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BUILDING THE RESILIENCE OF TURKMEN PASTORALISTS TO ENVIRONMENTAL VARIABILITY

Sarah Robinson[1], Gulbahar Abdurasulova[2], Akmurad Gardashev[3], Guvanchmurad Atahanov[4], Ahmedyar Akiniyazov[4], Elmar Mamedov[4] and Muhamad Durikov[5]

[1]Consultant, German Agency for International Cooperation; [2]Coordinator, FLERMONECA project, German Agency for International Cooperation; [3]United Nations Environment Programme, Ashgabat; [4]Institute of Deserts, Fauna and Flora, Ashgabat; [5]Director, Institute of Deserts, Fauna and Flora, Ashgabat

Abstract

Our work in Turkmenistan concerns the role of legislative change in building the resilience of pastoralists to environmental variability. Official statistics suggest that livestock inventories may now be far higher than during the Soviet era. Whilst pastures are owned by the state and allocated to state farming entities, a large proportion of animals are now held in private hands, yet there are no formal mechanisms governing pasture access for these users. Formalisation of pastoral property rights is perceived to be key to improving management of the resource and legislative development is part of the national climate change strategy. With a view to designing a draft law, we conducted a stakeholder analysis of current pasture management systems on five state farming entities, using interview and participatory research techniques with both state and private pasture users. The research found that in mountain areas, where private stock dominate, organised user groups have emerged and now manage highly mobile grazing systems on state pastures. Where the state still has significant numbers of animals, farm leaders have an important role in pasture allocation; some private owners are excluded from state pastures and their stock become concentrated around settlements. It is here that grazing pressure is greatest and users have little means to move animals in response to vegetation or water shortages. On the other hand, many herders of state and private livestock have found ways of accessing pastures outside their home farm boundaries through informal agreements with other users. Such flexible grazing access is crucial for sustainable pasture management and resilience in a highly variable and drought prone environment. This fluidity is partly facilitated by the existence of state structures, which set a recognised but porous framework for pasture access, combined with a lack of exclusive individual pasture rights. The challenge is to find legal mechanisms to maintain flexibility and provide access to both private and state users, through pasture allocation processes applicable to both user groups.

Keywords: Turkmenistan, pastoral systems, land tenure, livestock

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1. Introduction

Although Turkmenistan benefits from large gas reserves, agriculturally it is a largely pastoral country - just 5.4% of agricultural lands are arable, the rest consisting of mostly desert pastures. In contrast with much of Central Asia, the state still controls large parts of the agricultural sector. However, growing numbers of private livestock have led to calls to regulate access to pastures by non-state users. The intention to go ahead with legislative development was a key element of Turkmenistan's National Climate Change Strategy, and a date for adoption of a law on pastures was set for 2015. As part of a long running partnership with the Institute of Deserts, the Ministry of Nature Protection requested technical support from the German Development Cooperation Agency (GIZ) to design a draft legal document.

Before initiating such a process, it was considered important to understand existing informal and formal systems of pasture management; relationships between the different stakeholders involved; and to examine the outcomes of these processes in terms of pasture use patterns and livestock distributions. Thus the process of legal development began with a livestock sector analysis, field research programme, and consultation with representatives of government ministries and institutions in Ashgabat. A preliminary law was produced for consideration, which was then re-drafted by parliament before adoption in August 2015. In this paper we describe these processes in detail. Firstly, we introduce the Turkmen livestock sector, and then go on to describe the findings of the field research and process of legislative design.

2. The livestock sector in Turkmenistan

In the 1990s, state and collective farms were transformed into associations of leaseholders known as farmers' associations (*daihan birleshik).* These are the successor institutions to state farms and are the dominant structures under which agriculture is organized in Turkmenistan. Some of these associations still own substantial numbers of state livestock, which are managed by members on a leasehold basis. Leaseholders receive a proportion of live young in return for managing the animals and are also able to raise their own animals in parallel (Behnke et al., 2005). Other farmers' associations now own few livestock and concentrate on arable farming, renting irrigated land rather than livestock to their members. Both farmers' associations and leaseholders may sell private animals and livestock produce on the market (Kerven, 2003).

In 2013, sixty-seven farmers' associations were transferred to the jurisdiction of The State Association for Livestock Breeding (*Dowlet Maldarcylyk Birleshigi*) which runs them directly (Government of Turkmenistan, 2013).[1]

[1] The number of farms under the jurisdiction of this association has since been reduced.

Resident on lands used by both these types of institution, are many private livestock owners who are neither workers nor leaseholders of state institutions. According to national statistics, around 90% of all livestock (sheep equivalents[2]) are privately owned. Yet farmers' associations and livestock farms together hold over 75% of the country's 38 million hectares of pasture lands (State Committee of Statistics of Turkmenistan, 2014), which are allocated for the use of these entities for an indefinite period.[3] The area officially allocated to village lands and directly to private citizens is negligible.[4]

There is thus a two tier system, with farmers' associations and livestock farms holding primary rights to pastures, and a multitude of individuals using the pasture privately, or as leaseholders or workers in one of these two types of organization. Theoretically until 2015, access to pastures by individuals was regulated by the 2004 Land Code. This document contains clauses concerning pasture leasing[5], but these were not implemented on the ground.

