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PLANNING AND POLICIES ON EXTENSIVE LIVESTOCK DEVELOPMENT IN CENTRAL ASIA

Carol Kerven, John Channon and
Roy Behnke

with abstracts of selected works by
Susanne Channon

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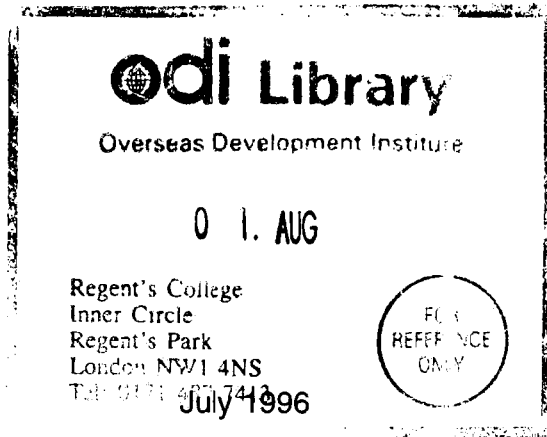
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WORKING PAPER 91

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Carol Kerven, John Channon and Roy Behnke

with abstracts of selected works by
Susanne Channon



Overseas Development Institute
Regent's College
Inner Circle, Regent's Park
London NW1 4NS

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Preface

The main objective of this review is to identify policy and research issues on range livestock production in Central Asia. This report reviews collected material in English, and presents a bibliography and abstracts of works in Russian, on extensive livestock production systems dependent on natural pastures in the ex-Soviet Central Asian republics of Kazakhstan, Kyrgyzstan and Turkmenistan.¹ Pasture is the predominant type of agricultural land in these republics.

Migratory livestock husbandry – the traditional livelihood for many Central Asian peoples – persisted in altered forms during the Soviet period of collectivisation and continues today to make an important contribution to the national economies of the newly independent states of Central Asia. Much of Central Asia, being semi-arid to arid grassland, is suited to extensive livestock production, but can only be converted to other uses through irrigation, which has proved to have major environmental costs. Many livestock management questions revolve around the seasonal variability of usable pastures, due to differences of altitude, cold, biomass production and pasture quality. These are recurrent problems in the dry desert–steppe–mountain ecology of Central Asia. Over the last century, several approaches have been applied to these problems. Prior to Soviet collectivisation, animals migrated in order to avoid areas of temporary feed insufficiency, snow and/or cold, and to take advantage of natural forage surpluses in other areas. Later, under collectivisation, livestock movement was restricted, cultivated forage substituted for the natural pastures previously captured through migratory movements, and winter settlements were imposed.

The collapse of the Soviet Union and the introduction of agricultural markets has, however, subjected the partially sedentarised livestock producers to new pressures. The newly independent Central Asian republics are now in various stages of transformation, including in some cases, privatisation. Restructuring of the extensive livestock sector has three main components: legal changes in the status of grazing land, the distribution of formerly collectively-owned livestock to individual families or cooperatives, and lastly, the emergence of free markets for livestock inputs and products. The rapid co-evolution of these three

¹ In this report data are presented from all three republics. However, it has proved difficult to obtain quantified data or official documents on Turkmenistan. A further visit may be undertaken, to Uzbekistan, as part of this study. Tajikistan was not included, as the importance of extensive livestock production is not as great as in the other four Central Asian nations.

processes means that profound changes are occurring in the livestock economies of households and nations, at a depth and pace which cannot be monitored by the normal state statistical services. The momentum of change means that policies and projects are being designed in an information vacuum.

There are questions about the commercial viability of irrigated fodder production and, hence, about the economic sustainability of livestock husbandry based on cultivated fodder. From a comparative advantage perspective, it may be more efficient on marginal land to grow sheep on unirrigated pastures, rather than growing wheat or fodder under irrigation. The environmental consequences of irrigation and concentration of livestock have also raised questions about sustainability. Finally, important regional markets for specialised livestock products such as wool have been lost to international competition, and it is unclear whether regional urban consumers – especially in a period of economic transition – have sufficient purchasing power to afford meat from irrigation-dependent husbandry systems. These economic pressures are reflected in recent trends which have been observed toward ‘re-nomadisation’ among newly independent pastoral households.

This review considers some of these questions through published sources and interviews with some of the key figures concerned with the extensive livestock sector in Kazakhstan, Kyrgyzstan and Turkmenistan. Short visits were undertaken to these countries in June 1995, to collect material and hold discussions with senior scientists in the desert, pasture and livestock research institutes² and with personnel in the EU/TACIS (European Union, Technical Assistance to Confederation of Independent States) agricultural projects, concerning plans for developing the extensive livestock sector. Material was also obtained from libraries in Moscow and in the UK.

Many issues arising from decollectivisation and a new market economy for land and livestock have not yet been closely studied, while policy-makers and international donors demand guidance and information. Important decisions with long-term implications are being made now in the context of a policy debate about the future organisation of agriculture undergoing transformation. An opportunity exists for policy-oriented research, in collaboration with local scientists who are experiencing reductions in research funding from the newly independent governments and are, simultaneously, trying to identify a new role for themselves. Local scientists expressed a keen interest in developing joint

² The Desert Institute in Turkmenistan, the Agricultural Academies of Turkmenistan and Kazakhstan, the Institute of Pasture and Fodder (Kazakhstan), the Institute of History and Ethnography (Kazakhstan), and the Institute of Agricultural Economics (Kazakhstan).

research programmes with Western-based range and livestock research institutes. This is therefore a period in which insights and findings on the processes of change at the household level could contribute to a critical debate.

We are grateful to the many people who assisted us on our visit to Central Asia, and we would especially like to acknowledge the following: Ilya Ilichev Alimaev, Prof. Babaev, Edward Birgells, Philip Joule, Alieva Khafiza, Dr Muradov, Rosa Noorjanova, Gulmira Noorjanova, Jhanna Omarova, Edward Strachan, John Shearing, Gerrit Walstra, and John Weekes.

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At the Overseas Development Institute in London, we thank Mark Perkins, Chris Pescud and Graham Hurford for their efforts in obtaining publications, Jonathan Cox and John Bennett for their support. We appreciate the assistance provided by library staff of the School of Slavonic and East European Studies at the University of London, and the staff of the Royal Geographical Society Map Room. Paul Burgon of Landell Mills Ltd, UK, was kind enough to help with materials. Susanne Channon provided invaluable assistance throughout the project.

This work was undertaken with a grant under the Economic and Social Committee on Overseas Research (ESCOR) programme from the Overseas Development Administration.³ We remain responsible for the opinions expressed here.

³ The Overseas Development Administration (ODA) is the British Government department which supports programmes and projects to promote overseas development. It provides funding for economic and social research to inform development policy and practice. ODA funds supported this study and the preparation of the summary of findings. ODA distributes the report to bring the research to the attention of policy-makers and practitioners. However, the views and opinions expressed in the document do not reflect ODA's official policies or practices, but are those of the authors' alone.

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1. Executive summary

Extensive livestock production remains an important component of the Central Asian economies. In Kyrgyzstan there are twice as many sheep as people. In the high dry mountains which cover most of that country, yaks and thick-woolled sheep are probably the most viable enterprise apart from tourism. Wool is the second major export (increasingly by informal barter). In the low-lying Kara Kum and Kyzyl Kum deserts that extend over much of Turkmenistan, Uzbekistan and southern Kazakhstan, local breeds of sheep can thrive in the extreme climates. There are twice as many sheep (up to ten million) as people in Turkmenistan, at stocking rates as low as 15 hectares per animal. More than half the agricultural output of Kazakhstan is derived from livestock, which depend for at least half their feed on natural pastures. There are similar proportions in Kyrgyzstan. In addition to the potential for expanding exports of livestock products to new markets such as Japan, China, Western Europe and Turkey, the food and transport which livestock provide are increasingly important to households now trying to cope with price inflation and shortages of fuel and other essential commodities.

The expanses of desert and steppe in Central Asia have long been exploited by pastoral peoples, seasonally moving their herds of horses and flocks of sheep to different pastures. In a region where annual rainfall is typically less than 300 mm, and extremes of heat and cold occur, much of the land could only be used briefly each season by domestic herbivores grazing off vegetation flushes. Farming was confined to desert oases and to irrigated valleys using melt water from snow-covered mountains. For the rest of the land, value could only be extracted fleetingly by a low density human population, specialised in raising livestock on open ranges.

