

# The Impact of Land-Reform Legislation on Pasture Tenure in Gorno-Badakhshan: From Common Resource to Private Property?

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*In this paper, we look at the ways in which recent economic and legal changes affect pastoral management in the Gorno-Badakhshan region of Tajikistan. In Central Asia, livestock mobility is crucial for sustainable pasture management, but*

*in Gorno-Badakhshan, average livestock ownership is extremely low. Households must therefore rely on collective herding practices if they are to exploit remote pastures and avoid overgrazing. Post-Soviet land legislation permits privatization with the aim of improving security of tenure for farmers; however, the same laws also apply to pastures. We consider*

*whether the recent legislation is likely to promote or prevent livestock mobility, and assess the potential impact on collective herding. The effects of the legislation on the ground were investigated using 2007 field data from 2 sites, looking particularly at the impact of pasture privatization on collective users. We describe the extent to which pasture at these sites is under private, community, or state control, discuss the implications for sustainable management of this resource, and make recommendations for Tajik legislators.*

**Keywords:** Pasture management; property rights; livestock; privatization; Gorno-Badakhshan; Tajikistan.

**Peer-reviewed:** September 2009 **Accepted:** December 2009

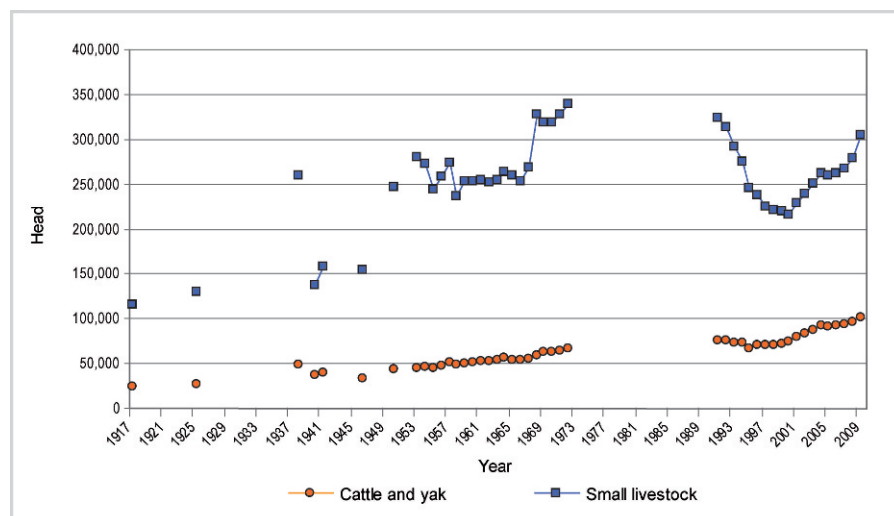
## Introduction: Property rights and pasture management

This paper looks at the relationship between pasture management and property rights in the Gorno-Badakhshan Autonomous Oblast (GBAO) region of Tajikistan. A central tenet to the analysis presented here is the idea that maintenance of livestock mobility (the use of different seasonal pastures throughout the year) is essential for good pasture management. The 2 major factors affecting livestock mobility are the costs of migration and property rights legislation. In this paper, we focus on the latter, reviewing the legislation in Tajikistan and examining how it is likely to affect access to seasonal pastures, both in theory and in practice. Secondly, we look at whether this legislation is likely to affect access to pasture by different livestock ownership groups, in particular, those owning small herds, which represent the bulk of households in GBAO.

Livestock mobility allows stocking rates to track available resources at different seasons and is thus key to good pasture management in environments that are temporally and spatially variable (Coughenour 2007). The literature on Central and Inner Asia strongly suggests that

reduced movement leads to pasture degradation and, in some cases, reduced livestock productivity, due to a mismatch between stocking rates and biomass availability (Sneath 1998; Kanchaev et al 2003; Kerven et al 2006; Wu Zhizhong and Du Wen 2009). These authors also suggest that changes in tenure regime may contribute to a decrease in mobility. In recent years, there has been a worldwide trend for state or common property regimes to be replaced by private ownership. The rationale for this is to increase individual investment in land and to avoid the degradation predicted by Hardin (1968) in his "tragedy of the commons" scenario. However Hardin's predictions apply to *open-access* regimes (where the resource has no defined boundaries or users). Instead, many of the pastures that have been subject to privatization were previously managed as *common property* by defined groups subject to internal controls on grazing ranging from weak to robust (Bromley and Cernea 1989; Ostrom 1990; Quinn et al 2007). Upon privatization, common resources often become fragmented into discrete parcels. This restricts the amplitude of annual migratory movements and undermines the flexibility to change grazing location with interannual variation in climatic conditions. Tenure rights are typically secured by households with larger herds, who

**FIGURE 1** Trends in livestock numbers in GBAO from 1917 to 2005 (Sources: State Statistics Committee [2006, 2008, 2009] and Regional Statistics Committee of GBAO [1972, 2003]).



can cover costs of herding individually. This has led to a loss of areas for communal grazing by smaller stock owners and a loss in overall livestock mobility (associated with deterioration in pasture quality) in many areas of the world (Rohde et al 2006; Wen Jun Li et al 2007).