According to national statistics, the increase in the proportion of privately owned livestock has been associated with a rise in total livestock numbers of around 350 percent for sheep and goats and 300 percent for cattle since 1992 (FAOSTAT, 2015). During the Soviet period, the total sustainable carrying capacity of Turkmenistan's pastures was considered to be between 5 and 7 million sheep units; today, numbers of small stock appear to exceed this number, whilst many additional livestock units are held as cattle.[6] It is this increase in stocking rates which has led to pressure to regulate pasture access though formal tenure arrangements.

3. Field research

i. Aims

The primary aim of the fieldwork was to examine the current role and capacity of farmer's associations, livestock farms, and local government at the levels of the province (velayat), district (etrap) and sub-district (gengesh), with regards to pasture allocation and use, and provision of other services essential to the livestock sector. Secondly, we examined negotiation processes for pasture areas between state farming bodies, their leaseholders or workers, and private livestock operations. Lastly, we investigated the outcomes of these processes on livestock movements and grazing patterns.

ii. Field sites and approach

We defined study sites as either a farmers' association (FA) or livestock farm (LF). Five sites were chosen to represent different ecological conditions and geographical zones, representing mountain, foothill, sandy and clay desert ecosystems (Table 1; Figures 1 & 2).

At each site, separate meetings were held with staff of the farmers' association or livestock farm; the head of the gengesh council (*archyn*); groups of shepherds leasing state animals

[2] 1 head of cattle = 5 sheep; 1 camel = 6 sheep' 1 horse = 5 sheep.

[3] See law on peasant associations '*O Daikhhanskikh Obedineniyakh'* .

[4] Most of the remaining 25% of pasture lands are held in the state reserve and by the Forest Department.

[5] Article 66 includes provisions for renting of pasture lands to individuals.

[6] These are more likely than sheep to graze on crop residues and cultivated fodder and may not represent an equivalent level of pressure on pastures.

from the FA or workers of the LF; and owners and shepherds of private livestock. Each state farming entity is split into smaller geographical units called *ferma* (Rus.) each with a manager or 'head '*zoofermer*', reporting to the overall director. These *zoofermer* were also interviewed.

Topics discussed covered seasonal grazing patterns; use of pastures outside the home FA or LF; mechanisms of pasture access; and the role of FAs, LFs and other actors in service provision. Methods used included both semi-structured interviews and participatory techniques such as resource mapping, institutional analysis, seasonal calendars and problem and expenditure ranking. Asking the same questions to different groups allowed for triangulation and for comparisons of different points of view. However, it should be noted that at one site the team were not able to meet with private farmers and statistics on private livestock were not always available. At one of the sites, Garagum FA, the Institute of Deserts recently conducted detailed socio-economic research into pasture management and livestock distributions (Jumardurdyev, 2010, Zverev et al., 2009) and some of this material is also referred to here.

Figure 1. Sites visited during the fieldwork

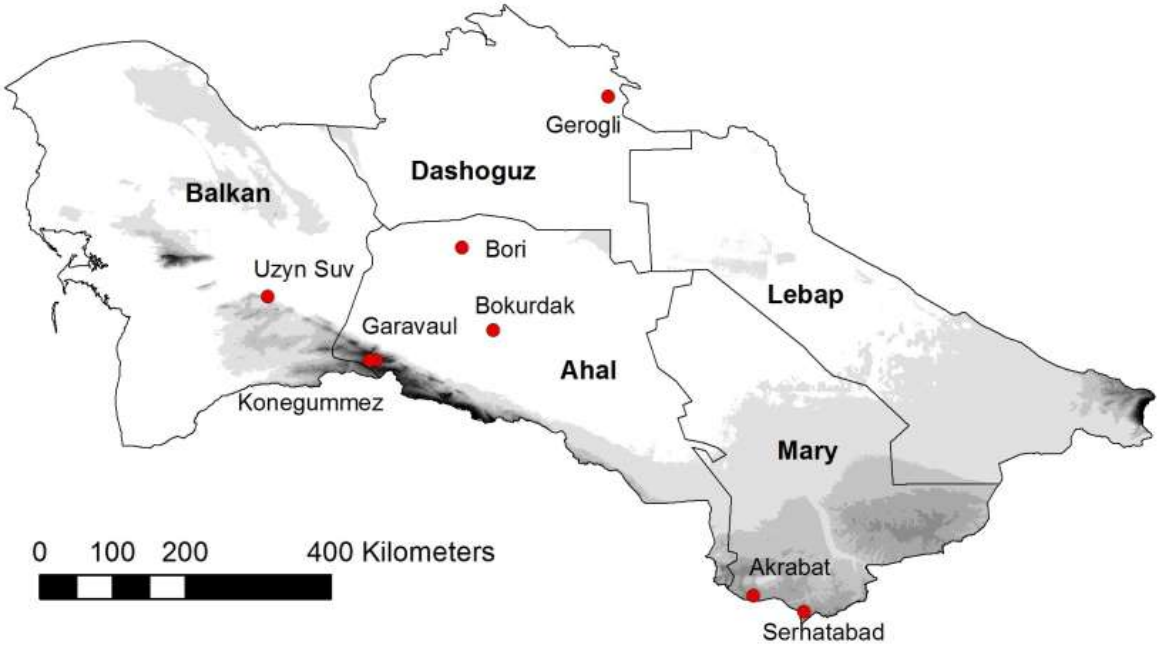


Figure 2. Study sites: (a) Enish FA, Kopet Dag mountains; (b) Garagum FA, Karakum desert; (c) Serhetchi, foothill pasture.

