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Livelihoods in transition: changing land use strategies and ecological implications in a post-Soviet setting (Kyrgyzstan)

JYLDYZ SHIGAEVA, MICHAEL KOLLMAIR, PETER NIEDERER and DANIEL MASELLI

ABSTRACT The sudden independence of Kyrgyzstan from the Soviet Union in 1991 led to a total rupture of industrial and agricultural production. Based on empirical data, this study seeks to identify key land use transformation processes since the late 1980s, their impact on people’s livelihoods and the implication for natural resources in the communes of Tosh Bulak and Saz, located in the Sokuluk River Basin on the northern slope of the Kyrgyz Range. Using the concept of the sustainable livelihood approach as an analytical framework, three different livelihood strategies were identified: (1) An accumulation strategy applied by wealthy households where renting and/or buying of land is a key element; they are the only household category capable of venturing into rain fed agriculture. (2) A preserving strategy involving mainly intermediate households who are not able to buy or rent additional agricultural land; very often they are forced to return their land to the commune or sell it to wealthier households. (3) A coping strategy including mainly poor households consisting of elderly pensioners or headed by single mothers; due to their limited labour and economic power, agricultural production is very low and hardly covers subsistence needs; pensions and social allowances form the backbone of these livelihoods. Ecological assessments have shown that the forage productivity of remote high mountain pastures has increased from 5 to 22 per cent since 1978. At the same time forage productivity on pre-mountain and mountain pastures close to villages has generally decreased from 1 to 34 per cent. It seems that the main avenues for livelihoods to increase their wealth are to be found in the agricultural sector by controlling more and mainly irrigated land as well as by increasing livestock. The losers in this process are thus those households unable to keep or exploit their arable land or to benefit from new agricultural...
land. Ensuring access to land for the poor is therefore imperative in order to combat rural poverty and socio-economic disparities in rural Kyrgyzstan.

Introduction

After decades of socialist rule, when the state acted as a relatively safe provider of economic and social security, the sudden independence of Kyrgyzstan from the Soviet Union in 1991 caused a harsh rupture at all levels. With the change of the political and economic system industrial and agricultural production came near to a complete halt, depriving large parts of the population of their regular income. Suddenly many families in rural areas had to rely on their own resources, seeking to secure basic needs by reverting to agricultural production at least for self-subsistence. While agricultural goods had been produced previously by collective farms (kholkhozes and sovkhozes)—or if necessary imported from distant regions at subsidised below-market prices—the Kyrgyz population was abruptly forced to rely on its own local production capacities. This called for the development of radical new livelihood strategies adapted to the emerging market-based economy in a changing political environment. The young Kyrgyz Republic, assisted by foreign aid, tried to provide immediate support and launched a vast privatisation campaign. Land, machinery and livestock belonging to the former large scale production units were distributed among households in a reasonably fair manner.

Considerable efforts have so far been made to analyse the impact of agrarian reforms on the Kyrgyz economy on a national scale while still too little is known about how the rural population has reacted to the completely changed socio-economic environment. Even fewer studies exist on the implications of land use changes for the environment. On the basis of empirical data, this paper therefore seeks to: (i) briefly describe the history of land use change since Soviet rule; (ii) identify key land use transformation processes; (iii) describe their impact on people’s livelihoods; and (iv) reflect on the implication for natural resources, especially pastures in two case-study villages: Tosh Bulak and Saz—in the Sokuluk River Basin (Figure 1).

Study area

The Sokuluk River Basin, a north–south oriented tributary of the Chu River, is bounded by the northern slope of the Kyrgyz range in the vicinity of the capital city of Bishkek. It covers an area of more than 800 square km ranging in altitude from 700 to 4400 m and is a representative lateral valley of the mountain range with regard to land use patterns and hydrologic characteristics. The area can be subdivided into three eco-regions. The upper part (high mountain zone), which covers about three-fifths of the basin, consists of subalpine and alpine habitats. Elevations range from 2500 m to more than 4400 m. The middle part (foothill
Figure 1. Location of the study area (black rectangle) in the Tien Shan Mountains of northern Kyrgyzstan.
zone) consists of mountain highlands and valleys with relatively gentle slopes. It includes the settlements of Saz (1054 m) and Tosh Bulak (1200 m), where a major part of the investigations were carried out. Further downstream the valley bottom zone is characterised by flatter agricultural plots and urban and peri-urban centres such as Sokuluk or Alexandrovka, both positioned at the portal of the Chuy valley, which accounts for a third of the country’s cultivated surface and contributes 63 per cent of the country’s GDP.4

