasture users, private entities) are not included in key operative activities. Possibly, the reason for the lack of presentable results is that the state does not dispose anymore of the needed manpower for such extensive operative activity, while the role of the private sector, which in non-centrally planned economies takes a great part of these activities, is omitted/neglected.*
Direct support to the legislative process by donor organizations may be a promising development approach. Further proposals relevant to land tenure can be found in chapters 7.3-7.7.

Implications for policy:
- Georgian politic actors in the land market will have to set priority among the conflicting goals pursued. Possibly, donors and lobby organization will may find it necessary to transparently communicate the interests at stake and the position the politic actors have taken.
- Donor financed projects that facilitate the registration of municipal land must insist that these activities are accompanied by binding obligations that protect the current pasture use conditions of poor farmers or compensate them for it.
- The described land purchase privileges are commonplace in all the countries of Western Europe as far as the authors know. If Georgia makes further steps to align to Europe in legal issues, the mentioned privileges may become an element of this process.
Implications for projects/policy:
As further detailed in chapters 7.5.-7.7, the study assumes that land tenure reforms can only lead to improved pasture resource use on productive pastures (see definition in chapter 7.7.). In any case, negative effects on low-income local and nomadic populations should be prevented. Ongoing activities regarding pasture registration and, possibly at a later stage, privatization, can supported in the case of productive pastures and can be considered neutral to the goal of poverty reduction in the case of winter pastures and summer mountain pastures, provided the following conditions are fulfilled:
- Binding regulations at municipal level ensure that low-income users of current public pastures don't lose pasturing possibilities due to sales or renting out of municipal land
- Binding regulations at municipal level ensure that low-income farmers who currently use public pastures free of charge will, in the future, not be charged fees unless they directly benefit from improvements in comparable value.
- Binding regulations at municipal level ensure that new land tenure practices don't have elements that can exclude vulnerable populations from access to land.
Proposed Measures:
- Changes in land tenure cannot relieve the pressure of animals to be wintered on a limited land resource. Changes in land tenure may, however, bring undesirable income transfers from land owners to non-owners.
- Mandatory actions, e.g. decreeing and implementing maximum pasture load thresholds, may be indispensable in order to reduce pasture overuse.
8.6. Proposed measures: *Reducing the extent of the problem means reducing the width of the migration route – possibly to the width of a mere road. Animals may in the long term have to be fed by renting pastures on a daily bases or by purchased hay. The benefit to the herders, in return for accepting the limitations, will be legally assuring a right-of-way. Possibly, activities to this goal are already being undertaken.*
8.7. Proposed Measures: *A positive cost/benefit ratio can be expected for measures to improve productivity on productive pastures, provided land tenure reforms provides ownership rights to the users, not to absentee owners, and the owner/users are motivated to invest. Therefore, land tenure reforms for productive pastures can, at certain preconditions, be recommended. On mountain summer pastures, no measures for pastures improvement are known to have a positive cost-/benefit ratio. Therefore, no recommendation is made.*

Chapter 9. There have been some experiments by dairies and even donors to set up rolling funds for financing as described in this chapter. The report, however, doesn't elaborate the reasons why even the biggest dairies have not been able to successfully implement such financing systems. Therefore the proposal also remains quite general.
Proposals for Project Activities PPA: *A simple value chain financing scheme may be structured as follows: A rolling fund is endowed with project funds and administrated by dairies or input providers. Farmers procure specified dairy production enhancing inputs (e.g. feed additives, AI semen, ...) from specified providers. The providers are reimbursed through the rolling fund. The dairy refinances the funds by deductions of a certain percentage from subsequent milk delivery payments. A key element for the sustainability of rolling funds is the monitoring of proper practices through a joint committee of dairy stakeholders and project implementers.*

Chapter 10. Technical and agronomical level recommendations are provided in this chapter and several of those are very good and practical. Experiments and demonstrations have been performed in Georgia, but the report doesn't handle the reasons why farmers have not crowded these better practices. Chapter mentions some of these (i.e. good dry harvest period to provide hay which keeps well), but the lack of cheap and easily available analysis service of the nutritional value of hay is not mentioned. Without these results market is based on hay volume and that is the better the later harvest.

