THE ECONOMICS OF LAND DEGRADATION

Policy Brief

Pasture management in Georgia

Legal and institutional analysis and valuation scenarios for pasture management

- Georgia's current system of leasehold on state pasture does not always reflect the ways in which pasture is actually used and accessed by livestock owners. The significant administrative and financial barriers erected by this system may explain why a majority of livestock owners do not have formal rights over the pastures they use. Legal frameworks should recognize collective herding practises, particularly in village areas, and provide priority grazing rights to resident pasture users, rather than allocating them by auction to the highest bidder.

- Municipal level spatial planning could enable integrated management of pastures as part of larger grazing systems and promote the application of land degradation neutrality principles at the landscape scale. But local government has no jurisdiction over pastures, most of which are private or administered directly by the state.

- Sustainable land management solutions such as de-stocking, rotation and multi-paddock adaptive grazing (MPAG) can contribute to land degradation neutrality by improving primary productivity. But modelled scenarios suggest that destocking is likely to be expensive and unpopular. Annual rotational grazing involves significant opportunity costs from foregone grazing land and therefore yields only marginal benefits to pastoralists. MPAG can improve farmer incomes, but whether the assumed rates of vegetation recovery required to generate gains are realistic has not been tested in Georgia. Combinations of the three interventions may yield stronger outcomes, and it is suggested that their potential be explored further using field trials in Kakheti.

Background

Natural pastures cover around 25% of Georgia's area. Kakheti is the foremost pastoral region with an estimated 65% of the national sheep and goat population. At 149,000 ha, the area of pasture in agricultural holdings is half the national total (GeoStat, 2016).

The pastoral system in Kakheti is largely nomadic, with animals using the high summer pastures in Akhmeta district and wintering in the southern lowlands (Figure 1). Other livestock use only part of this system or are resident close to settlements all year round.

FIGURE 1

Location of Kakheti region in Georgia *(named districts and red points indicate survey coverage and locations of respondents. Dark shading indicates winter pasture)*

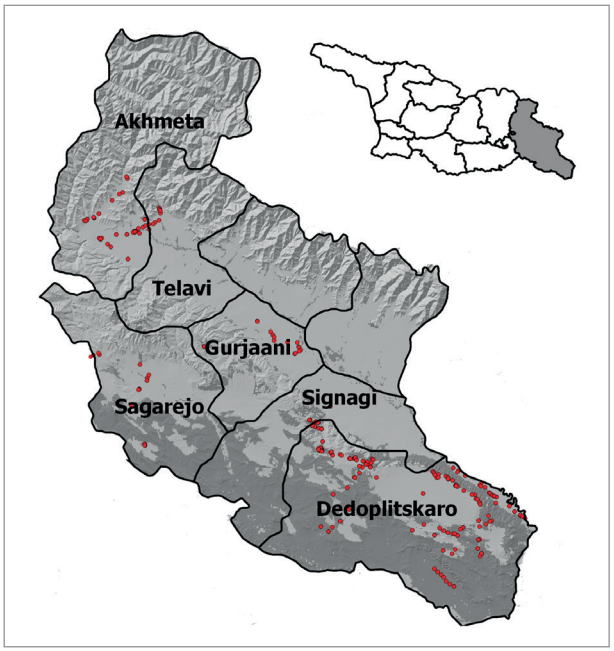
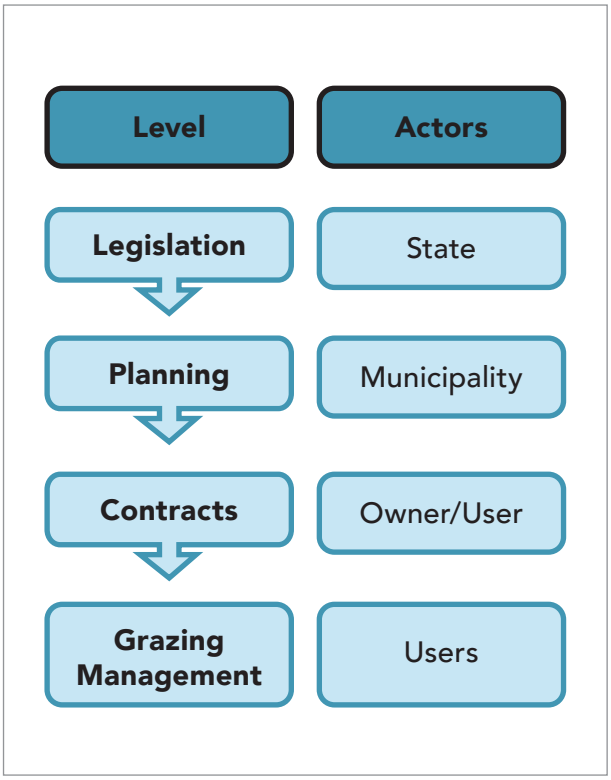