In Central Asia, pasture management has moved from state-managed mobile systems towards de facto common property regimes and, more recently, to leasing or privatization. Mobility has contracted due to drops in animal numbers and the collapse of state subsidies for migration and water supply. The sector today is characterized by a large number of small herds used for subsistence, and a much lower number of large commercially viable herds. Broadly, the major barrier to movement amongst small herders is the cost of migration itself, combined with lack of infrastructure in remote areas (Kerven et al 2004). However, as livestock numbers recover, the influence of property rights on movement will become increasingly important. In Kyrgyzstan, following the collapse of state farms, pasture continued to be used by those communities that historically exploited them, and common herding systems enabled partial use of remote pastures (Farrington 2005). Introduction of leasing laws led to a loss of control over some of these pastures by former users as land was leased to individuals from outside the area (Undeland 2005).

By comparison, in Kazakhstan, certain seasonal pastures and key infrastructure such as wells may be privatized, but only those with large herds can afford the costs of privatization and of transport associated with migration. Collective migratory herding systems are rare, so households with low animal numbers graze them year-round close to settlements, causing localized degradation (Kerven et al 2004). In Turkmenistan, access to state

pasture is negotiated with farmer's associations, enabling flexibility of movement and relatively high levels of livestock mobility (Lunch 2003; Behnke et al 2008); however loss of state support for movement and water provision has meant that overall mobility has probably decreased since reform, with associated effects on pasture quality (Kanchaev et al 2003).

### The livestock sector in GBAO

Animal numbers in GBAO fell sharply at the end of the Soviet period (Figure 1). Although there has been a recovery since the late 1990s (MSDSP 2004), ownership remains low, averaging 9 small stock and 2 head of cattle per household (MSDSP 2009). The consequences of this are twofold: (1) most households access pastures through common herding systems (pooling animals from many households into 1 herd, overseen by a professional shepherd), and (2) the livestock sector is largely subsistence oriented (Robinson 2005). Today, winter fodder is the major factor limiting livestock production, suggesting that numbers are unlikely to reach levels at which pastures might be damaged. However, livestock mobility has also declined (see Box 1 and Figure 2). Village (winter) pasture and nearby summer pastures are heavily stocked for long periods, whilst remote summer pastures are underused (Ludi 2003; Hoeck et al 2005; Haslinger et al 2007). These studies indicate that overgrazing is likely on village pastures, but empirical research measuring the impact of this process is lacking. Indeed, the most serious degradation may come from collection of forage plants for fuel (Hoeck et al 2007).

Policy makers will need to balance the economic and productive interests of larger herders with *ecological sustainability* (defined here by mobility) and *social equity*

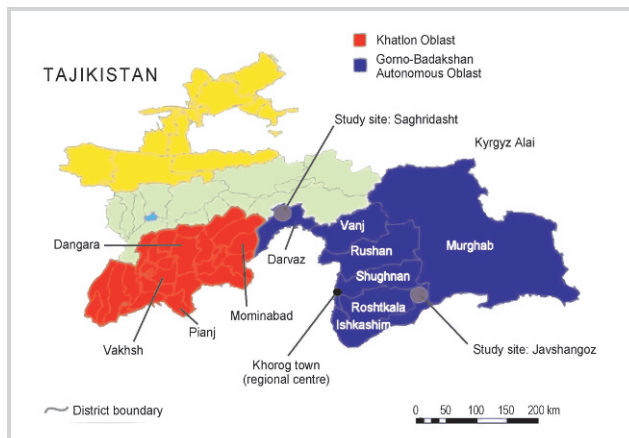
### BOX 1: Livestock movement in GBAO: Contraction of mobility

During the Soviet period, most migrations in the western Pamir were local and vertical, during which most stock moved up the nearest lateral valley (Ovchinikov 1977). The main migration to GBAO from outside the region was that between Saghridasht and southern and eastern districts of Khatlon Oblast (see Figure 2). In addition, some *sovkhoz* in the western Pamir were allocated summer territory in the Kyrgyz Alai, also entailing very long migrations. Within GBAO, cross-district migrations included movement of animals from lower Rushan to Darvaz and Murghab districts (all shown in Figure 2). Animals from lower Shughnan and Shughdara used the large high-altitude pastures in Jelondeh (on the border of Shughnan and Murghab districts) and Javshangoz, respectively, entailing relatively long migrations, although district boundaries were not crossed. Upon independence and the collapse of the state farm system, pastures in other republics became inaccessible, and use of pasture in other districts or oblasts is now subject to negotiation with district authorities or heads of collective *dekhan* farms. It is therefore migrations across administrative boundaries (shown in Figure 2) that have declined the most. Hoeck et al (2005) noted that a primary reason for overgrazing on near-village pastures is deterioration of transport and infrastructure in distant pastures.

Movement of populations and animals on the high-plateau areas of Murghab district is much more widespread and complex than in other regions of GBAO, making use not only of altitude differences but also microclimates associated with slope and exposure. Whilst in the western Pamir only professional shepherds go to the pastures with common herds of village animals, in Murghab, many households are mobile, and villages empty in the summer as families leave for the pastures with their yurts. Households with large numbers of animals also move to remote pastures in autumn, spring, and even in some cases in winter, thus living away from the village for most of the year (Hangartner 2002). Today the remote pastures are used only by the few families holding the largest herds whilst many common herds remain concentrated around villages in these seasons (Hangartner 2002), a center-periphery phenomenon which is a repeating feature of Central Asian pastoralism today (Undeland 2005; Kerven et al 2006).