The study area belongs administratively to the Sokuluk Rayon. Land use is characterised by rain fed and irrigated agriculture (about 54 per cent) and pastures (42 per cent).5 In 2005, Tosh Bulak consisted of 503 households with a total of 2630 residents made up of 86.7 per cent ethnic Kyrgyz, 6.7 per cent ethnic Russians and 6.6 per cent ethnic Ukrainians. For the same year the population of Saz encompassed 529 households with a total of 2540 residents. The ethnic composition of this village was 99 per cent Kyrgyz, and 1 per cent Russians.6 The main agricultural products of the area are wheat, barley, corn, potatoes and perennial herbs used as animal fodder. Almost 100 per cent of the population in both villages is engaged in individual farming both for subsistence and cash crop production. Thanks to the proximity to urban and peri-urban centres as well as good roads and public transportation facilities available at moderate costs, market access is good.

Approach

In order to reflect the diverse and complex ways in which people have reacted to economic and political change after independence, the sustainable livelihoods approach7 was used. The concept relates to the living conditions of people, their opportunities and capabilities for well-being, their resilience, and their resource base comprising various assets.8 The basic idea is that the choice and practice of livelihood strategies is strongly linked to people’s available assets comprising human, natural, physical, financial and social capital. However, the institutional context and the resulting power relations widely determine access to and (strategic) use of these resources as well as the capitalisation opportunities of the livelihood outcomes.

The process of transition was assessed from the viewpoint of individual livelihood strategies influenced by the (to a certain extent unique) institutional and contextual framework. While it was not our aim to explore the reasons for institutional change, emphasis was put on documenting and analysing the activities of individuals and households to cope with or profit from these dramatic changes. Despite its weaknesses9 the livelihood approach provided a useful framework to identify complex situation before analysing it more deeply. The analysis of assets too often plays a central role in livelihood analysis,10 while people’s livelihood outcomes and strategies within a given institutional framework facilitating or restricting them, are neglected. Livelihood security for individuals or households depends definitely on the access to, use of, and the interaction among the various assets available, but their capitalisation depends on the existing dynamic of political and social institutions.11
**Methods**

The profound changes linked to the creation of the Kyrgyz Republic in 1991 and their implications for the adaptation of individual livelihoods were examined by reviewing research literature, official documents and statistical data at regional and local level from various administrative entities. Based on our conceptual framework, the following methods were also applied:

(a) Wealth ranking, socio-economic survey and land use strategies

The fieldwork, which was conducted in the months of July–August of 2004 and 2005, was related to livelihood analysis and was carried out in two village administrations (Ayil Okmotu) of Tosh Bulak and Saz following a six-step procedure:

1. An initial reconnaissance survey was undertaken in two representative villages in order to gain a preliminary picture of the general socio-economic situation. Eight individual semi-structured interviews were then conducted with representatives of the Ayil Okmotu, land use planners and several heads of households in both villages. Furthermore, statistical data from the village and district offices was gathered and analysed.

2. With the help of six key informants belonging to the two villages identified during the reconnaissance survey, appropriate indicators for a participatory wealth ranking exercise were identified.

3. The participants divided their neighbours into various wealth categories. These were then grouped into three categories: (i) poor households; (ii) intermediate households; (iii) wealthy households. This procedure made it possible to stratify the community according to locally defined parameters of socio-economic status.

4. Based on the resulting stratification, a total of 110 households were randomly selected in the two villages. Within each wealth group, one household member was interviewed with the help of a structured questionnaire which included aspects related to the various sources of income, agricultural production, marketing, livestock and machinery.

5. In a final step, a total of 22 in-depth individual open-ended interviews with representatives of all three household categories were carried out in order to explore people’s strategic livelihood and land use decisions, their social networks, as well as their perception of the effects of land reform on local ecological conditions and natural resource use.