In this century, technology and ideology combined to reorganise the way land was used. Large-scale irrigation projects enabled fodder to be grown, obviating the need for livestock to be moved in search of their food. Political theory made it obligatory to civilize nomads, by settling them. A great experiment in industrialised, state-controlled pastoralism ensued. Although the experiment was at first disastrous, adjustments were made over the decades. Lessons were learned and new techniques introduced. By the time the old Soviet Union dissolved and new independent states emerged some five years ago, there existed a relatively high-yielding livestock industry, based on a combination of modern inputs and traditional skills, making use of natural pastures supplemented by cultivated fodder. Resources of land, livestock and labour were collectively managed. Output was geared to the requirements of a large and secure domestic market – the former Soviet Union – which subsidised the cost of producing fodder for livestock in return for meat, wool, leather and dairy products at below world market prices.

These conditions no longer prevail. Land and livestock are no longer necessarily

held collectively. Different types of pastureland are developing market values. Labour has other choices. Fodder production is no longer subsidised, while guaranteed markets at pre-set prices are a thing of the past. As input and product prices shift in relation to supply, demand and government legislation, individual livestock producers must now face the open market with little protection from the state, but also with few restrictions. Fortunes can be made, but flocks and herds can also be lost.

In response to newly emerging market conditions, pastoralists with privately-owned animals are altering their grazing and livestock husbandry systems. Making maximal use of the natural pastures, by lengthening the migratory cycle and reducing dependence on expensive cultivated fodder, is one option. This requires sufficient herding labour and secure access to grazing land. Another choice is to continue supplementing the natural forage with purchased or home-grown fodder. This option depends on a high domestic or international price for livestock products, in order to justify the cost of animal feed. A third option is to cease raising animals for surplus; instead growing crops under irrigation and retaining animals only for home use. Other livestock-keepers are leaving agriculture altogether and seeking employment in the towns.

One of our questions is whether the 'traditional' forms of migratory pastoralism are re-emerging in Central Asia, and whether these forms are compatible with a modern industrial economy. But the question is misplaced. What may be re-emerging is not necessarily 'traditional' pastoralism at all, but rather a predictable response to the industrial economy which happens to exist in these areas now. Two of the characteristic features of 'traditional' pastoral nomadism are migratory herd (and usually household) movement, and a subsistence-orientated household economy. The re-emergence of these features may be attributable to price changes of inputs and outputs rather than simple conservatism on the part of producers.

Migratory herd movement is most sensitive to changes in input prices. In the cold desert regions of Central Asia and Inner Asia, herds move to escape extremes of cold, lack of water or insufficient natural forage. All these deficiencies can be remedied through capital expenditure on industrial inputs – livestock shelters, water development and (most importantly) cultivated/irrigated forage. These inputs were formerly provided by the state through collectives. With privatisation, the costs of these inputs have devolved onto the individual livestock-owning family. It may be more attractive for families to move their flocks away from problems of resource insufficiency rather than to invest in expensive inputs to alleviate the problems on site. Hence the re-emergence of migratory production systems.

The re-emergence of market-shy household pastoral economies, on the other hand, may be attributable to changes in pastoral output (rather than input) prices, relative to the retail cost and availability of food. Taking the example of another pastoral system (Mongolia) which experienced privatisation earlier, industrial collapse has

undermined the purchasing power of urban consumers. The terms of trade between industrially-produced foods and livestock products are now very unfavourable to consumers; pastoralists therefore choose to retain an increasing proportion of their own production (Humphrey and Sneath, 1995; OECD, 1995).

As centralised purchasing, fixed prices and government controls are removed, pastoralists prefer to sell through unofficial (thus unrecorded) channels to cross-border markets (Kerven, 1993; Edström, 1993). What appears as pastoral withdrawal from trying to feed the cities, and even a massive destocking through deliberate slaughter, may actually reflect the *sub rosa* emergence of high value regional or international trade in animal products (Duncan, 1994). With new international trade links, pastoralists search for a source of cash to buy consumer items. These are not the traditional pastoralists of a century ago.

Price responsiveness is also evident in Central Asia as pastoralists shift to private marketing of meat and milk products to supply domestic consumers, having lost out in the formal high value regional markets for fine wool (replaced by Australia) or *karakul* pelts (less fashionable). But at first this domestic market is not as lucrative as the old wool or pelt trade, and the pastoralists must cut their costs. An immediate option is to reduce expensive fodder inputs whenever possible – i.e. conserve fodder for maintenance and survival feeding of livestock – and migrate. But again, this so-called traditional behaviour is really only a response to price changes. Such a case has been recently recorded in France, where, in response to shifts in European Union subsidies from a product basis to a herd/land basis, some livestock farmers are now keeping sheep under more extensive management, using more land and less inputs (especially fodder) for the same amount of livestock (Chabosseau and Dedieu, 1995).

Prevailing institutional arrangements influence what is 'economic'. If policy-makers do not recognise that migratory husbandry systems are reasonable responses to economic incentives and constraints, they may construct institutional impediments (in land tenure, for example) that induce herders to ignore an otherwise appropriate form of production – migratory pastoralism. This form of production may be quite appropriate both for some livestock producers and for the nation.

The challenge now is to carry out policy-relevant research in an environment in which prices, husbandry systems and institutional arrangements are all changing. Which choices pastoralists make will have a cumulative effect on people's lives, national economies and trade patterns. The direction and impacts of these trends are at present unclear. Under these new conditions, new research is needed to discover how producers are responding and adapting to rapidly-shifting economic parameters. Only when there is sound knowledge of how the new pastoral livestock husbandry systems are evolving can relevant advice be given on the best ways to develop the extensive livestock sector in Central Asia.

But it is not only the economic and institutional environment which is altering. Livestock can also cause environmental damage when political or economic circumstances enforce sub-optimal management methods. Large tracts of open rangeland and more valuable irrigated areas have been degraded and their productive capacity thus undermined by the intensive livestock husbandry and fodder cultivation enjoined by Soviet governments over this century. With mobility reduced, animals were kept at a higher density for longer periods of time on the same pieces of land. Increased grazing pressure, as animals were no longer moved quickly over the land, has meant a reduction in plant species diversity. Soil erosion by wind and water followed from the ploughing up of grasslands to be replaced by fodder and food crops. Now there is the added pressure of labour and input costs, which means that owners, even if they wished, cannot always afford to take their animals to faraway pastures, or to feed them supplementary food. As a result, grazing pressure has increased around settlements. These are important environmental considerations which need to be researched at the local level, as changing economic factors bring new hazards but also new solutions to the conservation of natural resources in Central Asia.

Several questions emerge. Is irreversible degradation occurring? What effect have the existing systems of livestock management had on land degradation? How might changes in methods of livestock management affect land degradation in the future? What are the economic variables which may bring about changes in livestock management which would reduce or increase degradation?

Overall, the issues fall into two distinct but related themes: how producers are adapting to the large-scale economic and institutional transformations engulfing their worlds; and secondly, how the natural resource base is being affected by these changes in livestock management. Addressing these issues will require research by both natural and social scientists. Four policy-oriented research issues are discussed in the report's conclusion, summarised as follows:

- Empirical studies of changes in land tenure under conditions of land privatisation and new commercial markets for livestock inputs and outputs.
- Field investigation of the costs and returns of extensive versus intensive systems of livestock management to producers at different economic scales.
- Ecological studies of the causes of grazing land degradation, and possible ways to prevent or ameliorate these causes, under emerging market conditions.
- Participative research on the most appropriate institutional forms for delivery of inputs and social services to dispersed pastoral households under conditions of reduced state support.

National scientists in Central Asia have initiated research – mostly biological – on

some of these issues. Their efforts could be supported and strengthened through collaborative, multidisciplinary research involving researchers with experience of similar issues in pastoral regions elsewhere. The first step in defining a research programme would be for senior range and livestock scientists from Central Asia to meet with interested counterparts in the UK, to work out common themes based on research strengths in various institutions. A proposal for achieving this goal is outlined in section 5.