(access for small livestock holders). Thus, an ideal property regime for GBAO would first encourage mobility (or at least not prevent it), and, second, it would allow for the communal use and management of pastures. In the next section, we examine the land legislation to see whether it meets these criteria. Further, we investigate the implementation of this legislation on the ground in order to ascertain its actual impact on livestock mobility and pasture access.

**FIGURE 2** Location of study sites and relevant district names in Gorno-Badakhshan and Khatlon regions (referred to as *Oblasts*, the Russian term for a region).



## Results

### Pasture allocation and the law

According to the Land Code (State Land Committee 2004), all agricultural land in Tajikistan is owned by the state. The legislation does not differentiate between arable land and pastures. Pasture is designated as “farming land” and is thus subject to the same legislation as arable land. The Land Code offers a number of tenure arrangements to users (Robinson et al 2008): permanent heritable land use, long-term use, and leasing. All are negotiated through the decentralized district offices of the State Land Committee (Tajikzaminsoz) and are presented in detail in Box 2.

In reality, in GBAO, most households have permanent heritable rights to land plots as shareholders in so-called “collective *dekhan* farms,” based on membership of former *sovkhoz* or *kolkhoz* (see Box 2). Until recently, only arable land was physically allocated to individual households. Pasture within the boundaries of collective *dekhan* farms is also theoretically eligible for distribution to members but is usually communally managed. This is a response to the practice of collective herding that makes splitting of pasture into shares an impractical proposition. Remoter areas of pasture may be allocated to collective *dekhan* farms from state fund lands for “long term use”; these areas are also generally treated as common land (see Box 2).

The law also allows applicants (theoretically any Tajik citizen) to obtain pasture for permanent exclusive use *on a*

## BOX 2: Application of land-tenure arrangements

### **Permanent heritable land use**

Permanent heritable land use is governed by The Law on Dekhan Farms (State Land Committee of Tajikistan 2009). *Dekhan* farms (literally peasant farms) may be established by individuals, families, or by groups (partnerships) based on shared ownership. In each case, the farm has a head, who holds the land certificate, and shareholding members, who should hold share documents to a physical plot of land. The head is responsible for reporting and tax collection, but decisions on reorganization or changes to contracts between members may only be decided at a general meeting. Members may secede from the *dekhan* farm without permission of other members, establishing their own individual or family *dekhan* farm on their land share, with the same permanent heritable land rights. However, this is an expensive process.

Individual or family *dekhan* farms: When applying to establish a *dekhan* farm, former *sovkhoz* or *kolkhoz* workers may apply for a share of the former entity for which they worked. Areas allocated should be based on norms calculated from the area of available land and the number of former *sovkhoz* or *kolkhoz* members. Other Tajik citizens may apply for land from the state fund (or various other categories of unutilized land). Existing *dekhan* farm holders may apply for additional pasture land, to be allocated according to the number of livestock to be grazed.

Collective *dekhan* farms: Legally, these are close to the group/partnership form of *dekhan* farm given in the law, but they were not specifically foreseen in the legislation, as in fact they consist of the entire former territory of a *sovkhoz* or *kolkhoz*. These structures appeared in response to government targets to restructure all state farming entities by the end of 2005 and due to the high transaction costs of forming individual and family *dekhan* farms. The collective *dekhan* farm head holds the land certificate for the whole area, but in GBAO, each shareholding household farms individually and should hold a legal share document for a physical parcel. Legally, the same principles apply to pasture that is *permanently* allocated to the former *sovkhoz* and *kolkhoz*, but until 2009, in GBAO, this pasture continued to be used in common by all members. In 2009, the Land Registration and Cadastre System for Sustainable Agricultural Development Project (LRCSP) facilitated the conversion of a selection of collective *dekhan* farms to individual *dekhan* farms with provision of full certification for each household. The process is ongoing but should improve security of tenure for those households. According to the law, each member should receive legal title to equal shares of both arable land and the “permanent use” pasture land allocated to the now defunct collective, regardless of the number of animals owned.

### **Land allocated from the state land fund for long-term use**

In some districts, most pasture used by collective *dekhan* farms is accessed by members under 25 year “long-term use” agreements made between farm management and the district land committee. Pasture tax is charged per hectare, but farm management usually gets around this by splitting the overall sum of tax payable so that each household pays a proportion corresponding to the number of livestock owned. As long as this land is not permanently allocated to collective *dekhan* farms, members do not automatically receive a share if the collective is dismantled. In the meantime, individuals may apply separately to the land committee for a permanent share of this pasture. Some officials indicated that in order to privatize pasture on long-term use land, an individual must obtain the written permission of the members of the collective *dekhan* farm to which that land was formally allocated. However, in Tajikistan, this is unlikely to constitute an effective guarantee of common user rights. It should be noted that collective *dekhan* farms may also apply to have this land transferred from long-term use to permanent use.