6. On the basis of the information collected, the dominant strategies of the three main household wealth categories concerning land use were derived and again cross-checked with the interviewees.

(b) Assessment of the ecological condition of pastures

In the study area, 65 representative plots established in 1978 and dispersed over three altitudinal zones were visited in order to assess the current ecological situation and compare it with a pasture management map of the Sokuluk Rayon.
Despite the fact that on each site a wealth of information such as total forage productivity, soil erosion, animal tracks, indicator plants or total plant cover were assessed, this article focuses selectively on the changes in forage productivity between 1978 and 2005. The respective assessments were carried out following the methodological guidelines used to conduct geo-botanical research on natural fodder lands of the Kyrgyz SSR. During July and August 2005, within each of the 100 m² sites, three samples of 1 m² were identified. In a second stage the grass cover was cut 7–8 cm above the surface on haymaking areas, 4–5 cm (for long grass) or 2 cm (for short grass) above the surface on pastures. Finally, the plants were sorted according to their palatability and then dried and weighted.

Results

Historical context and recent key processes in land use

The recent history of the region during the 20th century can be subdivided into three periods characterised by different land use systems: (1) the pre-Soviet period (prior to 1917), (2) the Soviet era (1917–1991), and (3) the post-Soviet period (from 1991 to the present).

1. Pre-Soviet period. For centuries, land use in Kyrgyzstan was characterised by a nomadic land use system adapted to local semi-arid and arid ecological conditions. The combination of short-term seasonal movements with long-term migrations in search of better pastures enabled people to cope with climate variability, thus constituting the dominant land use strategy. In 1876 Russian troops occupied northern Kyrgyzstan and within a few years, the entire territory became part of the Russian Empire. This allowed Tsarist Russia to encourage Russian and Ukrainian settlers lacking agricultural land in their home country to settle in northern Kyrgyzstan. These colonists started founding villages and towns, cultivating fertile land plots, and introducing more intensive agricultural systems. Simultaneously the process of industrialisation started. This process also forced some local small-herd owners to settle down, and by 1914 up to 22 per cent of the Kyrgyz population had settled.

2. Soviet era. After the revolution in 1917, peasant farms were collectivised, sovkhozes and kolkhozes established and planned economy introduced. Regardless of its former ownership, land was cultivated collectively through large scale farms and cooperatives encompassing thousands of hectares and providing jobs for hundreds of workers. Since the 1950s the Soviet model of social agriculture has been characterised by an administrative top-down command, state-dominated commodity chains and hardly any budget constraints. Private production was restricted to small rural household plots (ogorod) of less than 1 ha. Through the ‘All-Union-Budget’, Kyrgyzstan benefited from investments for agricultural, industrial and mining infrastructure as well as for social institutions. This allowed developing large scale irrigation schemes in Chuy Valley as well as in the Sokuluk River Basin. Central top-down management—particularly from the Ministry of Agriculture—decided on the kind and size of cultivation, irrigation norms, and even agricultural yields and production costs per hectare.
an inter-republic compensation and exchange mechanism and large scale infrastructure, intensification of agriculture was excessive. Large sheep herds were transported to distant high summer pastures (jayloos) by lorries and winter fodder was imported by railway from Kazakhstan. In the case of the Sokuluk Rayon, summer pastures were situated in nearby Susamyr as well as in Keness Anarhai, Kazakhstan, several hundred kilometres away.

(3) Post-Soviet period. After the collapse of the Soviet Union, the large-scale state and collective production systems were abandoned and a market economy introduced. This transition period triggered a deep economic and social crisis and called for immediate measures to avoid societal collapse. The Kyrgyz government initiated an agricultural reform process to improve the efficiency and productivity of agriculture. It consisted mainly of transforming collective enterprises into individual agriculture through private ownership and evolved in three major phases:

(i) **First legal changes (1990–1995)**—As early as 1991, the Kyrgyz parliament passed laws which empowered local councils to create peasant farms and establish a fund for ‘unutilized or underutilized land’. Due to the deepening economic crisis, the privatisation program was suspended until the beginning of 1993, when land reform showed modest progress. In 1994, at the same time as in Kazakhstan and Uzbekistan, the Kyrgyz government gave a new impulse to land reform reducing procurement quotas for private farms, and conceding usufruct rights for 49 years. After parliamentary elections in February 1995, legislative changes were announced in order to make titling of private land possible.