Two comprehensive bibliographies appear at the end of this report, one of works in English, one of works in Russian, together with a set of abstracts in English of key works on this topic in Russian. This bibliographic resource will form the basis for a continuation of the research.



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Note: Alma Ata = Almaty (Alma-Ata pre-1990)

2. Overview of past and present pastoralism in Central Asia

2.1 Climate and ecology

Central Asia is a vast plain ringed on its southern and eastern flanks by mountains (see Map 1). Three republics, Kazakhstan, Uzbekistan and Turkmenistan, occupy the plains and are partially within the mountains. Two republics, Tajikistan and Kyrgyzstan, are principally within the high mountains of the Tien Shan and the Pamirs. The climate of the region is continental and extreme, with cold winters and hot summers. Far from any major body of water, only residual amounts of rainfall from any ocean reach the region.

Within the region as a whole, the natural environment varies according to latitude and altitude. Precipitation is highest and temperatures are lowest at higher elevations or in the north. The climate becomes progressively drier and hotter at lower elevations and to the south of the region (Fig. 1). Four main vegetation zones are associated with these major transitions in climate and topography (Matley, 1989a). Grasslands – the steppe – in the north give way to semi-desert vegetation followed by desert vegetation to the south, with alpine and mountain forest vegetation in the uplands rimming the plains.

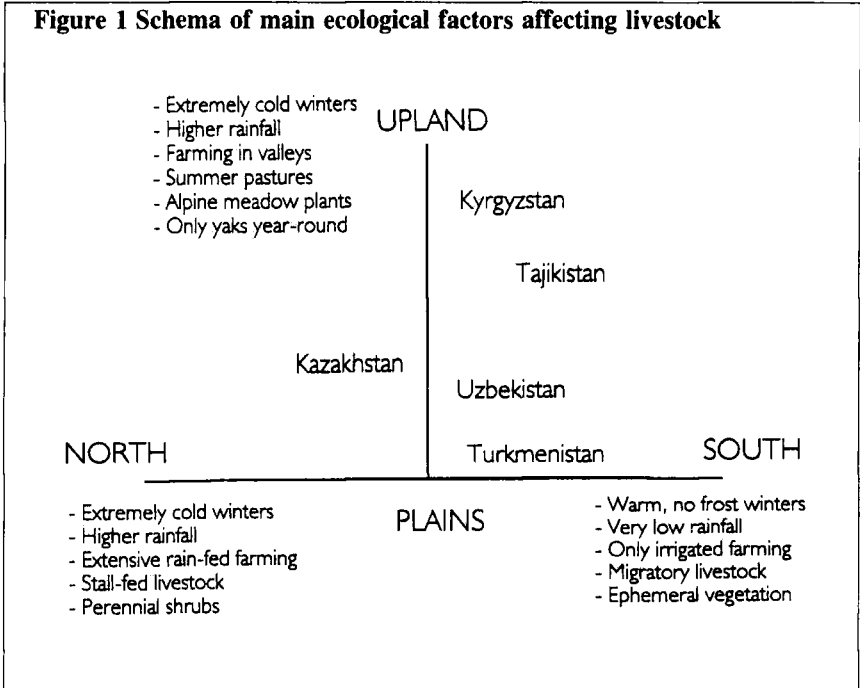
Northern region

There are substantial climatic differences between the northern and southern plains regions (Babaev et al., 1985). Precipitation is highest in the north and there is a more even distribution of rain compared to the southern region, with two peaks in late autumn and late spring. With a continental climate, winters are severe with mean January temperatures as low as -18°C . A particular feature of winters in the northern region, which has drastic effects on pasture and thus on livestock, is the occurrence of a thaw followed by freezing conditions. This refreezing, termed *jūt* or *kökmüz* in Kazakh, renders the grasses inaccessible to grazing animals and can result in mass livestock deaths (Matley, 1989a). Much of the northern region is occupied by northern Kazakhstan.

Southern region

The defining feature of the southern region is that agriculture is only possible with irrigation (Matley, 1989b). In this region, which includes most of Turkmenistan and southern Uzbekistan, the mountains on the eastern fringe create a rain shadow on

Figure 1 Schema of main ecological factors affecting livestock



the plains. Rainfall starts in October and reaches a maximum in March/April. The deserts of Kara Kum and Kyzyl Kum and some other areas register less than 100 mm annual rainfall. But these mountains and their foothills receive more moisture, and are the sources for streams and rivers which, on the plains, have allowed irrigated agriculture to flourish for millennia. Winters are warmer in the southern region, with only moderate frosts. Summers are extremely hot, with maximum temperatures of 50°C. Since the peak of rainfall coincides with the hottest temperatures in the summer months, there are high rates of evaporation in areas such as central Turkmenistan.

Upland

The high alpine and sub-alpine mountain regions of the Tien Shan and Pamir mountains form a distinct major climatic zone with higher rainfall and very cold winters. Most of the pastures in Kyrgyzstan are upland, lying between 1,000 to 3,200 metres above sea level (ULG, 1994d). Over one hundred different vegetation complexes have been identified in the pasturelands of Kyrgyzstan, varied according to aspect, slope, altitude and soils. These pastures provide a rich but very short-lived grazing resource which can only be used in the summer time due to the extreme cold of the winters.

financing falls or its cost rises. Globally it will be the distribution of deficits and not just their size which is important.

Undoubtedly an important factor in explaining growing BoP disequilibria worldwide during the 1980s has been the large and increasing United States current account deficit. But one would not expect this to have any discernible or direct impact on IMF lending since the US remains internationally creditworthy. For those countries whose creditworthiness has evaporated, as happened to the highly-indebted developing countries after 1983, there may be little alternative other than to turn to the Fund. It is useful to recall here that in *Working Paper 64* a simple typology of countries which emphasised creditworthiness was suggested to explain the pattern of Fund lending across countries and over time. For industrial countries creditworthiness is well established and at the very least will take sometime to erode. The evidence suggests that such countries do not borrow from the Fund. For low income countries persistently low creditworthiness determines an equally persistent demand for IMF resources. We do indeed empirically observe the relatively large number of Fund arrangements with such countries, not only under stand-bys but also increasingly under the structural adjustment windows. For middle income countries, such as those found in Latin America, the picture is less clear cut because their creditworthiness is uncertain and varies over time. While they were creditworthy in the 1970s and early 1980s they avoided the Fund. But as their creditworthiness declined so their demand for Fund resources increased.

On the supply side of the Fund lending equation there are, first of all, the access limits which constrain the ability of countries to draw under various facilities, shown in Table 6; second, the Fund's willingness to lend under different conditions; and third, the charges that the Fund makes on the use of its credit. Certainly there have been occasions when an increase in IMF lending has been directly associated with the liberalisation of a particular facility or an increase in IMF quotas. Moreover, the implementation of stricter conditionality by the Fund will mean that more programmes are rejected, or that the negotiation of the programme breaks down, or that countries, mindful of the conditionality they are likely to encounter, opt not to turn to the Fund in the first instance.

A further more complex supply-side factor has been the Fund's policy towards commercial lending and latterly to arrears. Immediately after the debt crisis the Fund's policy of concerted lending attempted to link the provision of its own resources with additional commercial assistance. As this lapsed the Fund insisted that recipients of Fund loans remained current with their commercial debt obligations and hence, in some quarters, was viewed as a debt collector for the banks. Such a policy may clearly have disinclined countries from borrowing from the Fund. It is noteworthy that the relaxation of this policy towards the end of the 1980s coincided with an increase in Fund lending.