Table 1. Sites locations and characteristics

Ecological zone	Velayat	Etrap	Farm name	Settlements visited[7]	Small stock		Cattle		Camels	
					State	Private	State	Private	State	Private
Kopet Dag mountains	Ahal	Baharly	Enish FA	Konegummez Garavul	788	19,250	181	1,500	0	0
Sandy desert dominated by shrubby vegetation on dunes: *Haloxylon*, *Calligonum* & *Ephedra* spp.	Ahal	Derweze	Garagum FA	Böri Bokurdak	35,300[8]	70,000	0	0	2,000	~6,000[9]
	Dashoguz	Gerogli	Garagum LF	Farm office[10]	27,257	NA	362	NA	1,512	NA
Rounded hills dominated by grasses (*Poa* & *Carex* spp); pistachio forests to the south and sandier soils to the north.	Mary	Serhatabat	Serhetchi LF	Serhatabad Akrabat	34,465	9,000	294	621	0	0
Between foothills of W. Kopet Dag range to south, & sandy and clay deserts in north dominated by *Artemesia* & *Salsola* spp.	Balkan	Bereket	Arkach LF	Uzyn Suv	19,715	NA	0	NA	2,820	NA

[7] Some farms had large number of settlements, those listed here were visited by the team.
[8] The number of state animals dropped from 90,000 head, reported in 2008, due to drought, which affected the available quantity of natural pasture (Zverev et al., 2009).
[9] Figure from Zverev et al. (2009)
[10] Farm offices were not located in a village.

iii. Livestock ownership and institutional arrangements

Livestock ownership is highly variable between sites (Table 1). Enish FA is very much focused on arable farming, and manages few livestock; most animals are thus held in private ownership. At Garagum FA, the majority of stock is also privately owned, but the FA still has substantial numbers in absolute terms. At Serhetchi, numbers of privately owned animals are relatively low whilst at Arkach and Garagum LFs, although statistics were not available, respondents suggested that private numbers were much higher than those of state animals. Only at one of the farms, Enish, did private numbers of livestock approach the proportion in the national statistics, at around 90% of small stock.

The major difference between leaseholders on FAs and workers on LFs is that the former are paid in livestock and the latter in money. LF workers receive a monthly salary and may also receive subsidised meat. They must provide a fixed quota of lambs for every 100 adult ewes to the livestock farm, whilst at the visited FAs leaseholders provide a much lower proportion of lambs to the farmers' association and may keep the rest for themselves.

Livestock farms appear to be more involved in the daily management of livestock raising than farmers' associations, on which husbandry is simply outsourced to leaseholders. A major cost of livestock raising in desert areas of Turkmenistan is trucking of fresh water from canals to fill up hollows and cisterns, or to mix with saline well water, rendering it drinkable for animals. Managers of LFs stressed the extent to which the bulk of water trucking costs, supplementary feed (cotton cake, husks, concentrate feed), shelters for livestock and veterinary services, are covered by the farm.[11] Yet workers at livestock farms are not entirely supported, as became clear when they ranked household expenditure. These interviewees tended to report personal expenditure on trucking of water as well as hay production and medicines.

At the farmers' associations visited, material and financial support to shepherds (leaseholders) was generally reported to be lower than that on livestock farms. Whilst veterinary support is provided in the form of vaccines, support for infrastructure maintenance, trucking of water and fodder provision are minimal. For example, at Garagum FA, leaseholders organize fodder provision, water transport, shearing and purchase of medicines themselves, but receive support for vaccination and partial compensation for fodder cut; leaseholders at Enish receive vaccination services, land on which to grow feed crops and access to emergency fodder supplies, but are otherwise relatively independent.

If the lambing plan is not fulfilled, herders must make up numbers with their own animals. This is far easier for leaseholders, who are paid in livestock, which partly explains the general preference by herders for the leaseholding arrangement over that of the salaried worker.

Private stock are grazed collectively in groups known as *chekene* (Turk.) or in flocks or herds belonging to a single individual known as a *chastnik* (Rus.) or private owner. *Chekene* groups may be family based, or composed by street or village. Both rota and hiring systems exist,

[11] To this end they employ substantial numbers of staff, for example Arkach has 81 staff of which the bulk are shepherds, but which also include accountants, drivers, *zoofermers*, vets, guards and mechanics

with members either taking turns to herd livestock or hiring a professional shepherd. Service provision by state farming entities to entirely private herds is negligible, with most interaction occurring via the veterinarian, who may sell vaccines or provide services at a fee to private livestock owners.

In terms of pasture allocation for private herds or flocks, the role of the FA ranges from absent (Enish) to strong, as at Serhatchi LF and Garagum FA, where farms heads fully determine were privately owned herds may graze. The local gengesh (village) government has almost no role in pasture allocation, although it mediates disagreements concerning pasture access and collects statistics on livestock numbers. Administratively, however, the boundaries of state farming entities, tend to correspond to the boundaries of the gengesh.[12]

iv. Case studies

A brief survey of grazing patterns at the five sites provides us with a deeper understanding of how pastures are accessed by private and state actors and of current factors driving and constraining mobility.