(ii) **Modern land laws and moratorium (1995–1999)**—With a Presidential Decree in 1995, land use rights for usufruct were extended to 99 years. This decree remained in place only until 1998, when a constitutional amendment was passed which converted all land use certificates into private ownership documents. The Land Code of 1999 enforces a moratorium that states: ‘Purchase and sale transactions of land are permitted, but in the case of agricultural land the right is delayed for five years’. This measure was meant to avoid speculation.

(iii) **Lifting of moratorium and farm restructuring (since 2000)**—The moratorium on land sale was lifted in September 2001, and the legal purchase and sale of land was guaranteed. In Kyrgyzstan land reform and farm restructuring—although definitely further advanced than in neighbouring countries—is not without contradictions and often remained merely cosmetic. The main reasons for this relate to a general lack of experience in land reform processes, difficult implementation conditions for the local administrations and, last but not least, a lack of political will to correct grievances.

Land reform in Kyrgyzstan led to a broad diversity of new agricultural enterprises, including joint-stock companies, partnerships, cooperatives and peasant associations, with a large number of production and marketing arrangements among its members.
Major changes in the composition of land ownership in the Sokuluk Rayon—to which the two case studies belong—are represented in Figure 2. The most striking change concerns the gradual decrease of agricultural land (including pastures) belonging to collective farms: from almost 40 per cent in 1992 to 2 per cent in 2005. Cooperatives show a similar overall tendency while peasant farms significantly increase. At the beginning of the 1990s only a small percentage of the total agricultural land was used by peasant farms while their share is now more than 25 per cent. A large percentage of land is still in state hands at all levels from the Ayil Okmotu to the ministries. The increase in state land property since 1997 can partly be explained by the fact that much land has been given back to the authorities—in particular to the Ayil Okmotu—by private owners. In many cases, households lack the necessary labour power or economic resources to exploit their land—or the plots are too distant to be cultivated. Moreover, since taxes have to be paid regardless of whether the land is used or not, some preferred to give it back during the time period when land could not be sold (moratorium in vigour until 2001). The creation of cooperatives has been encouraged since 1995 and has led to an increase of their relative share. However, after a while, their proportion dropped again as a result of the lack of organisational know-how and resulting dissatisfactions or inequalities. The rapid and repeated changes of land tenure and their corresponding official classification make a comparison of the statistical data rather difficult; however, there is no other source available.

Transformation of livelihoods

De-collectivisation and stratification of households. Based on the ‘land to the tiller’ strategy, after independence, former workers of the sovkhozes and
members of the *kolkhozes* were given shares of land for free in a relatively equitable manner mainly in the form of usufruct rights. In Saz and Tosh Bulak—where only *kolkhozes* existed—every person received three types of land: irrigated, rain fed and haymaking land: 0.22 ha of irrigated land, 0.5 ha of rain fed land and 0.16 ha for hay making. Non-agricultural employees, such as teachers or doctors, were entitled to 50 per cent of this share, while those who had not been employed by the Kolkhozes only received 25 per cent. The livestock was partially sold, exchanged for other goods or slaughtered. When the collective farms were reorganised as joint cooperatives, only a few animals remained to be distributed among the village population. Many households were then forced to either sell or slaughter their animals in order to survive. In contrast to agricultural land, pastures remained state property but could be grazed for free. Later it became possible to lease pasture land. Every household also had a small garden plot (*ogorod*) of about 0.3–0.5 ha attached to their house. The non-divisible physical assets like machinery and buildings sometimes remained state property, or were distributed to groups of shareholders or acquired by well-placed individuals. This distribution of assets contributed to different livelihood strategies and capabilities to adapt to the new situation, which, in turn, led to a rapid social stratification process.