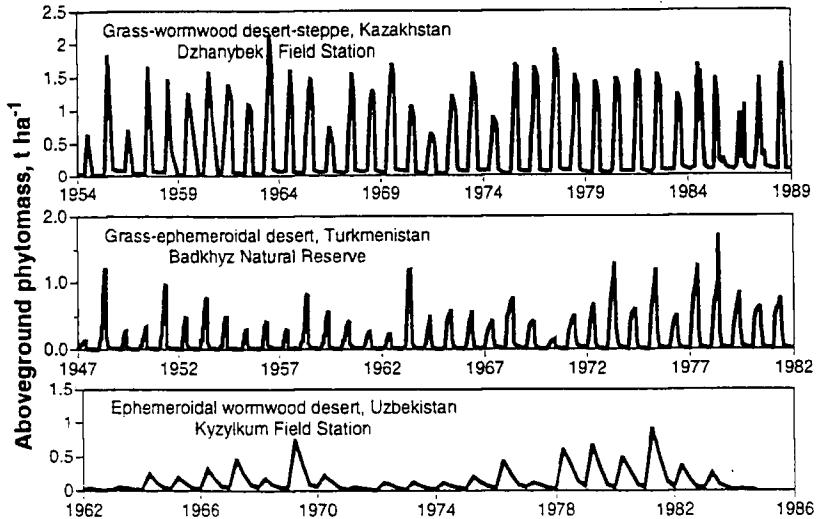
On a quantitatively more muted scale a similar impact might be associated with the Fund's evolving policy on arrears. Here the Fund has adopted a so-called 'intensified collaborative strategy', which according to one well informed observer may be seen as 'the ultimate in disguised rescheduling' (Kafka, 1992). Under this strategy a member country which agrees to follow a programme monitored by the

Table 6: Evolution of maximum access to Fund resources (as percentage of quota)

Facility or policy	May 1947	Feb 1963	Sep 1966	June 1969		Sep 1974		Apr 1975		Dec 1975		Jan 1976		Apr 1978		
				A	B	A	B	A	B	A	B	A	B	A	B	
Credit tranche	100	100	100	100	100		165	100	165	100	165	145*		100 ^b	165	
EFF	-	-	-	-	140			140		140	165	140		140		
Compensatory financing facility (exports)		25	50	50		50		50		75			75		75	
Compensatory financing facility (cereal)	-	-	-	-	75	-	75	-	75	-	-	-	-	-	-	
BSFF	-	-	-	50		50		50		50		50		50	50	
Oil facility (1974)	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	
Oil facility (1975)	-	-	-	-	-	-	-	125		125		-		-	-	
Facility or policy	Feb 1979	Dec 1980		May 1981		Jan 1984		Dec 1984		Dec 1986		Dec 1989				
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Credit tranche		100 ^b		100		100		100		100		100		100		
EFF			165	140	165	140	165	140	165	140	165	140	165	140	165	
SFF/enlarged access		102.5 ^c	305 ^d	140 ^e	500 ^e	600	500 ^e	600	308 ^e -400	408-500	308 ^e -350	408-450	300 ^e -340	400-440	300 ^e -340	400-440
				460 ^e	460 ^e		460 ^e		268-360 ^e	268-310 ^e	268-310 ^e	260-300 ^e	260-300 ^e	260-300 ^e	260-300 ^e	
Compensatory financing facility (exports) ^f			100		100	100		83		83		83		83		
Compensatory financing facility (cereal) ^f						100		83		83		83		83	122	
Contingency financing ^f														65		
BSFF			50		50		50		45		45		45		45	
SAF ^g													47		70	
ESAF															250	

Note: A indicates maximum by type of access; B indicates maximum combined access. * In January 1976, the Fund extended temporarily the size of each credit tranche by 45%. From January 1976 the Fund applied its credit tranching policies on the basis of the increased credit tranches, each equal to 36.25% of quota. ^b Following the Second Amendment in April 1978, the size of each of the credit tranches reverted to 25% of quota. ^c Stand-by arrangement. ^d This limit could be exceeded in exceptional circumstances. ^e Extended Fund facility. ^f In August 1988 the compensatory financing facility was replaced by the CCFF. ^g Access increased by 63.5% in July 1987 and to 70% in March 1989.

Figure 3 Long-term dynamics of above-ground biomass at three desert sites in Central Asia



Source: Gilmanov (1995), Figure 4.

(Alimaev et al., 1986). The fluctuation in output between different ecological zones is considerable; seasonally the minimum and maximum biomass varies from 1:5 in dry steppe, while over the long term the range can be between 1:10 in ephemeroidal deserts (Gilmanov, 1995). This means that in some years the productivity of these types of deserts can be ten times higher than in other years.

Pastoral livestock raising has been a major economic activity in these desert and semi-desert areas as the natural fodder can be used year-round. Prior to Russian settlement and colonisation in the 19th century, Kazakhs did not provide supplementary fodder for their livestock (mainly horses and sheep) but instead moved between ecological zones to seasonally-available grazing areas (Matley, 1989a). Turkomen tribesmen did provide some fodder to their horses, which were used for military purposes, in raiding. Otherwise, the tribes relied on natural pastures. This was possible as over the southern portion of Central Asia, where winters were 'vegetational' (Babaev and Orlovsky, 1985: 15), the growth of natural vegetation was only interrupted by cold for a maximum of 30 days. This meant that sheep could be grazed year-round in the southern plains, but animals grazed in the northern region during summer had to move south in the winter.

Turkomen and Uzbek pastoralists had to migrate shorter distances, since they occupied the southern region, while Kazakhs who kept their livestock in the northern grasslands had to move southwards each year. Migration of livestock in a general north–south pattern was the norm where ‘Ecological conditions favor the growth of plants in the northern desert subzone during the warm period of the year, and in the southern subzone during the cold period’ (Babaev and Orlovsky, 1985: 23).

2.2 Historical overview of the last hundred years

In late Tsarist Russia a belief prevailed, which continued into the Soviet period, that by the early 20th century Kyrgyz and Kazakhs were in a transitional stage between pastoral nomadism and settled agriculture where the decline of periodic migrations, together with the weakening of tribal ties, would be replaced by an independent farming community. Tribal organisation was strongest amongst Turkomen who were predominantly nomadic. Soviet-forced collectivisation of agriculture was undertaken on the assumption that such backward pre-capitalist economic forms (nomadism and pastoralism) would be destroyed. Up to the mid-1950s the latter were viewed as ‘archaic’ and ‘remnants of semi feudalism’ (Channon and Channon, 1990).

Before 1917, numerous regional variations of nomadism and semi-nomadic pastoralism prevailed in Kazakhstan. A nomadic economy with migrations throughout the year was found in the steppe, semi-desert and desert. Semi-nomadic groups also existed with permanent winter quarters and these probably constituted the majority of the Kazakh population. Another group practised transhumance, making use of alpine or sub-alpine meadows for pasturing in the summer. The latter involved a migration of 30–35 km in radius while pure nomads in the steppe and desert might cover up to 1,000–2,000 km.

The pastoral economy was subsistence-based, with marketing at a minimum. The level of technology and the standard of living were low, and life was precarious, constantly subject to the weather, famine and epizootic diseases. Even in 1928 one-quarter of the total number of livestock in the south and west of Kazakhstan perished due to drought (Channon and Channon, 1990). With a tribal structure, grazing areas were in the possession of the tribe as a whole, even though differences in wealth existed, most notably between the *bais*, the owners of large herds, and the *kedeis*, the poor (Olcott, 1987). Nomadic movements took place within the tribal territory.

In the 19th century, the tsarist government seized the majority of summer pastures used by the Kazakhs, and the crisis of the Kazakh nomadic economy began. As Russian settlement in the northern region gradually excluded Kazakhs from their seasonal grazing grounds, some Kazakhs adopted a sedentary life, growing crops.

Another innovation, adopted from Russian peasants, was the scythe, which allowed Kazakh pastoralists to cut hay to store as winter fodder, for the first time (Matley, 1989b). Kazakhs began to keep cattle on the open ranges, their winter diets supplemented by cut fodder.

The number involved in nomadic and semi-nomadic activities is uncertain but it has been suggested that in 1916–17, nomads comprised between 40–78% of the population, with variations according to area. On the eve of 1917 there was a preponderant proportion of semi-nomadic people, a substantial number of nomads and a limited proportion of sedentary farmers engaged in agriculture, some of them in irrigated agriculture (Channon and Channon, 1990).

The revolution of 1917 was important in settling nomads, even though such developments had been in progress since the 19th century, but the real transformation came with the liquidation of the so-called wealthy (or '*kulaks*') and the forced collectivisation of agriculture in the years after 1929. In accordance with Bolshevik ideology, it was argued that the communal use of pasture benefited the owners with the largest number of livestock (the *bais*) to the detriment of the poor: for the Bolsheviks, it was the *bais* who were opposed to the settling of nomads and semi-nomads. The enforced sedentarisation under Soviet rule was a process of impoverishment for the pastoralists which reached its peak in the 1930s (Olcott, 1981). At that time, livestock were removed from most of the rangelands, and a process of enforced collectivisation began (Asanov and Alimaev, 1990).