FIGURE 2

Elements of pasture management systems



Study approach

This study takes a hierarchical approach to pasture management systems in Georgia, examining the following elements of these systems (Figure 2):

National legislation: Laws and decrees governing pastoral property rights arrangements.

Local planning processes: Incorporation of pastures into broader land management and planning for Land Degradation Neutrality (LDN).

User contracts and charters: Formal terms and conditions under which individual users or groups access pasture.

Grazing management: Ways in which users manage their animals on pastureland (for example, long or short distance stock movements; rotation; stocking rate adjustments).

[1] *https://land.copernicus.eu/global/products/lai*
[2] *sheep, 0.7 goats or 6 head of cattle*

To this end, the following studies were undertaken:

- A review of property rights legislation, arrangements for local level planning and pasture access.
- A household survey was conducted in five districts of Kakheti (Figure 1). The survey data were used to group households into profiles by mobility and livestock holding size. Four profiles (Table 1) were selected for an examination of costs and benefits of livestock production.
- A valuation study was undertaken, analysing the costs and benefits to the selected groups of livestock owning households of three different types of grazing management on winter pastures: destocking, annual rotational grazing and Multi-paddock adaptive grazing (MPAG). All three strategies were based on the principle that vegetation offtake by animals on pastures does not exceed the 'proper use factor' of 40% considered to be sustainable on perennial winter grazing lands similar to those in Kakheti (Holechek et al., 1999). Biomass was estimated using calibrated value from the PROBA-V satellite Leaf Area Index (LAI) product[1] available from 2014 to the present.

TABLE 1

Real Macroeconomic Indicators in 2035 with respect to Base *(2019 US$ Million, Difference with respect to Base).*

Profile	Resident	Migratory		
		Small	Medium	Large
Sheep units[2]	230	390	1,071	2,542
% of sample	42	13	6	1
% owning or leasing pasture	15	50 (across all migrators)		

1. Destocking: Most range scientists agree that the primary factor affecting pasture condition is stocking rate and this strategy concerns the voluntary reduction of animal numbers to sustainable levels.

2. Annual pasture rotation: Under this scenario, each year a portion of pasture remains ungrazed

and is thus able to regenerate, particularly in spring when growth rate is high. Parameters for this scenario come from exclosure experiments on winter pastures in Dedoplitskaro municipality (Lachashvili, 2015, 2016).

3. Multi-Paddock Adaptive Grazing: One intervention in the MPAG toolbox – adaptive planned grazing - is a special case of rotation based on the assumption that overgrazing is the result of leaving animals to graze for too long on the same areas, rather than actual number of animals per unit area (Savory, 1983). This method differs from other rotational grazing systems by the enforcement of short-duration high intensity grazing on paddocks. No field experiments in the region have been conducted upon which to base the valuation, so predictions were parameterised using data from a similar climatic region of Turkey.

Legal and institutional analysis

National legislation

The legacy of past reforms has left Georgia with both privately and government owned pastures, the latter administered by the Agency for State Property (ASP), municipalities, and the Agency for Protected Areas. Today, pasturelands cannot be formally privatised, but re-designation to other land types means that registration into private ownership continues to some (unknown) extent. The main legal pathway to pasture access is the leasehold, although large areas of state-owned lands are used informally. The vast majority of pastures are administered by the ASP, but there is currently a moratorium on leasehold issuance whilst this body conducts an inventory of state agricultural lands.