### **Lease of state fund land**

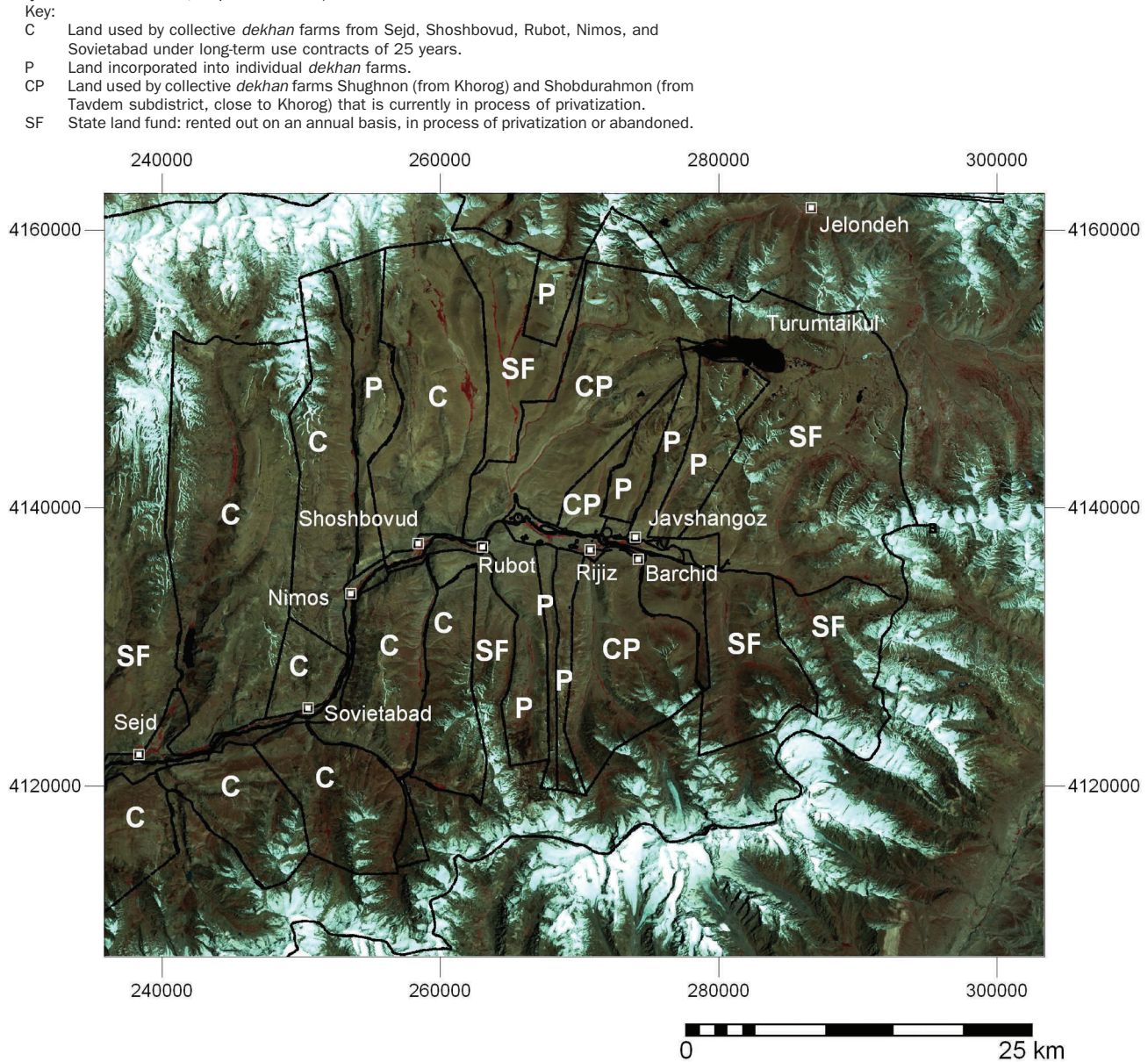
Many remote pastures remain unallocated and form part of the state fund. Any party (individual, collective *dekhan* farm, or state enterprise) may take out an annual lease for an area of state fund pasture. As mentioned already, such land may also be privatized and incorporated into *dekhan* farms by application, at which point it ceases to be available for lease.

*first-come, first-served basis.* Applications may be submitted for lands allocated to collective *dekhan* farms under long-term use agreements or for state fund land. The theoretical possibility thus exists that pasture could be privatized or leased by individual applicants, reducing access by others. For this reason, such cases of privatization were a major object of investigation for the present study.

## Choice of study sites and methodology

The case study areas consisted of 2 remote pastures of regional importance used by large numbers of communities (see Figure 2). Javshangoz was the first part of GBAO to undergo significant levels of individual privatization. Saghridasht, a subdistrict of Darvaz district, had a mixture of collective grazing and continued state ownership that was

**FIGURE 3** Pasture tenure in the Javshangoz Valley. (Source of cadastral information: Tajikzaminsoz, Dushanbe, 2006. Satellite image: Landsat color composite 8 June 2001, Projection: UTM Zone 43, Ellipsoid: WGS84)



also unique in GBAO and was chosen to assess the impact of such a mixture of ownership types on mobility.