The First World War, revolution and civil war (up to the early 1920s) in Central Asia saw the depletion of livestock, though the latter experienced something of a resurgence in the relatively peaceful years of the New Economic Policy (NEP) in the 1920s. Figures suggest that the livestock economy was longer in recovering from the losses sustained in 1914–21 than more sedentary forms of agriculture (Channon and Channon, 1990). For the pastoral economies of Central Asia, the first period of collectivisation largely meant de-nomadisation and settlement, in which millions of livestock and the people dependent on them perished, particularly in the famine of 1932–33 (Kozybaev et al., 1992; Olcott, 1981, 1987).

By the 1940s, official recognition that sedentarisation of the nomads was a disastrous failure led to a repopulation of the arid ranges. During the next two decades, water supply systems and other basic infrastructure for hay-making, as well as social amenities, were constructed in the rangelands by the state. These facilities allowed a partially-sedentarised state-organised form of nomadic animal husbandry to develop in the desert (Asanov and Alimaev, 1990).

Yet private operations were still important in relation to livestock, especially in regard to the livestock recovery which occurred after 1933 and the accompanying increased availability of meat in towns and villages (Channon and Channon, 1990). Policy reversal by the Party in 1939 meant a downturn for the private sector since

the size of personal plots was reduced while *kolkhozy* (collective farms) were decreed to increase considerably their number of livestock. The question of 'personal' ownership of livestock was to irk the Soviet authorities during the three decades which marked the leaderships of Khrushchev and Brezhnev. Gorbachev's 'rural *perestroika*' removed some of the rigidities of the former system though the system of lease contracts was far from straightforward for former pastoralists (Humphrey, 1989).

With the dissolution of the Soviet Union and the emergence of the New Independent States since 1991, each republic has followed its own course of agricultural restructuring. Sometimes this has led to initial privatisation of land and property, including livestock, although most economies are in a state of flux, the boundaries between the possession (or ownership) of state and private livestock being blurred and transitory. In many cases members of state and collective farms, whether continuing as such or in the course of transformation, appear to consider the collective's animals their own.

The main difference between the collectivised grazing system of the latter Soviet era and the tribal grazing pattern that prevailed until the late 19th century was in the distances that livestock migrated seasonally and the degree of settlement. Kazakh nomads of the steppes and deserts travelled north in the summer and south in winter, over distances up to 1,200 km (Emeljanenko, 1994). Winter pastures were on places protected from snow and cold winds by mountains, bushes or sand dunes. Summer pastures were on the better-watered grass steppes of the north. It was these summer pastures that were settled and farmed by non-Kazakhs from the end of the 19th century.

Nearer to the mountains, Kazakhs and Kyrgyz practised a more vertical form of seasonal migration, moving up to summer pastures and down to protected valleys in the winter (ULG, 1994a). Mountain pastures also have seasonably and locationally variable vegetation, which can be exploited by moving animals up and down the slope. Over 100 different vegetation complexes (plant associations linked to site variables) have been identified for the uplands of Kyrgyzstan; of these, about 50 are used for pasturing livestock (ULG, 1994d). Animals are moved between zones classified as alpine, sub-alpine, meadows, steppes, interior Tien Shan steppes and semi-desert. Starting in the spring after over-wintering in valleys, the different livestock species are moved gradually to higher and higher mountain pastures until late summer, when the movement downwards begins. This pattern of transhumance was traditionally practised in Kyrgyzstan, but has come under some pressure in recent years, due to the costs (in fuel, transport and hired labour) of moving up to high summer pastures since decollectivisation.

Most of the Turkomen tribes, prior to collectivisation, combined settled agriculture at the oases with migratory livestock-breeding. Women and children moved out to the flocks in spring time, and the male herders moved back to the settled villages

in the winter. Grazing cycles revolved around seasonal and permanent water points, which were controlled by individual families within each tribe. Directions of seasonal migrations varied according to the type of pasture and rainfall patterns.

2.3 Changing pastoral organisation

Variations in climate, topography and the ecology of Central Asian pasturelands have meant that no one standard form of pastoral production has prevailed even under the latter-day Soviet governments, with the introduction of scientifically-managed collective pastoralism. There are several critical variables:

The fodder requirements of the herd, the necessity of providing it with water and the best way of protecting it from the cold in winter are the basic factors in the economic life of the nomad. The amount of time spent in camps, the direction of migrations, number of pastoral migrations and distance of the latter all depend on these factors (Khazanov, 1984, citing Ishchenko et al., 1928).

The temperate zone of nomadism, with cold winters and hot summers, is termed by Khazanov (1984) as Middle Asian-Kazakhstanian, while the southern desert zone of Turkmenistan is characterised as South Middle Asia, having some similarities to the nomadism of the Middle and Near East. For pastoralism, the difference between these zones is that seasonal livestock movements in the hot deserts of Turkmenistan are determined principally by availability of water, whereas the factors of cold and snow mainly shape seasonal movements in the more northern temperate zone (Emeljanenko, 1994). The more northern and wetter areas receive higher amounts of snowfall in winter, which means that only horses can easily be kept on natural pastures in winter, as they are more able to graze by kicking away snow.

Although higher altitudes receive more rainfall, they are too cold for most domestic animals (except yaks) in the winter. Conversely, drier areas, though warmer, do not produce sufficient forage (plant material) to support many animals all year. Extremely hot summer temperatures in the southern-most deserts have meant that only certain breeds of sheep can be kept on the open range. Another important factor influencing the form of livestock husbandry has been the construction of irrigation systems, especially in the Soviet era (Alimaev et al., 1986). Irrigation made arable agriculture possible in vast areas which could otherwise only be used for rearing livestock extensively. However, this reduced the land available for pasture, while allowing animals to be kept under stall-fed conditions, using fodder crops raised with irrigation. Dependence on cultivated fodder increased progressively from the mid-1960s as reliance on natural pastures declined (see Fig. 3, Gilmanov, 1995).

Methods of livestock husbandry had to be adapted to the environments of the different regions. As summarised by Popova (in van Leeuwen et al., 1994), the main forms were:

- Stall-feeding of cattle and pigs, without winter grazing – prevalent in the densely populated and farmed northern steppe and hill areas. In such areas, land is given over to crops, either rain-fed or irrigated, and pastureland is only sufficient for a brief summer period. The land use is intensive.
- Summertime distant herding, stall-feeding in winter, with draught and milk animals stall-fed year-round. This system was found in the dry steppes and mountain areas, except in Turkmenistan.
- Distant herding of some hardier animals in moderate winters, close herding near settlements of all other weaker animals, year-round. This system was used in desert areas, except again for Turkmenistan.
- Herding animals, except cattle, between seasonal pastures, sometimes distant from main settlements, for the bulk of the year. Typical of desert and high mountain areas especially of Kazakhstan.
- Year-round herding between seasonal pastures, with a minimum of cultivated fodder, typical of southern, warm and less snowy areas, particularly the deserts of Turkmenistan, Uzbekistan and south Kazakhstan (camel and astrakan sheep), as well as the dry high mountain areas of the central Tien Shan and the Pamirs (yaks and horses).

In Kazakhstan, the extensive sheep-rearing areas lie in a crescent around the central-southern edge of the country. Sheep kept in the north, where former pastures have been cultivated to wheat, are mainly stall-fed and kept intensively. Within the southern region, sheep are moved in winter from the south into the drier centre desert zone where snow cover is lighter, and the sheep can graze the sparse vegetation (AGROTEC, 1995). The distance between winter and summer grazing can be up to 500 km. There are still about 1,200 large sheep farms (collectives), of which 700 are exclusively for sheep-rearing. Each collective holds between 40–45,000 head of sheep, which are tended by shepherds on horseback. It is not clear whether these organisations are *kolkhozy* or the newly-created '*kollektivny*'. One shepherd is responsible for 500–1,000 sheep (fewer if merinos and more if fat-tailed local breeds).