The leasing process is held by electronic auction at the national level, with pasture provided to the highest bidder regardless of their residency and actual use of the pastures in question. In some cases leaseholders do not even own livestock and sub-lease to others for short periods, undermining good management principles. Such issues have also contributed to the imposition of the leasing moratorium whilst alternatives are considered. In the meantime the ASP is issuing a restricted set of leasehold agreements to cooperatives in mountainous areas, outside the auction system and on an experimental basis.

BOX

Key legislative instruments relevant to pasture management in Georgia

2003 Law on Soil Conservation: Excessive grazing leading to erosion on high mountain pastures is prohibited. However, the law makes no reference to winter pastures, nor does it provide official norms for stocking rates.

2010 Law on State Property: State-owned pasture cannot be privatised or registered to municipalities. The major mode of access is leasehold by auction to physical or legal persons.

2017 Government Resolution 265 on Rational Use of Pasture and Hay land in High Mountainous Regions: Specifies conditions for pastures to be leased to cooperatives in high mountain areas.

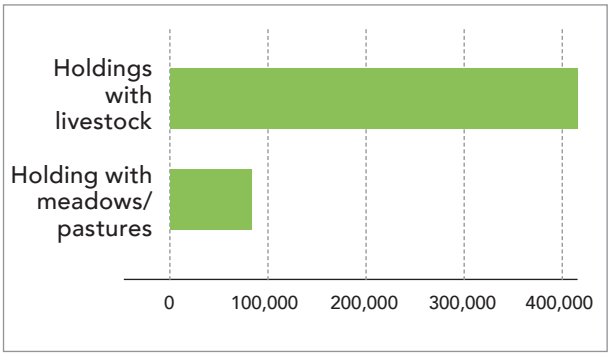
2018 Law on Spatial Planning: Creates a framework for zoning and land management at the municipality level. But this level of government has little regulatory power over pasture, which is mostly private or state owned.

Many village pastures in particular are de facto commonly managed, as herds are comprised of animals belonging to multiple owners who manage grazing as a group. But these pastures have no legal status as such and the only legal protection from leasing is the possible veto on ASP-administered leasehold agreements by the local municipality. The lack of legal instruments to delimit and designate municipal pastures to village users for common use is both a source of insecurity for village-based livestock owners and a barrier to good management. Whilst some municipalities own pasture in their own right (registered under laws in place from 2005-2010) it is estimated that this pasture makes up only a small proportion of the total, and legal mechanisms to register additional pastures in this way no longer exist.

The outcome of this situation is that the vast majority of livestock owners in Georgia do not have formal access (ownership or leasehold) over pastures (see Figure 3; source GeoStat 2016).

FIGURE 3

Agricultural holdings with livestock & pasture



Local planning processes

The role of municipalities in administration of pastures within their boundaries is important as decentralisation to this level is one way in which issues with leaseholds and collective pasture use might be resolved. One mechanism which has been identified to unify pasture use zoning, allocation and monitoring at the local level is the spatial planning procedure, for which the legal basis is currently being introduced. Spatial planning on pastures is currently being piloted in Akhmeta district, where the municipality directly administers leaseholds over pasture in the Tusheti Protected Landscape. However, few municipalities have this level of jurisdiction over pastures. Pasture use planning cannot be integrated into spatial planning processes whilst municipalities and users have no role in pasture allocation or mangement. The current ASP programme of leasing to cooperatives is also not embedded in local planning; allocations do not consider existing users or integrated mangement of grazing systems.

Under Georgia's commitment to the UNCCD, the country has committed to monitor progress towards land degradation neutrality (LDN), including measurement of change in soil organic carbon, land cover change and biomass production. It has been suggested that LDN could be incorporated into the spatial planning process by identification of anticipated losses and definition of areas within the municipality which should be preserved, improved or restored (LDN priority areas). Transferring some administrative powers over pasture to the municipal level would make them more likely to engage in LDN activities on these lands and to be able to implement actions to restore priority areas.