Site 1: Enish farmers' association, Ahal velayat: As mentioned, the key characteristic of this farm is that almost all animals are privately owned. Livestock owners lack sufficient pasture within the borders of their home FA to graze their animals all year around. Their animals must also migrate in order to access pastures at different altitudes having specific climatic and vegetation characteristics in different seasons. Thus private small stock and the single leasehold flock are highly mobile (see Figure 3). Livestock from both villages graze the high mountain pastures on the Kopet Dag ridge in the summer. Stock from Konegummez then descend the Chendir valley towards Magtymguly in Balkan velayat in autumn and winter, moving up to 70km away from their home village. Stock from Garavaul leave the mountains to graze in lower Baharly etrap in the winter period, close to the settlements of Sunche, Murche and Arvaz. Some flocks spend almost the entire year away from their home settlements. Private cattle are less mobile – most are located within daily walking distance of the two villages for much of the year and are partly stall fed. The few state owned cattle are held down on the plain, on arable land belonging to the FA close to the Garagum canal and thus do not come into contact with private livestock.

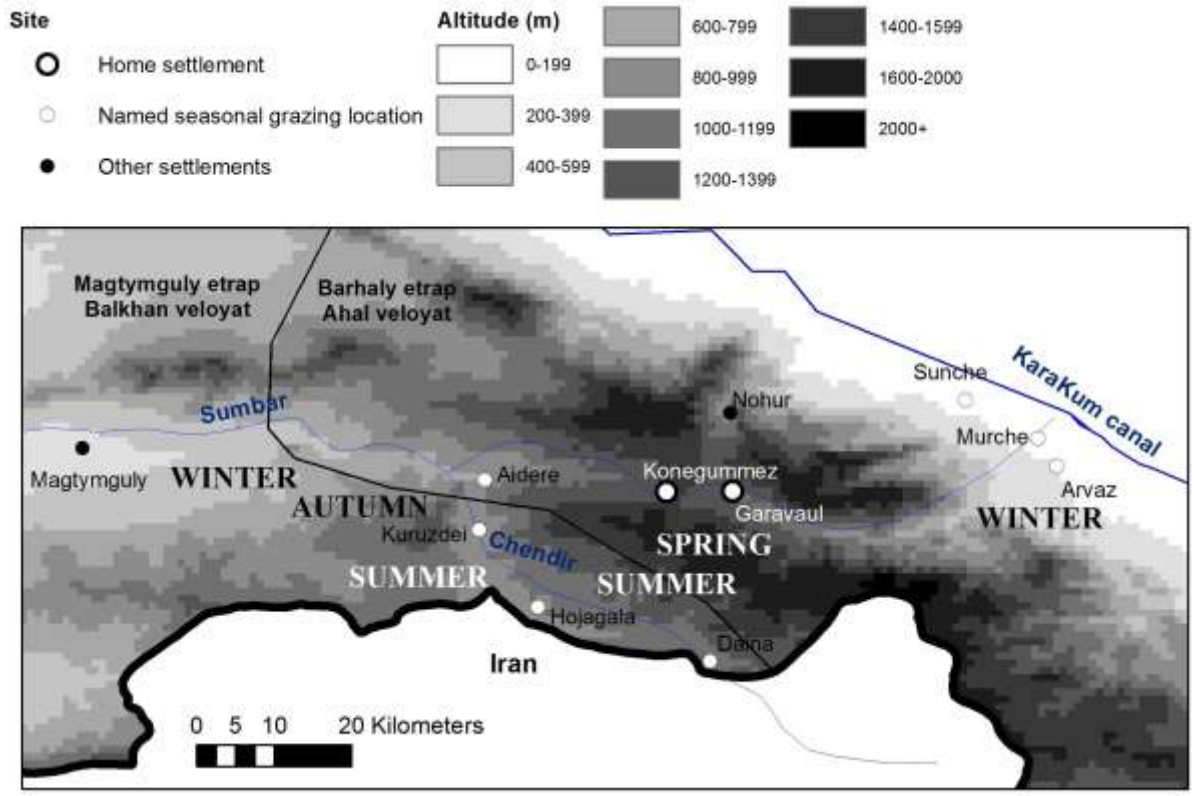
Pasture allocation and grazing management of private stock is performed by a traditional institution – personified by the '*baiar'*. *Baiar* are local leaders responsible for pasture allocation and grazing management for *chekene* herding groups. Each *chekene* group is made up of a number of households who pool their livestock together to make up herds of around 800 head, considered to be the optimum number which can be managed by a shepherd and helper. Each group has one *baiar*, whose roles are listed in Box 1.

[12] At Garagum FA there were two gengesh, corresponding to *ferma* 1 and *ferma* 2 of that association.

Box 1. Role of *baiar* in the organisation of grazing

- Organizing meetings of *chekene* group members;
- Organization of shepherding – through professional shepherd or by rota;
- Responsibility for financial records concerning payment of shepherds;
- Organization of supplies for shepherds - donkey, dogs, transport and clothing;
- Mobilization for collective maintenance works at watering points;
- Application of penalties for members who do not respect pasture use and migration principles;
- Organization of vaccination and disinfection.

Figure 3. Seasonal pastures used by livestock from Enish FA



Enish FA administration plays little role in pasture allocation; negotiations for the pastures used outside its boundaries are conducted by *baiar* and individual private shepherds. In Balkan velayat, there is little conflict over pastures with locals, who do not use the areas occupied by incomers, but in lower Baharly etrap where winter pastures are used both for locally based animals, and by incoming flocks from Enish FA, rising livestock numbers have led to competition for grazing land. Thus, pasture access was ranked as the most critical issue

for people at Garavul whilst at Konegummez water supply in the mountains was considered more problematic. Fodder costs at this mountain site were higher than at other study sites, as there is more snow and many keep cattle, which are stall fed for some of the year. Leaseholders have access to arable land from the FA to grow fodder crops, but private owners have less access to land for this purpose.