The purpose of production within the state-controlled collectives is radically different from the purpose of domestic, household pastoral production. As noted by Humphrey for the case of former Soviet Buryatia (1983: 232), domestic production which, as in Central Asia, continued side-by-side with collectivised production, was not organised around specialised tasks, particular species or products 'but with the

whole life-cycle of several different kinds of animals for multiple purposes'. Similarly, the reindeer herders of the former Soviet Siberia were reorganised from family-based nomadism to 'production nomadism' in the 1930s, in which herding was reduced to a worker's job (Vitebsky, 1990).

Prior to collectivisation, the semi-nomadic and nomadic Kazakh, Turkomen and Kyrgyz pastoral families kept horses for transport, milk, meat and leather; sheep for meat, milk, wool for clothing and felt for construction of the *yurta*, the traditional nomadic tent. Cattle were not kept on the open ranges, as they were not hardy enough. The Bactrian two-humped camel was kept in the northern regions, where it could survive the extreme cold, and was virtually the only means of transporting migratory households. Camels were also important as sources of milk and wool (Matley, 1989a).

The introduction in the Soviet era of industrialised forms of animal husbandry to the Central and Inner Asian pastoral nomadic systems led to certain anomalies in the interpretation of 'traditional'. As Humphrey found in her study of agro-pastoral collectives in Buryatiya (Inner Asia):

Quite often it is the most experienced and the most 'traditional' herders who are the most successful. When yet another resolutely unmodern old man or woman trudges up to the kolkhoz stage to receive their award of honour it is the culmination and justification of a whole way of life and way of thinking (1983: 230).

The combined effects of collectivisation, with its constriction of migratory grazing, the alienation of former better-watered grazing lands to arable (crop) cultivation, the specialisation of tasks formerly carried out by families, and introduction of new animal breeds, meant that herding became more labour-intensive. That is, the amount of labour required to raise each animal increased. In particular, Humphrey (1983) notes that loss of control over fodder, which formerly had been provided through the kin-based herding unit, meant that it was more difficult than in the past to be a good herder. Hence, those with traditional knowledge of animal husbandry, indigenous grasses, climate, animal diseases, predators and other specialised skills could more readily cope under the new imposed forms of production. There is every reason to suppose that the relevance of this observation, made about the Soviet extensive livestock production system some twenty years ago, has not diminished in the current post-Soviet period of changes.

2.4 Economic contribution of livestock

Within the territory of the former Soviet Union, the large area of rangelands, amounting to 370 million hectares, was viewed as an area of high potential for livestock production, and the population of cattle and sheep increased by about 5%

per year from the end of the Second World War (Gilmanov, 1995). Recent estimates of ruminant livestock are shown in Table 1.

Table 1 Ruminant livestock in the Central Asian republics, 1992
(‘000 head)

	<i>Horses</i>	<i>Cattle</i>	<i>Sheep</i>	<i>Goats</i>	<i>Camels/yaks</i>
Kazakhstan	1,523	9,600	33,908	692	Camels 143
Kyrgyzstan	315	1,200	9,200	300	Yaks 52
Tajikistan	53	1,400	2,620	780	
Turkmenistan	20	900	5,380	220	Camels 100
Uzbekistan	108	5,100	9,200	900	
Total	2,019	18,200	60,308	2,892	

Sources: FAO *Production Yearbook* (1992), World Bank (1993a and b), ULG (1994d).

In the 1970s it was reported that the primary cost of production of desert animal produce – meat and wool (from sheep) – was 50% lower than in other parts of the USSR (Babaev, 1977). Range-based livestock were required to supply the cities and farmers with meat, dairy products, wool and skins. However, production of livestock commodities was already in decline by the 1980s; reasons given are inadequate fodder, poor management and economic distortions resulting from collectives producing to a pre-set central plan. Shortfalls in meeting domestic (internal) demand for meat and milk were experienced throughout the 1980s, in Kazakhstan and Turkmenistan (McCauley, 1994).

Kazakhstan

Kazakhstan alone produced one-quarter of USSR’s lamb and one-fifth of its wool (McCauley, 1994). By the end of the 1980s, Kazakhstan was responsible for 23% of Soviet production of meat and wool (EIU, 1995b). The livestock sector now accounts for between 50–60% of total agricultural output with beef, mutton, dairy products and wool being the major livestock products (World Bank, 1994). In terms of finished product, the livestock sector contributes nearly 60%, though this does not take into account agricultural production (grain and fodder) used in livestock production (World Bank, 1993a). The problem in recent years has been a recorded apparent fall in production for all livestock commodities: meat production fell 18%, milk 16% and wool production 11% between 1991–93 (Kaliev and Satybalidin,

1993). Table 2 shows the extent of decline. Some probable explanations for this fall are discussed below.

Table 2 Production of selected livestock products, Kazakhstan
(all farms, '000 tonnes)

	1986-90	1993
Meat (live weight)	2,456	2,192
Meat (slaughter weight)	1,465	1,257
Milk	5,350	5,335
Wool	108	95
Karakul ('000 skins)	1,773	1,520

Sources: World Bank (1994).

Most of the adjustment in output is assumed to result from declining productivity as total livestock numbers, though somewhat reduced, have not fallen nearly as much as livestock products. Also important has been lower domestic demand for livestock products as a result of falling real wages and higher prices. Consumption of meat and associated products is recorded to have fallen by 14% between 1990-92 and of milk products by 12%. Wool and meat were traditionally exported to the USSR but the volumes sold to the republics of the FSU in recent years have declined significantly. Current figures give a total of more than 14 million sheep and goat skins processed each year, but the poor quality of animals now being marketed, together with inadequate technical processing, now means that only 30% of skins are satisfactory (Medeubekov, 1995).

Kyrgyzstan

In Kyrgyzstan, by comparison with Kazakhstan, livestock have been of greater importance to the national economy given the relative value of grain production in the northern steppes of Kazakhstan. World Bank estimates for Kyrgyzstan are that livestock accounted for almost two-thirds of the value of agricultural output at the end of the Soviet era (World Bank, 1993b). This was equal to about one-third of gross domestic product (GDP).

The relative value of livestock then declined after Independence, mainly due at first to a rise in the market value of crops following some liberalisation within the economy. In 1994, official figures show meat output falling by 17% and milk by 15% (EIU, 1995b). The falling contribution of agriculture to GDP reflects the decline in agricultural output and a deterioration in the terms of trade. The

proportion of the average consumer basket spent on food increased from 30% in 1980 to 36% in 1991 and was reported to be about 50% in 1992 (World Bank, 1993b). The agricultural sector accounted for 35.5% of all employed in 1991, which is not thought to have declined. In 1992, livestock contributed some 43% of gross output in agriculture (ULG, 1994a).

Livestock numbers are reported to have been falling at an accelerated pace, mainly due to the lack of profitability and increasing feed shortages (Abdurasulov, 1995). Between 1989–91 the sheep population declined from 10.5 to 9.5 million while the cattle herd remained fairly stable at 1.1 million. Livestock productivity in the state sector has also been declining, now to about half of West European levels, indicated by, for instance, average milk yields of 2,300 litres per cow and feed conversion ratios of 8–10:1. Serious shortages of protein feed and animal vaccines are cited as major contributory factors.

Both in Kazakhstan and Kyrgyzstan, state statistics widely report a decline in total numbers of livestock, which have been accompanied thereby with an apparent decline in production. The degree of decline is unknown, however, as under-reporting of privately-owned livestock is likely to be very common, according to observers (ULG, 1994d). Kyrgyzstan has introduced a pasture use tax, by head of animal, which would be a disincentive for people to report all the animals they owned. Producers are also wary of reporting all their livestock resources, as until very recently (and still in Turkmenistan), all members of *kolkhozy* had to fulfil the state procurement order for livestock and their products. Since the state prices are now far lower than open-market prices, producers try to avoid selling at the official prices. As much of the livestock output is also bartered, official statistics are unable to capture the extent of this trade (ULG, 1994a). (Also see the discussion on the Russian situation in Channon (1995), and on Mongolian livestock prices in Kerven (1993) and Edström (1994).) Again, this will have led to underreporting of production. It is therefore unclear how much the decline in state sector production has been compensated by private production. The reluctance of state and collective farms to deliver products to state outlets at controlled prices may also have exaggerated the decline in production.