Javshangoz is used exclusively by stock from the Shughdara valley (which runs the length of Roshtkala district, with lower reaches close to Khorog). Saghridasht is used both by local livestock and animals from Khatlon region. In Javshangoz, livestock numbers and tenure arrangements at all camps were recorded through interviews with herd owners and shepherds. In Saghridasht, emphasis was on interviewing key

informants, including heads of the major state or collective farms using the pasture or their representatives in the field. In both areas, local officials were interviewed about land tenure policy and its implementation. Full methodology is given in Robinson (2007).

Following fieldwork in 2007, there was an acceleration of land reform in GBAO. In 2009, follow-up interviews were carried out with staff at the Land Registration and Cadastre System for Sustainable Agriculture Project and both district and regional Land Committee officials in

GBAO in order to understand the recent developments and assess their implications for pasture management.

### Case study 1: Javshangoz

The uppermost part of the Shughdara valley (far eastern end of Roshkala district) is shown in Figure 3. Javshangoz is the area east of Rubot village, used in the Soviet period by livestock from lower Shughdara, Khorog, Ishkashim districts, and Javshangoz itself (see Figure 2 for locations). West of Rubot, most pasture is allocated to collective *dekhan* farms under long-term use agreements. However, in Javshangoz, much of the pasture has been privatized through individual application. Emerging tenure arrangements are discussed below.

1. *Individual dekhan farms*: There are 7 registered individual *dekhan* farms in the Javshangoz valley, each of which has between 4 and 12 member households. They are usually registered by prominent local figures or professional shepherds of collective *dekhan* farms, whose claim to the pasture is supported by the fact that they have lived and worked there for many years. Lastly, 2 groups of households from Javshangoz itself registered their own *dekhan* farms through application, consisting of pasture areas that they use and manage on a communal basis.
2. *Individual dekhan farms under application*: Large areas of land have been factually annexed by individuals or groups of households as described above, but the legal proceedings leading to certification are still ongoing. Here, we refer to applicants for pasture who have not yet completed the privatization process as “claimants.”
3. *Renting from individual dekhan farm or claimant*: Registered *dekhan* farm owners and claimants rent out pasture to others, usually shepherds grazing common herds from villages in lower Shughdara. Some provide shepherding services for the “owner’s” animals, thus gaining access to pasture for his own animals and those of his relatives.
4. *Annual renting of state fund land*: Large areas of state fund land have not been privatized or allocated to collective *dekhan* farms for long-term use. These areas were allocated to *sovkhos* or *kolkhos* during the Soviet time, but, with the decrease in livestock numbers and introduction of pasture tax, they were ceded back to the government by successor organizations. Eleven occupied camps on state fund land were identified for which users made annual rental agreements through the district Land Committee. Some herds had multiple owners from various villages, whilst others belonged to individual *dekhan* farms renting extra summer pasture to supplement that which they had privatized. Large areas of state fund land remain unused, including the area around Turumtaikul Lake.

There are several factors suggesting that exclusion is not a reason for loss of livestock mobility to Javshangoz.

**FIGURE 4** Heavily used winter pasture in Javshangoz. (Photo by Nodaleb Muzofirshoev)



First, for ordinary households in Shughdara, the key agent through whom pasture may be accessed is the shepherd, who negotiates with the Land Committee and constitutes the herd. Those renting pasture may herd animals of 1 village only, or they may constitute a mixed herd from the animals of anyone demanding access to summer pasture in the region. Even shepherds hired to herd animals of large stock owners with their own *dekhan* farms may take on extra animals in the summer in addition to those of the owner. These systems offer pasture access to households without a formal land claim in Javshangoz. Second, the number of stock using Javshangoz is now about half that during the Soviet period, and large areas of pasture are empty. This does not mean that all who would like to use Javshangoz pastures have access: transport, shepherding costs, tax, and deterioration of pasture dwellings are all deterrents, but exclusion by privatization does not yet seem to be crucial, at least in summer. In other seasons, only the animals of *dekhan* farmers and claimants stay in Javshangoz, because pasture and barn space are limited (Figure 4). It is important to note that nearly all camps on state fund land are summer ones, whilst most of the crucial winter and autumn camps are located in areas undergoing varying stages of privatization. This pattern reflects the relative value of these resources.