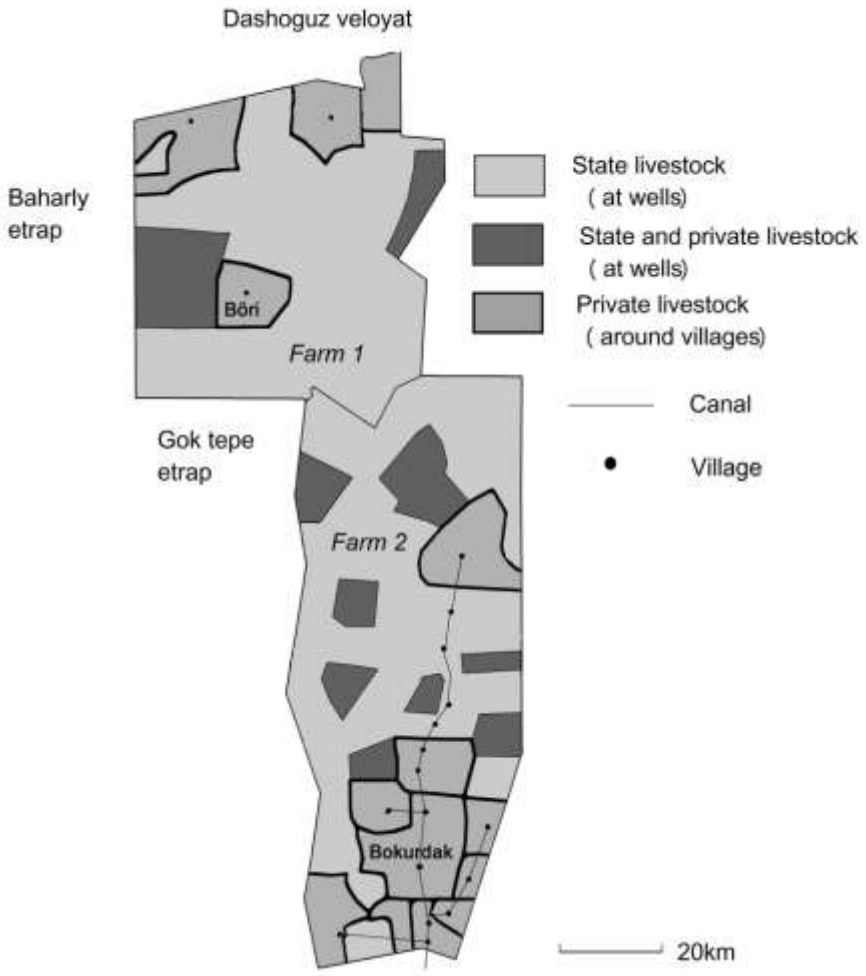
Site 2: Garagum farmer's association, Ahal velayat: The desert site of Garagum FA is split into two farms, centered on the northern settlement of Böri and on Bokurdak in the south (see Figure 4). Each farm is managed by a *zoofermer* working for the FA. *Zoofermer* at this site play an important role in pasture allocation, distributing pasture areas directly to both leased and private herds and holding responsibility for dispute resolution. The map in Figure 4 illustrates how, although around 70% of small stock are privately owned, the area allocated to these animals is smaller than that available for state herds.

At Bokurdak private herders explained that their animals are located close to the settlement all year around, and tend to use water sources such as hollows or cisterns which must be frequently replenished from trucks. In contrast, leaseholders generally move between winter and summer wells located in the light grey zone of the map in Figure 4, with summer pastures close to the canal and winter pastures around 25km away. These movements allow summer pastures to regenerate. Winter wells are salty and water must be trucked there, yet leaseholders clearly value these pastures - some have negotiated the use of wintering areas in neighbouring Baharly and Goktepe etraps. Others spend the entire year outside the FA territory, for example in Tedzhen etrap, 150km to the east.

Leaseholders at Böri spend spring, summer and autumn at wells within farm boundaries. Some then move around 60km east to winter wells in Baharly or Gok tepe etraps. Others use pastures over 60km to the north in three etraps of Dashoguz velayat, for the whole year. Leaseholders must truck water from Böri village to fill up wells in these distant pastures and negotiate user rights with local herders there. Such extra-territorial movements were said to have become more common in recent years. Herders of private animals stay at a radius of around 6-7 km from Böri on land allocated to them either all year round or in spring-autumn and summer. In the winter, some move out to Baharly or Gok tepe etraps, again through verbal agreements with local shepherds. Another strategy, likely to have negative impacts on pastures, is to move out to wells vacated by state herds, shown as dark shaded areas in Figure 4 (Zverev et al., 2009).

At this site, trucking of water was the largest household expenditure for both leaseholders and private herders; all groups interviewed cited water supply issues and pressure on pastures as the most important obstacles to livestock raising.

Figure 4. Areas available for grazing by livestock from Garagum farmers' association (Source: Zverev et al. (2009)).