Another reason to suspect gross underreporting is that since Independence, the state can no longer afford to pay the salaries of the data collectors who used to reside in collectives and regularly obtain quantitative data on production. State statistics are now considered to be even less reliable than in the past, both by donor representatives (for example, ULG, 1994d) and by senior national scientists.

Turkmenistan

At Independence in 1991, 46% of net material product (NMP at current prices) in Turkmenistan derived from agriculture. Overall, nearly one-quarter of the gross

agricultural output comes from the livestock sector (EIU, 1995a). By 1994, only 19% of GDP derived from agriculture and forestry (EIU, 1995a; EIU, 1995c). This change is due both to a rise in the price of energy products relative to the price of agricultural goods and to a decline in agricultural output. The fall in output of livestock products in Turkmenistan has been ascribed to a lack of appropriate feedstuffs (Landell Mills, 1995). About 40% of the labour force is still employed in agriculture, and half the population live in rural areas. The importance of agriculture to the country's economy and society has been a prime reason for the cautious attitude of the government in moving away from the centrally-planned economy (Landell Mills, 1995).

Rangeland livestock in Turkmenistan consist of some 4.4 million sheep, mostly of the karakul breed, kept for its pelt which is exported (Landell Mills, 1994b). Senior officials give higher figures of up to 10 million sheep, based on the quantity of wool and pelts marketed. The price was 200 manats (250 manats = US\$1 in June 1995) per skin in June 1994, with 40,000 tonnes produced a year. Some 1,200,000 pelts are sold annually. Sheep also provide about 40% of the country's domestically-produced meat. Turkmenistan has a meat deficit, with about 60% of its meat requirements being imported. Camels are also kept in the desert zones, with a total population estimated at 100,000. They are kept mostly for subsistence, providing traction, wool and milk. Some camel's hair is marketed privately, but no figures could be obtained.

2.5 The value of livestock products to exports

The dissolution of the USSR after 1991 resulted in major changes to trade patterns for the Central Asian republics. We have noted already that significant amounts of the wool, meat and leather required by the Soviet Union as a whole were derived from the livestock industries of Central Asia. Overall, less than 10% of exports from Central Asia went to regions outside the USSR, while a slightly higher percentage of imports originated outside the USSR (Çeviköz, 1994). For trade in agricultural commodities, most imports from outside the USSR were procured through Moscow so the newly independent states in general had little exposure to external trade systems. While trade in agricultural commodities within the USSR was relatively high, as with all inter-republic trade there is now substantial contraction and reorientation in response to adjustments in the agricultural structure and relative prices. By 1993, Kazakhstan exported the following quantities of livestock products (Table 3).

However, since the republics acquired independence, non-tariff barriers to trade have appeared, most significantly the introduction of export quotas (World Bank, 1994). In Kazakhstan, 34 commodities in 1993 remained under quota (from about 90 in 1992) covering mostly raw materials, including wool, leather, hides and skins. The quotas are voluntary agreements by the Central Asian republics to observe

Table 3 Exports from Kazakhstan to FSU by destination, 1993

	<i>Russia</i>	<i>Ukraine</i>	<i>Belarus</i>	<i>Uzbekistan</i>
Clean wool (tonnes)	9,093	1,835	4,451	185
Hides (pieces)	108,431		65,453	
Skins (pieces)	74,447	40,000	20,247	
Karakul (pieces)	65,100		247	23,500

Source: World Bank (1994).

quantitative restrictions on their exports to key markets; this is to allow adjustments in domestic resource allocation within the various states of the FSU. The quotas are set by governments, and based on a calculation of domestic requirements together with trade volumes accepted under bilateral agreements between countries.

In the case of Kyrgyzstan, exports to FSU republics in 1991 included woollen products with a net export value of 1.1 billion roubles (World Bank, 1993b). Overall, food and agriculture comprised 31%, while wool (together with silk) made up 18% of total exports to non-FSU republics. Table 4 gives figures of livestock-related trade for 1991.

As in the case of Kazakhstan, disruption of inter-republic trade has caused the government to react with measures aimed at restricting key exports through quotas and licences. In the case of Kyrgyzstan, the share of wool exports has been restricted in a barter agreement for plant-protection chemicals. Import substitution is also being promoted but without any proper assessment of comparative advantage, thus making it difficult to predict the impact on production and commodity availability (World Bank, 1993b).

Table 4 Kyrgyzstan – livestock-related items of total agricultural trade, 1991 (millions of roubles)

	<i>Inflow</i>	<i>Outflow</i>	<i>Balance</i>
Food/fodder industrial equipment	6.6	28.7	22.0
Wool products	316.3	1,450.8	1,134.5
Leather and fur products	172.6	31.1	(141.5)
Livestock products	24.8	17.4	(7.4)
Total agricultural trade	3,029.2	3,651.5	622.3

Source: World Bank (1994)

One of the first priorities of the Turkmenistan government since Independence has been to reduce dependence on food imports. Consumer prices have been held artificially low for basic products (including meat) which are rationed to restrict demand, with 45% of milk and dairy products being imported in 1991 (Landell Mills, 1995). In 1994, about half of all livestock products were estimated to be sold privately, and statistics on trade in livestock and their products were either not available, or else had questionable validity (see section 2.4).

As input prices adjust to international levels, trade patterns will change based on new indications of comparative advantage. The old system of inter-republic trade resulted in interdependence defined by state orders rather than market signals (World Bank, 1994). With new input prices affecting the costs of livestock production, the question remains whether livestock raised in Central Asia under these emerging market conditions will be competitive in the world markets in which Central Asian republics can now trade.

3. Decollectivisation – problems and opportunities

Until recently, the state controlled the major factors in the extensive livestock sector. All pastureland was held by the state, under the *kolkhozy*⁴ and *sovkhozy* forms of collective use; the majority of livestock were also state property, managed either on a hired or collective basis by herders. The state also fixed prices for livestock products and set the costs of livestock inputs.

The pace and extent of decollectivisation in the livestock sector differs in each of the three countries visited. Decollectivisation in this sector has two major components – land and livestock. Some degree of private animal ownership has been permitted throughout the Soviet period, but pastureland for grazing animals has been held collectively by *kolkhozy* and *sovkhozy* until recently (ULG, 1994a; van Leewen et al., 1994).

Approaches to economic reform are not uniform in the region. Government leaders in Kazakhstan and Kyrgyzstan have favoured a greater degree of structural change. But despite apparent enthusiasm for the market economy among these leaders, and legal reforms in place, implementation has been difficult. There are concerns about unemployment and social disruption, on the one hand, and suspicions among the populace that government officials may grab state assets (such as land) when these are privatised (Çeviköz, 1994). Leaders in Turkmenistan and Uzbekistan have been slower to implement privatisation (EIU, 1995a).

3.1 Reorganisation of agricultural collectives

Kazakhstan

This republic has so far passed through three phases since Independence in 1990.

⁴ In Soviet theory, *kolkhozy* are cooperatives comprising a number of families, which pooled land and equipment and whose members were paid according to work undertaken. Members did not receive an annual salary, but a division of the collective income after costs. This variable monthly portion was often in kind. In *sovkhozy* (state farms), planned and budgeted by the Ministry of Agriculture, every *sovkhovnik* (worker) received a wage, the same amount with a bonus at the end of the year if the income of the operation was sufficient. *Sovkhozy*, according to Humphrey (1983) for the case of former Soviet Buryatiya, having been considered a 'higher' social and economic form than the collective farm (*kolkhoz*), received large subsidies and other advantages over collective farms.

(a) During 1991–92 the Land Reform Law was launched and the land administration system was reorganised. All past grants of land were reissued to transfer rights to landholders, with 99-year inheritable leases for individual farms and small plots and permanent leases for *sovkhozy* and *kolkhozy*. A farm privatisation programme was initiated at the same time. By the end of 1992 some 920 cooperative farms, joint stock companies and small enterprises had been established (World Bank, 1993a).

(b) A second phase of land reform was implemented in early 1993. This included a uniform framework for privatisation and the recognition of rights of individual farm workers to establish private farms, though it did not include legislation to permit individual land ownership. Yet very few farms chose to break up into individual units or to change the managerial and organisational structure of the farm (World Bank, 1993a.). Lack of restructuring was attributed to the fact that while individual land holding was permitted, it was usually not encouraged by the government and little information was available on alternative farm structures. Further, continuation of the state procurement programme and the system of supply contracts between farms and state-owned processing facilities reinforced the former farm structure. At the same time, the economic environment of low commodity prices, limited access to inputs and non-existent marketing channels discouraged independence from the state-run system.