Fertilising pastures in spring is beneficial for the whole season if pastures are rotated and used properly. This has effect in autumn too not just during summer when the milk prices are actually at their lowest.

Also results from feeding experiments with milk production come very seldom faster than with fattening, because a cow needs time to recover from malnutrition and drastic changes in feedingstuff disturb the rumen and need 2-3 at least to recover to the previous level.

PPA: *Promote demonstration experiments. Experiments must primordially show the production effect of the improved forage quality (**knowing why comes before knowing how**). Demonstration effects are best in milk production because, contrary to fattening, effects are visible within days or weeks.*

Other conceptual aspects of the demonstration experiments (e.g. number, possible outreach, PR con-cept) must be developed by a project implementer.

PPA: *demonstration experiments with milking cows; intra-Georgian knowledge exchange: The Benchmark region for intensive hay production and optimal storage is Adjara.*

PPA: *demonstration experiments with milking cows*

PPA: *performing demonstration experiments with milking cows, organize and fund prefinancing by dairies through value chain financing funds schemes (see chapter 8)*

PPA: *Promoting the use of Artificial Insemination AI is already part of current implementers' projects (e.g. ALCP, Moli). AI use could be further enhanced by a financing through a value chain financing scheme as described in chapter 8.*

PPA: *Providing a complete development package to enable dairies to go into long term storage:*

- Access to storage equipment and technology, including training and coaching in the initial phase

- Facilitate cofinancing of the necessary equipment

- Providing solutions to finance the stored cheese, e.g. by providing a rolling fund

A key element for the sustainability of rolling funds is the monitoring of proper practices through a joint committee of stakeholders and the project implementers. Enabling cheese storage is part of the activities of RED project.

***PPA**: **Cheese as a storable product is the main product of the Georgian dairy branch. If the financing issues can be solved, promoting cheese and butter storage is the most cost-effective way to deal with seasonal variability in milk production.** At the same time, it does not require efforts that small farmers struggle to perform. Improving summer/winter feed rations are more useful when pursued with the goal of increasing overall productivity.*

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PPA: *performing demonstration experiments on experimental plots, organize and fund prefinancing schemes for fertilizer purchases through value chain financing funds (see chapter 8.1.)*

PPA: *install pilot watering units, facilitate co-financing according to current project co-financing rules or through a value chain financing scheme*

10.7 PPA: *- **Awareness rising:** The fact that bush clearing is currently inexistent increases the importance of awareness rising. Municipal bodies may have to take an important role, particularly regarding public pastures.*

*- **Controlled fire, chemical and mechanical methods:** Adequate techniques have been developed, but need to be adapted to Georgian conditions and condensed to easy-to-understand practical manuals usable for farmers/ responsible persons for pasture management at municipal level.*

PPA: *Condense measures to contain un-wanted species/weeds into easy-to-under-stand practical manuals usable for farmers. Model examples are: http://www.liebegg.ch/pdf/1339740758-mb_ackerkratzdis-tel12c.pdf. The know-how must be propagated by well publicised demonstration pasture improvements. In order to assure sustainability and perpetuation, the know-how should be implanted into an advisory service which may be incorporated into the existing agro-inputs sales network or created from scratch.*

PPA: *- **Genetic improvements:** Hybridization breeding and suppression breeding with sturdy foreign meat genetics can improve performances and increase the part of animals reaching the weight threshold estimated at 30 kgs of live weight (Kochlamazashvili et al., 2014). However, the amount of breeding rams to be imported must not be underestimated; a financing solution may be needed. The imported breeds will have to prove their robustness before widespread acceptance can be expected. Moreover, discussing imagined and economically relevant qualities of traditional Georgian breeds vs. imported breeds in a non-emotional way may be challenging.*

*- **Selective marketing:** On the long trek from the summer pastures to the main markets (Marneuli, Rustavi) where unsufficient pasture forage is available along the migration route, fattened animals lose weight. Interviewed experts did not doubt that the value of the weight loss exceeds the cost of truck transport. Sales out of the herds or improvised short-time markets in the summer pasture areas may yield a higher share of animals above the weight threshold. Also, selective animal buying according to quality standards may offer the possibility of satisfying the demand of countries with higher quality thresholds. However, the acceptance for both measures may not easily be won, taking in account conservative attitudes, the reported aversion of herders towards a protracted animal sales*

process, and the difficulty to access nomadic populations with campaigns and vocational education. Absentee owners of large scale herds may provide an entry point.