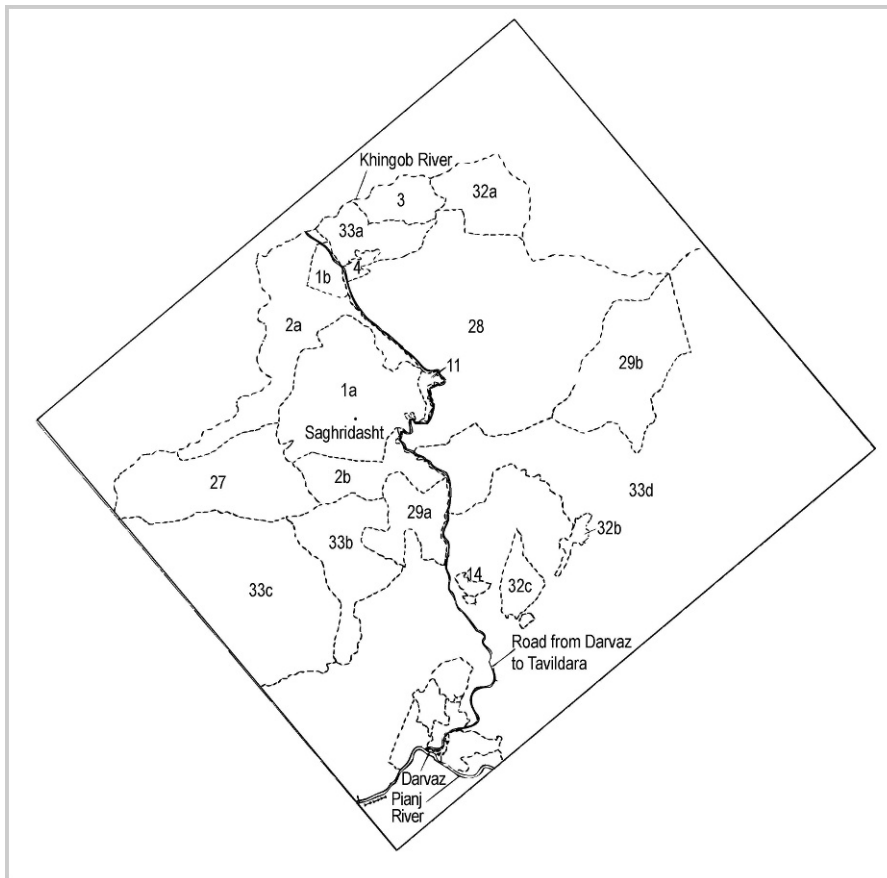
### Case study 2: Saghridasht

In Saghridasht, most pasture and arable land are still controlled by state enterprises (breeding farms that were exempt from the restructuring process). The users are listed in the key to Figure 5, which is based on the cadastral map of 2005. Since that time, the land-tenure arrangements have become further fragmented.

**FIGURE 5** Cadastral map of pasture in Darvaz district between the Pianj and Khingob Rivers.

Key:

- 1a and 1b: State livestock breeding farm "Saghridasht," permanent use.
- 2a and 2b: State livestock breeding farm "Saghridasht," long-term use.
- 27: Long-term use for Vakhsh district, now used by state farm Tebalai from Mominabad.
- 28: Long-term use for Pianj district.
- 29a and 29b: Long-term use for Mominabad district, no longer used due to mines.
- 32a to c: Land belonging to the State Forestry Department.
- 33a to d: State land fund available for annual lease or privatization through application.



The former *sovkhoz* Saghridasht covered much of the subdistrict during the Soviet period. It was then split into 2 small collective *dekhan* farms (Orzu and Kalai Hussein) and 1 larger state enterprise, Saghridasht. The state enterprise has maintained long-term land-use rights to winter pasture in Dangara district of Khatlon Region (see Figure 2), thus continuing the Soviet-era migration. Summer pasture is all located within the enterprise boundaries in Saghridasht itself (contours 1a and 1b in Figure 5). Camps are allocated to both state and common herds (belonging to villagers) by the farm administration, so households living on the territory of the state enterprise have access to seasonal pastures for their private animals. In collective *dekhan* farms Orzu and Kalai Hussein, all animals belong to member households, and at the time of the 2007 fieldwork, pasture was

managed as common land. However, due to their small size, there are few remote summer camps, and some herds graze close to villages all year-round. No remote winter pastures are available. Darvaz was the first district in GBAO where collective *dekhan* farms were dismantled, and land certificates are now being distributed to all households through the LRCSP (see Box 2). Most pasture available to these collective *dekhan* farms is located within their boundaries. As such, it must be distributed in equal shares to members in the same way as arable land parcels. However, each household owns different numbers of animals, livestock are herded in common, and the pasture is highly heterogeneous both in time and space. The way in which these contradictions will be resolved is unclear, as the pasture allocation process is ongoing.

**FIGURE 6** Livestock from Khatlon Oblast on summer pasture in Saghridasht. (Photo by Sarah Robinson)



In addition to farms based in Saghridasht, in the summer, livestock also come from Khatlon region, in the south of the country (see Figures 2, 6). Animals come principally from 3 former *sovkhoz* (in Mominabad, Vakhsh, and Pianj districts), which are now registered as state breeding enterprises. Pasture is accessed through long-term use agreements negotiated with Darvaz district Land Committee, although the enterprise from Pianj now makes annual rental agreements after having lost long-term rights during several years of nonuse during the 1990s.

Conversely, many former *kolkhoz* from Khatlon have become collective *dekhan* farms and no longer use pasture in Saghridasht. Low animal numbers, transaction costs of negotiations for remote pasture in another administrative district or region, and lack of coordinated herding organization are all likely to represent barriers to migration where farms are no longer owned by the state. Thus, many areas of Saghridasht remain empty, including northern parts of the area used by Pianj district (contour 28), areas allocated to Mominabad (29a and 2b), and long-term use areas of Saghridasht State Enterprise. As in Javshangoz, stock numbers using summer pastures have dropped by about 50%.

## Conclusions and recommendations

This study has confirmed that pasture privatization is possible in Tajikistan, not only in terms of legislation, but

in practice. Where pasture is accessed on long-term use land or on state fund land, privatization occurs on a first-come, first-served basis and there is no provision in the law formally *guaranteeing* pasture-use rights to village herds. Thus, theoretically it may lead to pasture fragmentation and reduction in access for those with few animals who herd livestock in common.