<u>*Site 3. Garagum livestock farm, Dashoguz velayat:*</u> Like Garagum farmers' association, this livestock farm of the same name is located on relatively homogenous pasture areas in the Karakum desert. It is a large farm stretching from close to Gerogli in the north to the border with Ahal velayat in the south, and split into three *ferma* in a north-south direction. As at site 2, movements of state animals are characterised by relatively short movements between two or three seasonal wells, with some flocks making longer distance movements into neighbouring farms. Small stock at the northernmost two *ferma* move between summer locations at settlements, and outlying winter and spring areas between 25 and 40km away, to which water is trucked to fill up hollows. Camels, grazed in the south, move between summer and winter wells, which they can use without trucking water, as they are resistant to high levels of salinity. Some camels graze in Lebap velayat, where they have a written use agreement negotiated by the LF director, or wander also into the neighbouring etrap of Darwaze in Ahal velayat. Disputes were not reported here and herders from both sides were said to collaborate when it is time to round up the animals. Statistics on private animals could not be obtained but workers have some private animals in their flocks and private stock from a neighbouring gengesh also use the area.

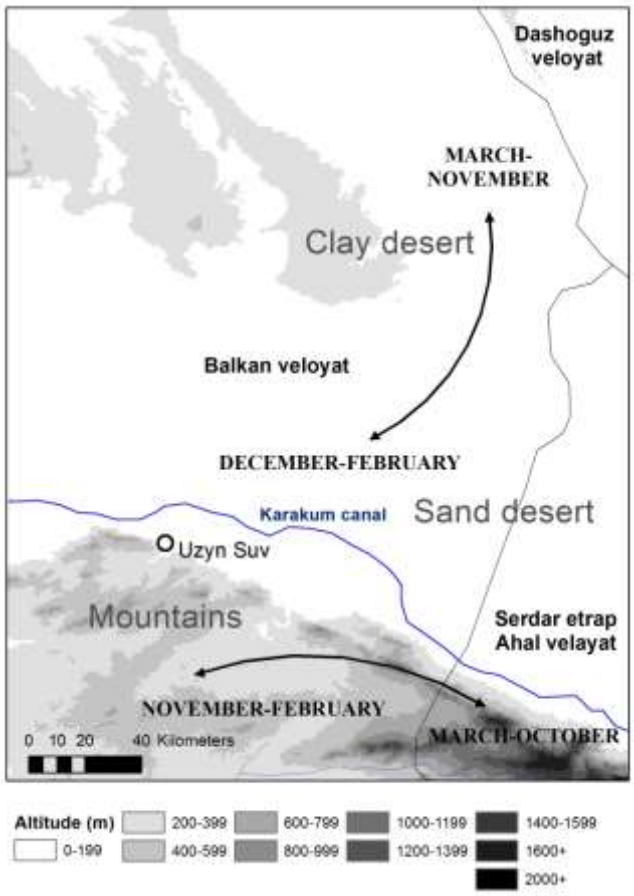
Site 4: Serhetchi livestock farm, Mary velayat: Private herders at Serhetchi have the poorest access to pasture of all sites examined, able only to graze stock at a radius of 5km around settlements, and using wells at their homes or the river to water their animals. They also graze on land belonging to the forestry department (*leskhoz*), not far from the village. This land is accessed by concluding contracts for firewood collection, which also confer informal grazing rights. However, the *leskhoz* is now planning to ban summer grazing and private owners have also lost access to land along the Afghan border, where the closed buffer zone has been enlarged. Thus, pasture access was the biggest problem mentioned by this group.

Regarding state owned animals, the livestock farm is split into two *ferma* centred respectively on the village of Serhatabat and Akrabat (see Figure 1). The livestock farm does not actively allocate specific areas of pasture to each shepherd and claims to wells, acquired through use in previous times, have persisted despite organisational change. There is little ecological differentiation between pasture areas on this farm; movements are made to reach fresh grazing and preserve pastures rather than to exploit different types of vegetation or climatic conditions. The livestock of *ferma* 2 have access to five summer wells close to the village of Akrabat, but water supply is not enough for all ten flocks, so small stock drink only every other day. They then move 10 km to salty winter wells or cisterns, both of which are periodically replenished with fresh water by the livestock farm. Stock from *ferma* 1 stay at a group of five wells in the summer pastures, moving out to barns 12 km distant in the winter, but these winter locations have no water sources so they must come back to summer areas to drink. Thus in winter small stock drink once every two days and must walk long distances. Not surprisingly the pasture around these intensively used wells is highly degraded at a radius of 3km and water was the problem ranked highest by all leaseholders and farm staff interviewed. Other more outlying pastures could potentially be used, but water must be trucked, entailing up to nine trips per day in hot weather.

Site 5. Arkach livestock farm, Balkhan velayat: At Arkach, statistics on private livestock were not available, but informants suggested that numbers are higher than those of state animals (see Table 1). Only one private herder could be interviewed, looking after camels for 25 households.

This site has three highly differentiated ecological zones, and livestock movements span significant distances, reaching up to 200 km to the north of the central village of Uzen Suv and over 100 to the south into the Kopet Dag mountains (see Figure 5). The LF is split into *ferma* 1 and 2. Movements of small stock from *ferma* 2 are shown in Figure 5. Certain flocks move between a group of 20 winter wells located in the sandy desert 80 km distant from Uzyn Suv, and clay deserts on the border with Dashoguz velayat, a further 100 km to the north, where they stay from March to November. Other flocks from *ferma* 2 follow a second migratory pattern, moving from wintering areas in the mountains south of Uzyn Suv to higher spring and summer pastures in Serdar etrap of Ahal velayat.