User contracts and charters

In conjunction with the design of appropriate property rights frameworks at the national level, specific technical instruments could be employed at the local level. One obvious instrument concerns the leasehold contracts themselves, which may include pasture management obligations, and enumerate roles and responsibilities regarding contract enforcement and pasture monitoring. Here, existing examples developed for protected areas may provide models. Where pastures are used as common property, then user-group charters specifying member rights and obligations, decision making procedures and sanctions would be required, but this could only happen under a new and appropriate legal framework.

Legal and Institutional reform: Recommendations

Georgia could consider designing new land tenure legislation specific to pastures, which recognises the specific ways in which pastures are actually used and managed. Where use is organised on a collective basis then the law could reflect this in forms of common property resource management (CPRM), at the appropriate spatial scale. Where leaseholds are more appropriate, mechanisms which prioritise access by actual users should be explored. The roles of the ASP, municipalities and Ministry of Environmental Protection and Agriculture (MoEA) currently responsible for monitoring of pasture condition should be clarified.

In many countries, organizations acting as intermediaries between pasture users and their (government) landowners support users to fulfil their legal obligations and provide assistance for technical aspects of pasture management on demand. In Georgia, the existing system of extension services could perhaps be further developed to fulfil this function. It should be noted that new standards for sustainable stocking rates need to be developed - existing recommendations for winter pastures differ by several orders of magnitude.

Decentralisation processes are often vulnerable to local corruption. The design of new legislation and institutional relationships should draw heavily on international experience in countries such as France, Switzerland, Kyrgyzstan and Mongolia.

The economics of grazing strategy

Household budgets suggest that the livestock-related activities of migratory households, having lower fodder costs, are generally more profitable than those of households resident in one location. Migratory households having very large herds create the economies of scale necessary to generate profits per animal which are significantly higher than those of residents. Currently this pasture user profile represents only 1% of the population of pastoralists in Kakheti. Resident households tend to have higher proportions of cattle in their herds and, grazing the same pastures all year around, are left with poorer pasture resources for the winter. Figure 4 illustrates how total profit and profit per sheep unit increase with herd size, whilst fodder costs per head decrease. These costs are particularly onerous for resident households.

Scenario results: benefits and costs

Destocking

The total supply of forage in the region during the 90 days of the non-growing season was compared to the total demand from all livestock, assuming an intake of 1.5kg/sheep unit per day and using biomass estimates for the end of October. Table 2 indicates the number of sheep units which can be supported over winter, and actual numbers.