For the moment, at the Javshangoz study site, although much land has been privatized, most collective *dekhan* farms retain common access to pasture for long-term use. Professional shepherds may privatize pasture as individuals, but they often continue to graze common herds there. On the other hand, livestock numbers are increasing; the value of pasture resources and the pressure to privatize are likely to increase with them (Behnke 1985).

The other major category of pasture tenure is “permanent use land,” which is within the boundaries of the collective *dekhan* farms themselves. As collective farms are dismantled, this pasture must be allocated to the new individual *dekhan* farms that replace them, in equal shares, regardless of the number of stock owned by recipients. If these shares were to be physically demarcated, this process could result in pasture fragmentation and a reduction in livestock mobility. In addition, most owners do not have available labor to herd their tiny flocks as individuals. At present, user communities, the GBAO Land Committee, and the LRSCP are looking for

mechanisms through which this pasture may be used collectively. However, there is no legal framework that can guarantee rights that are both *secure* and *common* to groups of *dekhan* farms.

Tajikistan should take active control over the future of its pasture resources rather than letting their management become a side effect of legislation that was designed for arable land reform. Laws should explicitly *recognize common use, remove negative incentives to livestock mobility, and allow flexibility in grazing patterns.*

The way in which pasture tax is levied is crucial in this respect. A major reason for distributing permanent pasture to individuals (whether they have stock or not) is that local officials are responsible for collecting tax on this land. With the demise of the collective *dekhan* farm, they must ensure that they continue to collect the same total amount of tax from the successor individual *dekhan* farms. Tax charged by head of livestock rather than by hectare would facilitate legal charging for

pasture use by common herds without splitting pasture into physical shares. Lastly, removing tax on remote long-term pastures would significantly increase incentives for their use.

To guarantee access and avoid fragmentation, a system of permanent and common property rights for pasture could be put in place using boundaries defined by the Land Committee and historical precedent, taking into account ecological variability and seasonal pasture requirements. Such a system has recently been passed into law in Kyrgyzstan, where user groups will become legal entities (known as Pasture User's Unions). These will allocate pastures to both common and individually owned herds on an annual basis, collect fees per head of stock, and enforce mobility rules. Whether the law provides commercial herders with the security of tenure they require remains to be seen, but policy makers in Tajikistan would do well to observe the implementation of this legislation in their neighboring country.

## ACKNOWLEDGMENTS

This research was funded by the US Department of Agriculture Education Nutrition and Dairy Program Phase III through MSDSP, a project of the Aga Khan

Foundation. Additional research in 2009 was funded by the Food and Agricultural Organization of the United Nations (FAO).