Figure 5. Seasonal grazing areas used by livestock from ferma *2 of Arkach livestock farm*



Small stock from *ferma* 1 (not shown on the figure) also spend part of the year in Serdar etrap, but winter there rather than spending the summer months. In summer these flocks then move to plains areas between Uzyn Suv and the Karakum canal, where some flocks are found all year and can use water from the canal.

The counter-intuitive use of certain mountain pastures in winter and desert pastures in summer, comes about because deep wells have been dug in the desert, whilst in the mountains many springs dry up in the summer months. At this site, both workers and one farm director evoked problems with private herders who use wells belonging to the farm without permission. Lack of functioning water points and shelters for livestock and shepherds were also mentioned by all.

4. Implications for law development

A pasture law for Turkmenistan must include mechanisms to reconcile the fact that the state entities controlling pasture land have economic imperatives which lead to a conflict of interest with private livestock owners, who are effectively their competitors. For this reason these entities sometimes attempt to restrict access to pastures by private animals, as seen at Serhetchi LF and Garagum FA. However, where the proportion of private animals is very high, as at Enish, pasture access for privately owned stock is good.

Farmers' Associations tend to provide less material support to their own leaseholders than is provided by LF to their workers. But the terms of leasehold contracts are more favourable and leaseholders were considered to be better off than hired shepherds on livestock farms. State farming entities are not direct providers of services to the private sector, but private herders do sometimes use infrastructure belonging to or paid for by these organisations, such as water from the major canal at Garagum FA, or wells and barns in pastures. Some hire the FA veterinarian for vaccination. Private livestock owners themselves also come in a number of types. Firstly, both leaseholders and workers own significant numbers of private animals; secondly, some private owners are members of collective herding groups which are informal institutions in their own right, but which are not legal entities. Lastly, individual private

herders managing only their own animals may hold small flocks with limited access to pastures or infrastructure, or run very large operations, conferring a relatively strong negotiating position for pastures, water and barns.

Locally based and equitable allocation systems are required to balance the needs of these different users, which is a challenge as there are fundamental inequalities in their status and interests. State farms are not only organised legal entities, but are also the current legal 'owners' of the pasture in the sense that this resource has been allocated to them for long term use. Private owners are not yet formally organised and lack legally recognised representative bodies.

The boundaries of state farming entities, which form a logical starting point for a pastoral land tenure system, also correspond to the boundaries of the gengesh - the lowest level of local government. This body constitutes a locally elected council, but does not hold jurisdiction over agricultural lands, of which pastures are a part. These lands are currently managed by state farming entities which generally have greater incomes and budgets than gengesh governments. However, from a territorial point of view the gengesh could theoretically represent a neutral platform for pasture access negotiations between the various stakeholders. Concerning private users, the existence at Enish of an indigenous Turkmen institution for pasture management has interesting implications for a pasture law and may provide an example upon which locally adapted forms of pasture users associations with a mandate to represent their members, could eventually be based.

Whatever system is put in place, barriers to livestock movement across administrative or institutional boundaries should be as low as possible. A key observation at all sites was the high level of migratory and mobile grazing practises, including movements outside the boundaries of 'home' farming entities. These movements are perhaps the result of growing numbers of animals and light levels of regulation which, as we observed, leaves plenty of scope for individual negotiation between pasture users at the local level.

Although cases of written agreements for pasture use between livestock farm administrations were noted during the research, in most cases negotiation for these pastures is made directly by herders themselves (both leaseholders and private herders) either with the 'foreign' FA or LF administration, or directly with the local herders with whom that remote pasture is shared. Some of the cross-border areas used today were allocated to state farms for long term use during the Soviet period, and are thus based on historical (and perhaps even legal) precedent, however there are exceptions to this, in which the use of such pastures has always been informal, or has been initiated in recent years. In most areas it appears that negotiations for pastures proceed smoothly, however disagreements do arise where livestock numbers are high or growing fast. Individual shepherds generally use the same areas from year to year, but may make additional moves between water sources in dry years. At Garagum FA, herders previously moved outside FA boundaries only in dry years, but with changing climate and increasing stock numbers, some herders now do so every year.

Flexibility is therefore essential, and it has been demonstrated empirically that freedom of movement allows Turkmen livestock owners to match stocking rates to the availability of forage and water resources across farm boundaries (Behnke et al., 2016). Whilst this is

encouraging for the management of natural pastures, there is a risk that regulation, whatever form it takes, will reduce this freedom of movement. Increased investments in water supply together with a property rights system which provides improved pasture access for private herders whilst keeping administrative barriers to livestock movement to a minimum would be an ideal scenario for future pasture management in Turkmenistan.

5. Development of a legal framework

A consultation process was conducted with ministries responsible for agriculture, economy, water, finance and nature protection. Stakeholder workshops were held with representatives of these ministries, the Forestry Department, Institute of Deserts and Livestock Institute. Those responsible for producing a draft law included a national lawyer on land and natural resources, an international pasture expert and international legal expert on natural resource property rights. The consultants considered both individualised and common property systems from other countries in Central Asia, China and Mongolia (Robinson, 2015, Robinson et al., 2012) and insights from scientific research on arid rangeland management which have emerged over the last 30 years (see box 2).