Table 1. Characteristic features of the three household categories in Tash-Bulak

<table>
<thead>
<tr>
<th>Household category</th>
<th>Features</th>
</tr>
</thead>
</table>
| Poor (20%)         | - Small and often elderly households  
|                    | - Pensions and social allowances are main sources of income  
|                    | - Up to one cow and possibly a few hens  
|                    | - 3–4 ha of arable land  
|                    | - Ability to cultivate only plots of land close their home  
|                    | - Modest additional income from working as day labourers  
|                    | - Strong dependence on support of relatives and/or neighbours |
| Intermediate (65%) | - About 10 sheep, 2 or 3 cows and up to 2 horses  
|                    | - 3–5 ha of arable land  
|                    | - No agricultural machinery but capability to rent it, if necessary  
|                    | - At least one member of the family works or lives in Bishkek and sends money  
|                    | - Work in school as a teacher or in a medical facility |
| Wealthy (15%)      | - 50–200 sheep, 10–80 cows, 10–30 horses  
|                    | - 5–20 ha of arable land plots  
|                    | - Financial ability to cultivate own land plots and to rent additionally up to 20 ha of land  
|                    | - Agricultural machinery, stables, 1 or 2 cars  
|                    | - Additional income sources, e.g. mill, shop  
|                    | - Influential social connections to the urban/peri-urban centres |
Typology of households based on participatory wealth ranking

Six indicators were singled out by the interviewees as differentiating household wealth conditions: (1) amount, quality, and type of available land (owned/rented arable land, pastures, etc.); (2) number and type of livestock; (3) ability to cultivate or use the available land; (4) agricultural equipment; (5) available labour force for herding; (6) non-farm income, including remittances; (7) social networks (relatives, friends, extended family). The subsequent analysis of the results of the participatory wealth ranking resulted in three major household categories (see Table 1):

(i) poor households disadvantaged on nearly every score (Tosh Bulak 20 per cent, Saz 25 per cent);
(ii) intermediate households including both those with a certain potential for development as well as those likely to fail in their endeavours and thus at risk of falling into the poorer section (Tosh Bulak 65 per cent, Saz 70 per cent);
(iii) wealthy households in a rather comfortable situation in almost all asset domains (Tosh Bulak 15 per cent, Saz 5 per cent).

There are considerable differences among the three categories of households in terms of livestock ownership and labour availability, which is again related to the amount of land owned. Poor households have no or only a few livestock. Livestock numbers of wealthy households appear to be five to 20 times higher for sheep and five to eight times higher for cows compared to intermediate households. Poor households consist mainly of elderly couples or are female headed and therefore considerably limited in their labour power. The absolute area of land owned by them does not differ significantly from the intermediate households, but lacking labour force and the fact that some of their land is far from their home, they face difficulties in cultivating it. Intermediate households have better access to labour thanks to a wider social network within the family or via neighbours. However, some additional labour power is also hired, usually tractor or machinery drivers, and up to two people for ploughing, harvesting and transporting the harvest. All wealthy households have a satisfactory labour force situation. They frequently hire extra workers for weeding, planting and harvesting. The number of hired labourers varies from five to 30 persons. In 2005 a person was paid on average 50–80 soms per day (about €1–1.5). Poor households usually lack agricultural equipment, which they must hire upon need. About 10 per cent of the intermediate households own agricultural equipment such as a tractor. Most wealthy households own a car and have their own agricultural equipment including a tractor, a plough and a combine harvester which they also rent out. They usually possess rather big stables for their cattle and sheep. Rich households can afford to hire labour to look after their livestock on the summer pastures (jailoos) or to work as milkmaids.
The diversity of livelihood strategies

The analysis of the use of assets revealed the following strategies (see also Figure 3) according to the three wealth categories.

Accumulation strategy

Renting and/or buying land is a key element of the accumulation strategy, because it appears to be one of the major factors leading to a significant
increase in productivity. Wealthy households are in a position to venture into rain fed agriculture as they can bear the risk of losing one or two harvests out of three, but making a good profit in a good year. For harvesting they are able to hire cheap labour. They also invest in livestock, agricultural machinery to be rented out and sometimes even own small milk processing facilities. A further key element is the diversification of the household portfolio via small businesses such as shops, crafts, mills and the provision of services such as transportation and trade in vegetables or other cash crops. The accumulating farmer strategy is thus characterised by good or even excellent access to land, capital and social or political influential connections. This combination allows this wealth class often to monopolise good land (leading again to a considerable concentration process) and to make long-term profits based on strategic decisions and powerful alliances.