## REFERENCES

- Behnke R.** 1985. *Open Range Management and Property Rights in Pastoral Africa: A Case of Spontaneous Range Enclosure in South Darfur, Sudan*. ODI Pastoral Development Network Working Paper. London, United Kingdom: Overseas Development Institute (ODI).
- Behnke R, Davidson G, Jabbar A, Cougenour M.** 2008. Human and natural factors that influence livestock distributions and rangeland desertification in Turkmenistan. In: Behnke R, editor. *The Socio-economic Causes and Consequences of Desertification in Central Asia*. NATO Science Series. Heidelberg, Germany: Springer, pp 171–204.
- Bromley W, Cernea M.** 1989. *The Management of Common Property Resources: Some Conceptual and Operational Fallacies*. World Bank Discussion Papers No. 57. Washington, DC: The World Bank.
- Coughenour M.** 2007. Causes and consequences of herbivore movement in landscape ecosystems. In: Galvin K, Reid R, Behnke R, and Hobbs N, editors. *Fragmentation in Semi-Arid and Arid Landscapes*. Heidelberg, Germany: Springer, pp 45–91.
- Farrington J.** 2005. De-development in eastern Kyrgyzstan and persistence of semi-nomadic livestock herding. *Nomadic Peoples* 9(1–2):171–197.
- Hangartner J.** 2002. *Dependant on Snow and Flour, Organisation of Herding Life and Socio-Economic Strategies of Kyrgyz Mobile Pastoralists in Murghab, Eastern Pamir, Tajikistan* [Master's thesis]. Bern, Switzerland: University of Bern.
- Hardin G.** 1968. The tragedy of the commons. *Science* 162:1243–1248.
- Haslinger A, Breu T, Humi H, Maselli D.** 2007. Opportunities and risks in reconciling conservation and development in a post-Soviet setting: The example of the Tajik National Park. *International Journal of Biodiversity Science and Management* 3:157–169.
- Hoeck T, Breu T, Stillhardt B, Schilch G, Herweg K.** 2005. *Baseline Survey on Sustainable Land Management in the Pamirs*. Report for the United Nations University. <http://www.palm.unu.edu/publication/Synthesis%20Reports>; accessed on 2 March 2008.
- Hoeck T, Droux R, Breu T, Humi H, Maselli D.** 2007. Rural energy consumption and land degradation in a post-Soviet setting—An example from the west Pamir mountains in Tajikistan. *Energy for Sustainable Development* XI(1):48–57.
- Kanchaev K, Kerven C, Wright I.** 2003. The limits of the land. In: Kerven C, editor. *Prospects for Pastoralism in Kazakhstan and Turkmenistan: From State Farms to Private Flocks*. London, United Kingdom: Routledge Curzon, pp 171–193.
- Kerven C, Alimaev I, Behnke R, Davidson G, Franchois L, Malmakov N, Mathijs E, Smailov A, Temirbekov S, Wright I.** 2004. Retraction and expansion of flock mobility in Central Asia: Costs and consequences. *African Journal of Range and Forage Science* 21(3):91–102.
- Kerven C, Alimaev I, Behnke R, Davidson G, Malmakov N, Smailov A, Wright I.** 2006. Fragmenting pastoral mobility: Changing grazing patterns in post-Soviet Kazakhstan. In: USDA Forest Service Proceedings RMRS–P–39. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station, pp 99–110.
- Ludi E.** 2003. Managing high pastures in the Eastern Pamirs. In: Breu T and Humi H, editors. *The Tajik Pamirs*. Bern, Switzerland: Centre for Development and Environment (CDE), pp 22–23.
- Lunch C.** 2003. Shepherds and the state: Effects of de-collectivisation on livestock management. In: Kerven C, editor. *Prospects for Pastoralism in Kazakhstan and Turkmenistan: From State Farms to Private Flocks*. London, United Kingdom: Routledge Curzon, pp 171–193.
- MSDSP [Mountain Societies Development Support Programme].** 2004. *Participatory Assessment of Change in GBAO: A Pilot Study of Four Villages*. [www.untj.org/library](http://www.untj.org/library); accessed on 30 October 2009.
- MSDSP [Mountain Societies Development Support Programme].** 2009. *GBAO Household Income Survey 2008*. Unpublished report. Available from the corresponding author of the present paper.
- Ostrom E.** 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, United Kingdom: Cambridge University Press.
- Ovchinnikov P.** 1977. *Pastures and Hayfields of Tajikistan* [in Russian]. Dushanbe, Tajikistan: Donish.
- Quinn HC, Huby M, Kiwasila H, Lovett JC.** 2007. Design principles and common pool resource management: An institutional approach to evaluating community managements in semi-arid Tanzania. *Journal of Environmental Management* 84: 100–113.
- Regional Statistics Committee of GBAO.** 1972. *Gorno-Badakhshan Autonomous Region in Figures* [in Russian]. Dushanbe, Tajikistan: Regional Statistics Committee.
- Regional Statistics Committee of GBAO.** 2003. *Annual Statistical Bulletin for 2003* [in Russian]. Dushanbe, Tajikistan: Regional Statistics Committee.
- Robinson S.** 2005. Short Communication on Pastoralism in the Gorno-Badakhshan Region of Tajikistan. *Nomadic Peoples* 9(1–2):199–206.
- Robinson S.** 2007. *Pasture Management and Condition in Gorno-Badakhshan: A Case Study*. Report on research conducted for the Aga Khan Foundation Tajikistan. [www.untj.org/library](http://www.untj.org/library); accessed on 30 October 2009.

**Robinson S, Higginbotham I, Guenther T, Germain A.** 2008. Land reform in Tajikistan: Consequences for tenure security, agricultural productivity and land management practices. In: Behnke R, editor. *The Socio-economic Causes and Consequences of Desertification in Central Asia*. NATO Science Series. Amsterdam, The Netherlands: IOS Press; and Heidelberg, Germany: Springer, pp 171–203.

**Rohde RF, Moleele NM, Mphahle M, Allsopp N, Chanda R, Hoffman MT, Magole L, Young E.** 2006. Dynamics of grazing policy and practice: Environmental and social impacts in three communal areas of southern Africa. *Environmental Science and Policy* 9:302–316.

**Sneath D.** 1998. State policy and pasture degradation in Inner Asia. *Science* 281:1147–1148.

**State Land Committee of the Government of Tajikistan.** 2004. *The Land Code and Other Legislation on Land* [in Russian and Tajik]. Dushanbe, Tajikistan: Sarparast.

**State Land Committee of the Government of Tajikistan.** 2009. *The Law on Dekhan Farms* [in Russian]. Dushanbe, Tajikistan: Sarparast.

**State Statistics Committee.** 2006. *Regions of the Republic of Tajikistan in 2006* [in Russian and Tajik]. Dushanbe, Tajikistan: State Statistics Committee.

**State Statistics Committee.** 2008. *Regions of the Republic of Tajikistan in 2008* [in Russian and Tajik]. Dushanbe, Tajikistan: State Statistics Committee.

**State Statistics Committee.** 2009. *A Summary of Statistics on Head of Livestock on the 1st January 2009* [in Tajik]. Dushanbe, Tajikistan: State Statistics Committee.

**Undeland A.** 2005. *Kyrgyz Livestock Study: Pasture Management and Use*. World Bank. Available from the corresponding author of the present paper.

**Wen Jun Li, Saleem HA, Qian Zhang.** 2007. Property rights and grassland degradation: A study of the Xilingol Pasture, Inner Mongolia, China. *Journal of Environmental Management* 85:461–470.

**Wu Zhizhong, Du Wen.** 2009. Pastoral nomad rights in inner Mongolia. *Nomadic Peoples* 12(2):13–33.