Chapter 11 handles specific areas of Adjara (mainly Kholo) and Racha and describes the situation very well in those areas. However, even great pasture management will most probably not have big effect on decreasing population in Racha.

PPA: *The high status that cattle farming enjoys in the social life of Adjara (i.e. Khulo) and the high professionalism that the farmers prove allow the expectation that further measures related to cattle farming are keenly implemented. Such further measures could be:*
- Increasing hay quality by earlier cuts (see chapter 9.1.)
- Demonstrate/advise case-specific measures to improve forage growth: adapted fertilization, sward improvement measures, combatting weeds.
- Introducing cheap artificial feeding (urea/carbamide, see chapter 9.2.)
- Supporting milk processing/storing/marketing structures in Khulo.
PPA: *Make the best possible use of the job potential in Racha by taking in account the very low level of entrepreneurial activity in the region:*
- Promoting investments and publicity in green tourism (focus on tourist from Eastern, possibly also Western Europe)
- Facilitating the implantation of lumber transforming companies – Georgian or foreign – to open the national market to Racha's enormous lumber resources
- Exploiting the job creation potential of the Blauenstein meat facility fully: through expanding (into pork, as planned), increasing capacity utilization (increasing meat output beyond the current 3 animals/week), increasing processing depth (transferring meat dressing, sausage production etc. from Tbilisi to the Racha plant). Concepts promoting that Blauenstein's hay consumption can, to the highest possible extent, be met by local farmers or seasonal haymakers are useful, too.
- However, with advancing bush growth and emigration, haymaking for export is hardly possible. Most pastures cannot be worked with machines anymore, and for manual haymaking, the remaining local labour force may be insufficient.

Supporting the remaining farmers with in investments, with loans etc. can slow down the rural exodus in Racha. Also, facilitating seasonal migration of farmers from the Ambrolauri region and surrounding regions to Racha's mountain pasture is useful. Facilitating the seasonal immigration of sheep herders from other regions may at the same time com-bat overgrowth of Racha's pastures and lessen the erosion problems elsewhere. Equally, the seasonal or permanent immigration of Adjaran farmers may combat overgrowth, revive Racha's economy and relieve the currently high animal load in Adjara.

Conclusions chapter would have been much more useful if key elements of it would have been highlighted in the Abstarct/executive summary. Now those readers who only leaf through the study might miss the conclusions completely. Anyhow some conclusions should have had more support in the main text.

Conclusions
Pasture overuse is a regional and local problem in Georgia. It cannot be considered an overreaching cause of reduced pasture productivity, but figures rather among different issues of inadequate pasture management which must be individually approached. Improved use of pasture resources requires applying a broad line-up of different measures in a situation- and solution-specific way, such as:
- Ease bottlenecks in capital availability, e.g. by implementing simple forms of value chain financing at farm and processor level
- Create awareness for possible productivity and financial gains through improved practices, use of inputs, investments in labour and capital. Showing why comes before showing how.
- Prepare technical advice on issues that are easy to implement and promote it through different channels (demonstration experiments with full PR coverage, VET, media, advisory services, product providers, intra-Georgian knowledge exchange etc.).
- Support activities for documentation and registration of productive pastureland in the medium altitudes. Promote that the user rights of current pasture users with low income and of nomadic pasture users will not be severed, that efficient common pasture use will remain possible in a future pasture tenure and that in a possible subsequent privatization, pasture ownership will not be mainly past to non-farming absentee individuals.
- Support state and municipal authorities in establishing and implementation of regulative edicts and police measures to prevent or correct unsustainable or disaster-risk-increasing pasture practices.