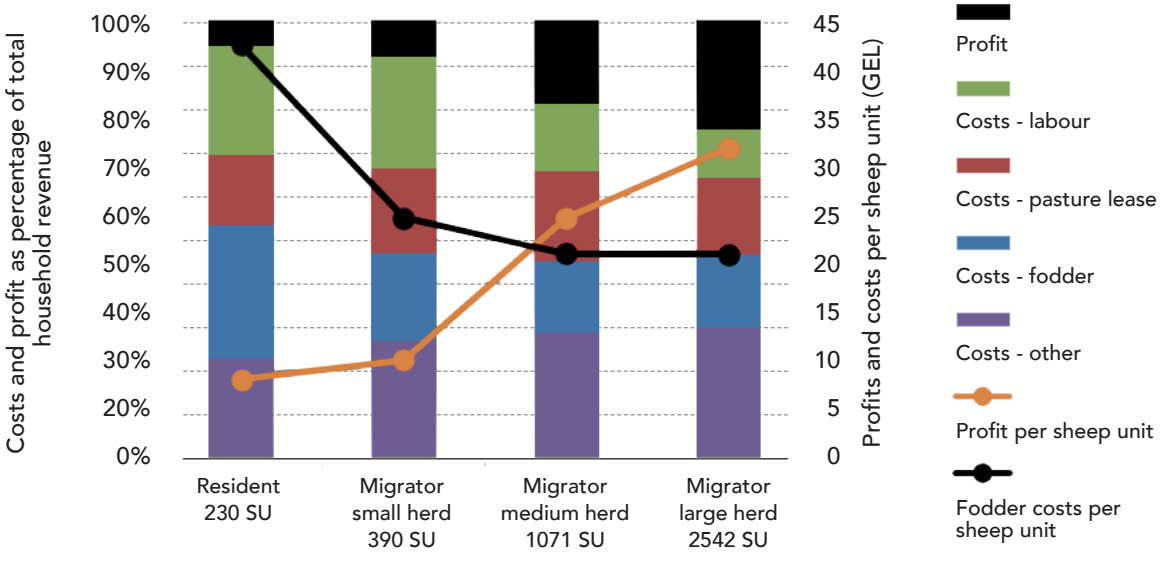
TABLE 2

Forage demand and supply in Kakheti

Stocking rates SU/ha:	Sustainable	Current	Difference
Total Kakheti	1.2	2.6	-1.4

FIGURE 4

Profitability of livestock production for four household profiles



Many pastoralists access land informally and thus it is difficult to know how much pasture they use. However, for those respondents owning or leasing defined areas of land, stocking rates were often strikingly similar to the regional average shown in Table 2. For these groups, destocking scenarios required to bring sheep numbers down to sustainable levels were then applied, taking into account avoided costs of additional feed. Resulting figures for net annual profit (Table 3) suggest that only large and medium migratory pastoralist households would be able to cover their fixed costs and remain profitable after reducing their livestock holdings. Resident pastoralists, and migratory households with small numbers of livestock, would become unable to cover their annual living costs if they were required to reduce their livestock holding to meet the carrying capacity of pastureland.

However, after year one, there would also be significant gains in pasture quality and quantity which would eventually lead to fatter, healthier livestock with a greater market value. Such benefits cannot be quantified with existing data, but in the short term if the destocking scenario was applied to the entire region of Kakheti then some households would no longer be able to keep livestock.

Destocking would entail a one-off benefit from livestock sale which would reduce losses, but this would be temporary and over five years offsets losses only for the group of residents. However, in the absence of pasture leasing costs, all examined pasture user groups, independent of herd size, would be able to retain a positive net-income after destocking. Thus, a policy which aims to recover forage resources through de-stocking is likely to be more successful if leasing costs were decreased, or under a common property regime.

TABLE 3

Result of destocking scenario

Profile	Resident	Migratory		
		small herd	medium herd	large herd
Before destocking (baseline)				
Sheep units	230	390	1,071	2,542
Stocking rate	2.5	2.3	2.1	2.5
Net household income (GEL)	1,870	3,946	26,438	81,085
After destocking				
Sheep units	120	200	606	1,220
Stocking rate	1.3	1.2	1.2	1.2
Net household income (GEL)	-146	-3,799	4,224	15,435

Annual Rotation

The rotation scenario was run for small migratory herds, with 25% of their overall average of 166ha of land set aside each year (Figure 5).

In the first year, the amount of grazing available is ¾ of the total and there is no net benefit compared with the continuous grazing scenario. In the second year, one quarter of the grazing land has been rested. If a net profit is to be gained, then the increase in biomass in this protected section must be high enough to compensate for the fact that another quarter of the grazing land is now exclosed. As we can see from Figure 6, such a net gain occurs on one of the three vegetation types for which real data were available. This gain on Artemisia lerchiana pasture over five years is around 26 GEL per ha or 4,280 GEL per year (biomass increase expressed as supplementary fodder costs saved).

On the other two types, the increase in biomass on the rested quarter (green) is not sufficient to off-