Box 2. The management of arid rangelands: from carrying capacity to livestock mobility

Firstly, on arid and poorly productive rangelands, it has become increasingly recognised that potential economic and environmental outcomes of pastoral land use are highly dependent on livestock movement, which enables animals to avoid forage scarcity and exploit abundance (Coughenour, 2008). Scientific insights into the nature of rangeland-livestock interactions in Africa have suggested that climatic factors such as rainfall may have a greater impact on range condition than grazing by livestock (Behnke et al., 1993, Ellis and Swift, 1988) and that policies aimed at restricting livestock to defined areas of land according to fixed carrying capacity calculations may be counter-productive, or even lead to greater land degradation. Secondly, it has been noted that increasing individualisation of rangeland tenure, encroachment of cropping and the need of pastoralists to stay close to markets and schools have caused livestock migrations to decline worldwide (Reid et al., 2008). Grazing systems have become increasingly fragmented, with implications for ecosystem resilience and livestock productivity (Boone and Hobbs, 2003, Li et al., 2007). Lastly, researchers have also highlighted the social repercussions of pasture privatisation programmes, which may lead to the exclusion of poorer livestock owners from grazing land (Li et al., 2014, Rohde et al., 2006). International organisations, which previously financed rangeland privatisation and ranching projects, have increasingly promoted common property resource management (CPRM) systems, or arrangements including elements of open access, although formalising these has proved more difficult (Turner, 2011).

Of particular regional interest was the example of Kyrgyzstan, where two very different tenure systems could be compared directly. Here, a leasing mechanism was introduced in the 1990s, but suffered from a number of drawbacks. Collective herding groups characterised by fluid membership were not legal entities and thus found it difficult to register contracts, leading to conflicts between such groups and leaseholders. Separate contracts had to be concluded for each seasonal pasture leading to high transaction costs and barriers to livestock mobility (Undeland, 2005). The system was abolished and a new law based on principles of

CPRM was introduced in 2009. Pastures are now allocated to local governments and managed by Pasture User Associations (PUA) through annual allocation of pasture tickets to members. The law introduces payment calculated per head of livestock rather than on a hectare basis, thus removing penalties for using larger areas of pasture. It aims to preserve the ecological integrity of grazing systems including geographically separated areas defined by a boundary commission.

Whilst important lessons can be drawn from this example, consultation suggested that the introduction of a CPRM system in Turkmenistan, where the Land Code allocates pastures to state farming enterprises, and many herders use sites in multiple enterprises, would be problematic. Many stakeholders considered that in such a context, the only way to provide private individuals with secure access to pastures would be to provide them with concrete long term leasehold contracts over specific areas of pasture land. International experience suggests that such a system may exclude collective grazing groups and undermine existing informal common property institutions, but on the other hand, the types of decentralisation required for common pasture management may not be possible or appropriate in Turkmenistan.

The draft pasture law recognised the *de facto* status of state enterprises as dispensers of pasture use rights, whilst including legal elements promoting flexibility, equitable pasture allocation and user participation in management. After amendments by Parliament, the law passed in August 2015. It specifies the following arrangements:

- Pastures are property of the state, to be provided under two types of tenure arrangement: ‘use’ and ‘rental’.
- *Users* are legal entities (not physical persons) and include farmers’ associations, livestock farms and pasture users associations. Pasture users associations may be formed by private livestock owning individuals at the level of the gengesh. These associations may apply to the land resources commission of the velayat to receive land. This implies that pasture land can be transferred from a state farming entity to a pasture users association. In practise this is only likely to happen where the state entity in question has few livestock and thus little interest in pastures, but the possibility has been established.
- *Renters* are private individuals or collective herding groups, as well as those leasing livestock from farmer’s associations, as these individuals usually own private animals of their own. They receive pastures for ‘rent’ by agreement with the ‘user’ organisation. Users are obliged by the law to provide pastures for livestock owners resident on their territories in addition to their own members and workers. They are empowered to make agreements for pasture with other users wherever necessary in order to broaden access to pasture and water resources where these are insufficient within their own territories. Renters make agreements with users for pasture access according to the pasture use plan (see below) and pay for pasture use per head of livestock to the user organisations, which are obliged to use the collected monies for pasture investments.

- The two forms of state 'user' (farmers' associations and livestock farms) have an obvious conflict of interest with those owning private livestock, and yet they hold considerable power in allocation of pastures to these latter. In an attempt to ensure fairness of pasture distribution and a process for promotion of environmentally sustainable grazing, the law establishes a *Commission on Pasture Use Regulation* at the level of the gengesh. On this commission sit representatives of the pasture owner, private individuals and chekene groups located on that gengesh. The *archyn* (head of the gengesh council) presides over the Commission, which also includes representatives of the etrap Land Resources Commission, responsible for pasture allocation between user entities. The Commission on Pasture Use Regulation is responsible for making annual and mid-term pasture use plans concerning the location of herds in each season. It should ensure representation of all renters in order to ensure fairness of access and even distribution of livestock on its territory.
- Collective herding groups (*chekene*) have been defined in the law and these should also be registered by pasture users as part of their information gathering process. Agreements for pasture rental and payments for grazing can be concluded only between users and renters, but should be made according to the plan.

The potential of these provisions to avoid problems of a first-come first-serve individualisation of property rights and promote continued flexible pasture access depends on how the law is implemented. This will first be explored through pilot projects and the elaboration of detailed bylaws. These bylaws will include templates for (i) access agreements between renters and users; (ii) pasture use plans at the gengesh level; and (iii) regulations for PUAs. These will be critical to the way in which the law may influence pasture management and access, for example by enabling groups to make agreements; limiting the duration of these; and ensuring that different types of user are represented on the Commission. It is hoped that through pilot projects mechanisms can be developed to promote forms of accountable and representative control over pasture allocation.

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