**Preserving strategy**

Intermediate households try to use their own land plots as optimally as possible, but are normally not able to buy or rent additional agricultural land. They have a tendency not to take too many risks and therefore rent their rain fed plots to wealthy households and do not cultivate them on their own. However, these households suffer from constraints similar to those of poor households in terms of land and labour access, albeit to a lesser degree. This group is therefore characterised by a fluctuating but comparably stable income pattern coming from agricultural activities and work as day labour on the one hand, and small business, allowances, or crafts on the other. They lack long- or medium-term opportunities for improving their livelihood on the basis of agriculture, but still try to invest in livestock or run a small village shop.

**Coping strategy**

Mainly due to limited labour power—many poor households consist of only elderly pensioners (60 per cent) or are headed by females—agricultural production is very low and hardly covers subsistence needs. The lack of financial resources does not allow them to employ external labour for land cultivation. For this reason mainly the home gardens (*ogorod*) around the house are cultivated, whereas other plots are often abandoned, returned to the official village administration (*Ayl Okmoto*), or leased to wealthier households. Whenever possible, land is kept to secure self-sufficiency and as a future inheritance for children. Agricultural products such as potatoes or fruit from the garden are rarely sold, while cash is often generated from milk production. Rents and social allowances are thus the backbone of livelihood covering on average 40 per cent of the total annual income. Occasional piecework and income from natural resources such as plant collection, grass cutting, or fuel production from dung, contribute to a modest diversification.
The role of livestock

The dramatic decline of the intensive animal husbandry system introduced during Soviet times was shown by the sharply decreasing number of livestock in the Sokuluk Rayon (see Figure 4). The number of animals has decreased massively over the last 20 years, particularly the number of sheep and goats (small ruminants). After independence in 1991 many farmers ventured into livestock breeding because the income from agricultural products such as potatoes and sugar beets was very low. By the mid 1990s this tendency came to an abrupt halt when fodder prices increased and demand for wool on the international fell market sharply. Since the end of the 1990s the number of livestock has remained constant or even augmented. Interviews in both villages revealed that a vast majority of all households are still willing to invest more in livestock. This tendency can be explained by stable or even rising prices for meat and milk on the national and regional market. According to interviewees, it is very profitable to feed up calves on easily accessible pastures and sell them at a good price in town. Nearby urban centres such as Sokuluk and Bishkek have a high demand for dairy products. This explains why milk is collected on a daily basis in the two villages. Consequently livestock is considered a source of rather ‘easy money’, representing one of the few opportunities for investments paying off in rural areas. It is an alternative to agriculture since most fertile land has already been sold or rented and no additional land is available. Furthermore, semi-nomadic livestock herding has always been an important element in the cultural foundation of the Kyrgyz identity. This pivotal role of livestock underlines the necessity to consider the

role of pastures and livestock for a better understanding of rural livelihood strategies today as well as in the future.

Ecological implications of land use changes for pastures and haymaking

By 1989 animal population levels in Kyrgyzstan were considered to exceed the stocking capacity of winter and spring/autumn pastures by a factor of 2–3. This led to severe pasture degradation including proliferation of invasive woody plant species, erosion, slope failures and, in general, reduced overall productivity of pasture lands. By 1970 and 1980, 25 per cent of the winter pastures in