FIGURE 5

Schema for the rotation scenario

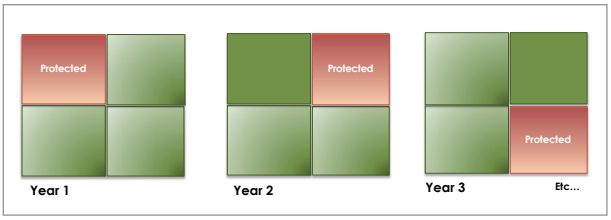
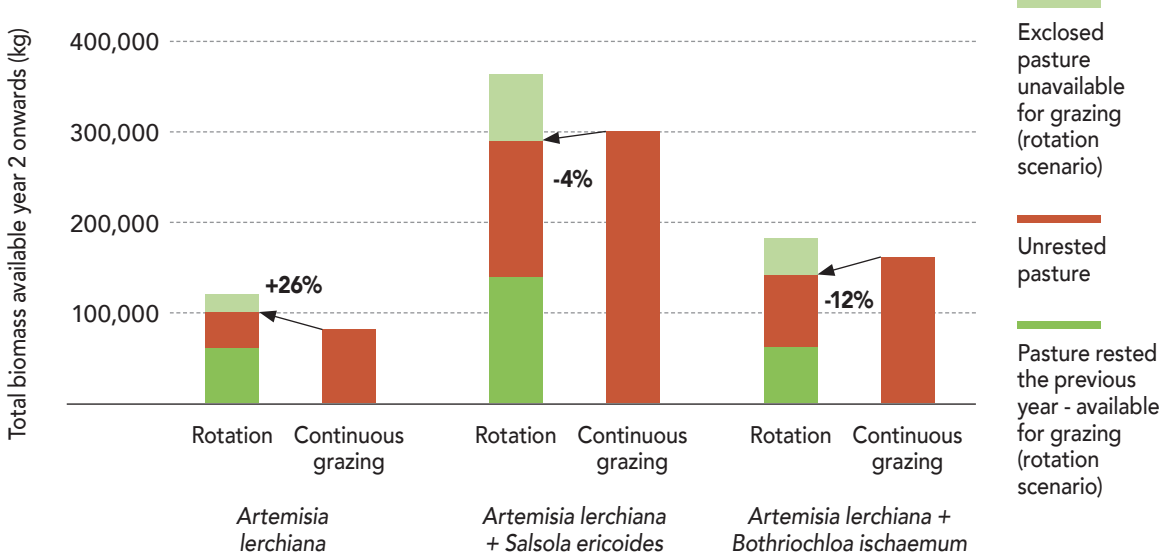


FIGURE 6

Comparison of available biomass under rotation and continuous grazing on three vegetation types for migratory households with small herds.

(Percentages indicate the change in biomass in year 2 when the rotation scenario is implemented)



set the total biomass lost on the exclosed quarter (white). In fact, in order to compensate for unavailability of exclosed land, biomass on rested land must more than double. Because farmers typically have very high discount rates, especially under insecure tenure, this figure would have to be still higher if pastoralists are to take up an annual rotation strategy, even on those pastures where benefit can be demonstrated.

Multi-paddock Adaptive Grazing

Forms of adaptive planned grazing were applied to the small migrator and resident household profiles. Small migrators have 390 sheep units and lease on average 166 ha of pasture. A larger area (230 ha) but similar stocking rate is assumed for resident users: as most pasture users have similar ratio of animals to land. It is assumed that the migratory pasture user implements paddocks in early March when the growing season is in full swing, until he leaves for summer pastures mid-May. When back from summer pastures, the pasture user incorporates paddocks in October and November. In the non-growing season, we simulate "free play" i.e. no use of paddocks. This principle is illustrated in Figure 7.

The resident pasture user implements paddocks throughout the summer growing season in addition to those shown in the Figure. Recovery periods of 30 days are assumed for spring, and 60 days for autumn. But as there is no growth in the winter period following the two autumn months, most paddocks will only recover partially before the onset of the non-growing season.

FIGURE 7

MPAG scenario for small migratory pasture user

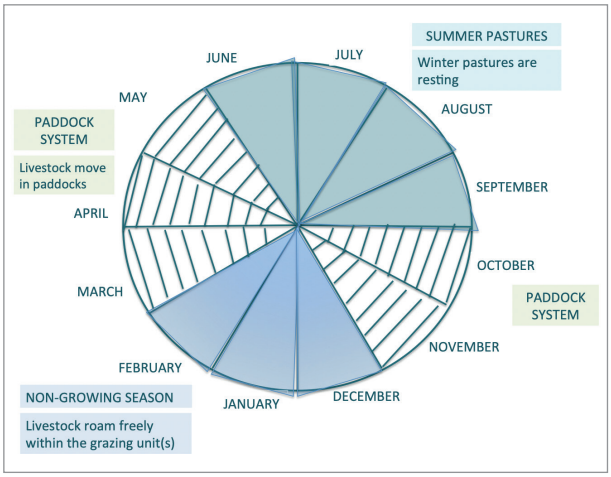


TABLE 4

Results of the MPAG scenario

Pasture species	Resident	Small migrator
Additional kg DM* / ha over the year (above baseline)	788	423
Additional kg DM in %	16	9
Net-benefit of additional kg DM per hectare leased (GEL)	165	89
Total net-benefit of additional kg DM per year (GEL)	38,036	14,742