### Table 2. Changes in average dry forage productivity in Sokuluk River Basin 1978–2005

<table>
<thead>
<tr>
<th>Altitudinal class/Type of pastures (characteristic plants)</th>
<th>1978 (kg/ha)</th>
<th>2005 (kg/ha)</th>
<th>% of change</th>
<th>No. of sites assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premountain (800–1400 m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-desert (<em>Bromus tectorum</em>, <em>Bromus oxyodon</em>, <em>Artemisia serotina</em>, <em>Artemisia absinthium</em>)</td>
<td>530</td>
<td>350</td>
<td>−34</td>
<td>10</td>
</tr>
<tr>
<td>Steppe (<em>Botriochloa ischaemum</em>, <em>Bromus tectorum</em>, <em>Bromus oxyodon</em>)</td>
<td>280</td>
<td>200</td>
<td>−28.6</td>
<td>13</td>
</tr>
<tr>
<td>Meadow steppe (<em>Ajania fastigiata</em>, <em>Agropyrum repens</em>, <em>Inula macrophylla</em>)</td>
<td>440</td>
<td>400</td>
<td>−9.1</td>
<td>6</td>
</tr>
<tr>
<td>Mountain (1400–2500 m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steppe (<em>Festuca sulcata</em>, <em>Artemisia serotina</em>, <em>Stipa capillata</em>)</td>
<td>740</td>
<td>750</td>
<td>+1.3</td>
<td>2</td>
</tr>
<tr>
<td>Meadow steppe (<em>Festuca sulcata</em>, <em>Artemisia dracunculus</em>)</td>
<td>590</td>
<td>500</td>
<td>−15.3</td>
<td>9</td>
</tr>
<tr>
<td>Meadow (<em>Achillea asiatica</em>, <em>Origanum vulgare</em>, <em>Ligularia thomsonii</em>, <em>Betonica foliosa</em> <em>Artemisia dracunculus</em>)</td>
<td>620</td>
<td>580</td>
<td>−6.5</td>
<td>10</td>
</tr>
<tr>
<td>High mountain (2500–3300 m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadow (<em>Alchemilla retropilosa</em>, <em>Phlomoides oreophila</em>, <em>Carex melanantha</em>)</td>
<td>890</td>
<td>940</td>
<td>+5.6</td>
<td>7</td>
</tr>
<tr>
<td>Meadow steppe (<em>Cobresia stenocarpa</em>, <em>Festuca sulcata</em>)</td>
<td>580</td>
<td>710</td>
<td>+22.4</td>
<td>4</td>
</tr>
<tr>
<td>Haymaking (1400–1600 m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadow steppe (<em>Agropyrum repens</em>, <em>Onobrychis pulchella</em>, <em>Onobrychis viciifolia</em>)</td>
<td>1200</td>
<td>1900</td>
<td>+58.3</td>
<td>4</td>
</tr>
</tbody>
</table>

the Sokuluk Rayon were invaded by non-palatable weeds as a result of overgrazing.  

With regard to the use of pastures, two simultaneous processes can be observed: intensification of pasture areas in the proximity of villages and underutilisation of high/distant/inaccessible pastures. This is because former herders now have too few animals and assess expenses as too high to make a profit from high pastures. Neither the supply for herder families living on the high pastures during the summer months nor sales of products (e.g. milk, butter, etc.) produced on high pastures during the summer are guaranteed. Last but not least, the access to high pasture areas both for people and animals is limited in many areas as a result of dilapidated infrastructure. 

To document the changes in pasture productivity in the Sokuluk River Basin the forage productivity of three types of pastures and haymaking has been reassessed in 2005 and compared to results of the 1978 survey.

The results show that, since 1978, the forage productivity of remote high mountain pastures has increased both on meadow steppe pastures and on meadow pastures most probably as a result of undergrazing because of the decreasing number of livestock. During this time span the number of sheep decreased by more than seven times in the Sokuluk Rayon. At the same time forage productivity on pre-mountain and mountain pastures close to the villages has generally decreased. The highest loss—dropping from 530 kg/ha to 350 kg/ha—concerns the category of semi-desert pastures, which seems to be the most vulnerable. The productivity on mountain pastures remained more or less constant between 1978 and 2005. Haymaking even showed a considerable increase in productivity owing to a strict prohibition on grazing and the sowing of perennial plants.