Results are shown in Table 4 – with monetary gains are expressed as supplementary fodder costs saved. Pasture recovery under the MPAG scenario represents a saving in fodder compared to the baseline. For larger pastoralists per hectare results are very similar, total savings larger as they lease larger areas of land.

However, there are a number of important caveats which underline the importance of field experiments in the assessment of such an intervention.

- In spring and summer, it is predicted that vegetation offtake will fully recover by the end of each resting period. However, in summer plants naturally die back, so recovery in resting paddocks is unlikely to reach that removed by animals. Recovery also depends on rainfall, which may be erratic, reducing recovery in certain periods.

- For our example profiles, autumn offtake in each paddock reaches 74% of pasture biomass, from which it may not recover. This reflects the small area leased by our example pastoralists. However, forage deficit in winter may be offset by harvesting hay from paddocks in spring.

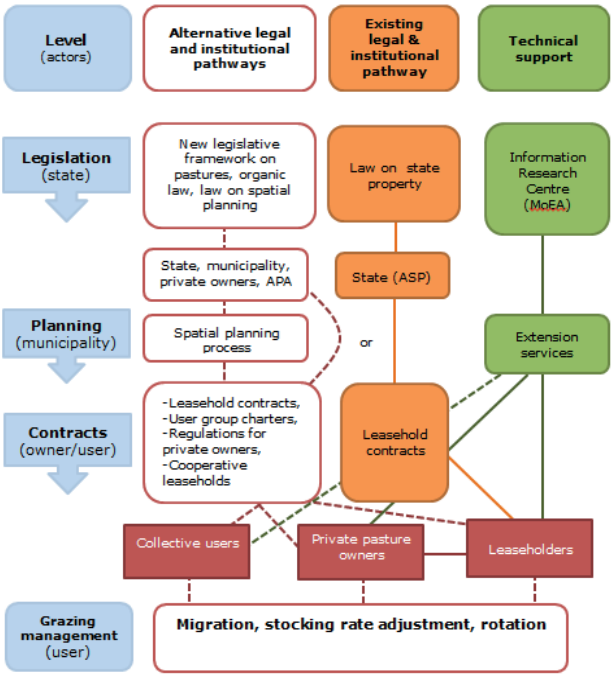
Conclusion

Existing and possible pathways for pasture management are summarised in Figure 8. The SLM interventions explored here, or combinations of them, may all contribute to LDN and merit being tested in Kakheti. But fundamentally it is important to first address underlying policy issues. Georgia should design an institutional and legal framework which considers pastures as part of wider grazing systems and support existing users to realise legal access to pastures. Such a framework would require greater decentralisation of pasture allocation and management.

FIGURE 8

Pathways to sustainable pasture management

(dotted lines represent absent relationships)



References

GeoStat 2016. Agricultural Census Of Georgia. Tblisi.

Holechek, J. L., Gomez, H., Molinar, F. & Galt, D. 1999. Grazing Studies: What We've Learned. Rangelands, 21, 12-16.

Lachashvili, N. 2015, 2016. Sustainable management of pastures in Georgia for the purpose of mitigating climate change and advancing benefits and dividends for local communities. An exclosure experiment in Vashlovani National Park (reports of Spring 2015-Autumn 2016). Tblisi: NACRES/UNDP.

Savory, A. A holistic approach to ranch management using short duration grazing. In: Hyder, D. N., ed. Proceedings of the First Intenrational Rangelands Congress, 1983 Denver, Colorado. Peerless printing, 555-557.

UNDP 2014. Climate Change and Agriculture in Kakheti: Part of the Third National Communication to the UNFCCC. Tblisi.

For more information about our study and the findings, please contact: info@eld-initiative.org