**Discussion and conclusions**

The analysis of the historical context shows that the drastic changes in the socio-economic environment, which include the interruption of subsidies, land reform and the de-collectivisation process, are the main driving force for change. New actors such as peasant farmers, joint-stock companies, and farmers’ associations follow new and diversified livelihood strategies leading to a transformed, post-communist stratification of society. The two case-study villages revealed that the diversification of livelihood strategies is taking place both within and outside the agricultural sector. For the two wealthier livelihood categories, agricultural production is still the main basis of income, while other opportunities supplement it to a different but steadily increasing degree. People from all three wealth categories are in general keen to hold on to their land and livestock if possible. But not all households are in a position to diversify their portfolio and thus to benefit from additional and/or new income options. Households with an accumulation strategy frequently embark on non-agricultural activities such as business or housing rents. This allows them again to expand their agricultural production by obtaining new land and increasing their livestock. Households with a preserving strategy profit from non-agricultural earnings such as crafts and wage labour.
This income mainly helps them to maintain their current living standard and possibly to expand. Usually, however, the supplementary earnings are not sufficient to allow for further investments in the agricultural sector or trade. Poorer households condemned to a coping strategy, heavily depend on non-agricultural sources such as allowances or piecework for mere survival. Their behaviour strategy resembles the maintaining and reductive response set described by Howell. The modest agricultural production from homestead plots (огород) remains the most important source of their food security. Ensuring access to land for the poor is therefore imperative to avoid the deepening of poverty and socio-economic tensions as long as no alternative is offered by the state. In order to reduce or avoid the spreading of further poverty it would be important for the poorer households to be able to exploit more irrigated land or to be able to invest in some livestock. At the moment, precious irrigated land is whenever possible not sold, while rain fed land is sometimes sold by poor and middle income households due to economic needs. The losers in this process are thus those households that are unable to keep their land or to benefit from new access to land. This process is a key element in the pauperisation of rural producers.

During the privatisation process farmers were generally left to their own devices, and institutional support, which is actually crucial for regulating or managing access to natural resources and accompanying agricultural policies, was—and largely still is—desperately lacking in Kyrgyzstan. In contrast to the privatised arable land, pastures are still a state-owned resource that is in principle accessible to all. In theory, pasture use in Kyrgyzstan is strictly regulated, including inventories, leasing contracts and user certificates. In reality, very few such contracts exist, and the baseline information (inventories) concerning vegetation and livestock numbers are completely outdated or inadequate. Despite the fact that many of the negative trends associated with livestock production during Soviet times have been reversed since 1991, pasture management involving rotational grazing (duration and movement), animal load (number and composition of livestock), and the practical and juridical delimitation of different zones has still not been put into practice.

At the end of the 1990s there was a certain perception that degraded pastures were recovering under reduced grazing pressure due to the decreased number of animals. This hypothesis was confirmed for the high mountain pastures in the Sokuluk area. However, there appears to be a clear trend led by the wealthy households to increasingly cultivate remote rain fed fields and to raise the number of grazing animals and send them to the most productive and easily accessible high pastures. This profitable exploitation of common resources is out of reach for poor and frequently even average income households who do not command the necessary equipment, such as tents and lorries, to make use of the remote pastures. As pastures are often leased on the basis of non-transparent, competitive bids there is a real threat that the urban elite could lease common pastures, thus excluding villagers from one of their crucial and traditional resources. This also implies that the (short) period of underutilisation of high mountain pastures could soon be over and that a new danger of unsustainable over-exploitation by
investors without any emotional relationship to the area could arise. This risk needs to be taken seriously.

Altogether this calls for well conceived state policies and support measures to help in (i) avoiding or reducing the monopolisation of land ownership and/or access, (ii) improving sustainable land management, and (iii) supporting innovative ideas for income diversification through eco-tourism, intensified horticulture, milk production or processing, and marketing of agricultural goods.

Notes and references
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6. According to the resident registry of Saz/Tosh Bulak Ayil Okmotu in 2003.
8. Chambers and Conway, op cit, Ref 7; De Haan and Zoomers, op cit, Ref 7.
15. Lerman, op cit, Ref 3.
18. Lerman, op cit, Ref 3.
20. Lerman, op cit, Ref 3.
22. Delehanty and Rasmussen, op cit, Ref 3.
25. Ibid.
26. Ibid.
27. Ibid.
29. Lerman, op cit, Ref 3.
31. Farrington, op cit, Ref 1.
36. National Statistical Department of Sokuluk Rayon, op cit, Ref 5.
38. Spoor, op cit, Ref 3.
40. Spoor, op cit, Ref 3.
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