(c) The third phase of land reform and farm restructuring began in 1994 when *sovkhozy* and *kolkhozy* were included in the economy-wide privatisation process and individual private land ownership was to be permitted as part of a privatisation law. However, since the Kazakhstan Constitution prohibits private ownership, any proposed legislation would need a constitutional amendment and would encounter numerous difficulties in gaining acceptance. Thus land rights are granted in the form of presidential decrees rather than in the form of laws, and therefore legally carry less weight.

The state of the privatisation plan is uncertain (e.g. the Cabinet of Ministers resigned in early 1995). There are reports on considerable activity at local level to privatise, due to abolition of the state procurement system which previously assured for producers the sale of their products, albeit at prices well below the world market price and at times at prices below production costs. Reports also suggest that while *sovkhozy* are breaking down into multiple enterprises there is no organised method for dividing financial assets. Social unrest is on the rise because farm workers and administrative staff believe that farm directors are able to negotiate advantageous agreements for themselves (Boye-Lord, 1995) – another facet of what has become known as ‘*nomenklatura* privatisation’.

The Prime Minister promised to accelerate market reforms and in December 1994, challenged the Supreme Soviet by calling on the legislature to approve the private ownership of land. But both Kazakh and Russian communities rejected this, each

fearing the other would gain disproportionate shares of agricultural and grazing lands (OMRI, 1995).

Kyrgyzstan

Land reform was initiated in late 1991 and a programme began to privatise and reorganise some of the 470 or 480 *sovkhozy* and *kolkhozy* then in existence (World Bank, 1993b). The privatisation programme was suspended in 1993, due to unfair practices in distributing assets, unclear rights in land leases, lack of post-privatisation support services, and the inability of the new private farms to reach potential markets due to continued state dominance in marketing and distribution systems.

In early 1994 the government restarted the agricultural privatisation programme. Despite the shift in responsibility for the privatisation programme from the State Property Fund to the Ministry of Agriculture, and provision for the sale and inheritance of land leases and their use as collateral, these decrees require clarification and consistency with other land laws adopted in late 1991. Responsibility for reforms devolved largely to *raion* (district) administrations and rural committees at the *sovkhov*, *kolkhoz* and village level. Reports indicate that private land ownership has been gaining momentum. A unit has been established within the Ministry of Agriculture to administer shareholder meetings that would allow family farms to obtain possession of land.

In Kyrgyzstan it is believed that agriculture is in a better position to lead the way in stabilisation and recovery of GDP than industry and therefore the sector has a particularly important role to play in the transition process (ULG, 1994b). The unclear approach which has characterised the privatisation process in both Kazakhstan and Kyrgyzstan has proved an obstacle to farm restructuring and land reform. Other obstacles include little information on alternative farm structures, continuation of state-run distribution channels, lack of post-privatisation farm training and management, and an absence of legislation on private land ownership (Boye-Lord, 1995).

There is donor and government interest in establishing farmers' associations, defined in one donor document as 'a collection of private farmers, either as individuals or as groups, who are democratically organised for the benefit of supporting each other in a common agricultural purpose and representing that purpose publicly' (ULG, 1994b: 37). In mid-1995 there were three or four such associations, which mostly operated only at *raion* or *oblast*⁵ level and lacked national recognition. However, other types of farmers' associations are being

⁵ Equivalent to district and region (or province).

formed which are working together as a farming unit – that is, for production purposes rather than as lobbying groups. In forming such groups, individual members retain their own land title but pool their resources in order to make better use of them.

Turkmenistan

The situation with regard to privatisation is least clear in Turkmenistan, where very few publications could be obtained. Apparently the general process of privatisation begun after Independence in 1990 has slowed down. No categories of pastureland have been decollectivised (EIU, 1995a). From a production perspective, there are two main types of land in Turkmenistan: pastureland (dry and unable to support crops without irrigation), and irrigated land (1.5 million ha).

A presidential decree of February 1993 allowed farm workers individual leases on their crop land for a minimum of 10 years (80% of leases granted are principally concerned with cotton production). The long run objective, apparently, is for 10–15% of the land to be in private hands. There has, however, been little change to date in the structure and organisation of the 568 large farm units, made up of 147 *sovkhozy*, 372 *kolkhozy* and 49 interfarms (jointly owned by the large farm units and used for fattening livestock). This is partly due to the failure to demonopolise the state firms responsible for the supply of agricultural inputs and for purchasing the crop and livestock outputs.

The President of Turkmenistan had issued a decree in June 1995 that all livestock and pasturelands were to be divided between new farmers' associations, as *kolkhozy* and *sovkhozy*⁶ are now termed. The new associations can be state-owned, cooperative, or take some other acceptable form of ownership but the land must remain state-owned though it can pass to peasant associations on long-term lease (SWB, 1995a). The details of how this was to be achieved were not known at the time of our visit.

3.2 Privatisation of livestock

In Kazakhstan by 1994 some 67% of sheep, the main pastoral animal, were owned by privatised farms (that is, farms in which the state has a less than 50% share) or by private individuals (OECD, 1995). Other information on privatisation of livestock is lacking.

⁶ *Sovkhozy* are under the control of the region (*welayat*) whilst *kolkhozy* are leased by the regions, which have no rights of sale.

In Kyrgyzstan by the end of 1994, some 54% of sheep were no longer state-owned (ULG, 1994d). Horses are enjoying a resurgence of popularity as riding animals and for transport, due to the increasing cost and unavailability of fuel. About 58% of horses are owned by peasant enterprises or private households, while for cattle, 82% are owned privately or by peasant enterprises. Most yaks are still held by the state. However, it is important to note that 'at the *Oblast* level . . . records of livestock population, or production parameters, are not now recorded by government for the private sector' (ULG, 1994d: 3).

The full extent of the impact of privatisation in Kyrgyzstan is not clear; for example, whether privately-owned sheep are more productive and private sheep enterprises are more (or less) economically efficient than state collectives (ULG, 1994d). It is clear, however, that private sheep owners are responding to market factors. Consumers are now able to express their preference, which is for meat of the traditional breeds of fat-tailed sheep. Meat from these breeds has a price premium (AGRER, 1994b). At the same time, profitability of fine-wool production has declined on the international market. Australian wool is of better quality, and the world market price is more than ten times higher than the export price received for Kyrgyz merino wool (Abdurasulov, 1995). The population of fat-tailed sheep is therefore increasing, at the expense of the Soviet-developed fine-fleece merino cross, as private sheep owners seek to augment their holdings of fat-tailed sheep. A further advantage of the fat-tailed sheep is that some strains can lamb and rear lambs in the open. It is likely that soon private owners will be able to sell sheep for export to the Arabian Gulf states and horsemeat to northern Europe (AGRER, 1994b).

In Turkmenistan the term 'reform' seems more acceptable than 'privatisation'. According to some local observers, the process of freeing up the economy through privatisation has come to a halt, and reform is in name only. International observers agree (EIU, 1995a). A presidential decree of 13 May 1994 was intended to transform the economy to a decentralised market economy by creating a non-state sector that would account for 33% of GDP and 44% of all employed by 1996. Until economic stability is achieved, such an objective is considered over-optimistic (in 1994, for instance, it was estimated that privatised enterprise accounted for 7% of GDP).

According to local experts, sheep are being transferred from collectives to shepherds, under an arrangement whereby the first 60% of output goes to the state through the state procurement order. However, the state purchasing price for mutton in June 1995 was 60–70 manats/kg, compared to a private market price of over 250 manat/kg (250 manat was equal to US\$1). Under these artificial market conditions, it was therefore not surprising that, in the words of one donor-agency expert, 'the state shops are empty but the cupboards are full'. It is estimated that about 45% of production is sold directly to consumers (Landell Mills, 1995). One of the effects of this price distortion was the 'disappearance' of between 20–25% of the country's

livestock. According to official sources, the explanation for these missing animals was that they had been devoured by wolves.

In all the states mentioned, a large drop in livestock numbers is said to have occurred over the past few years (e.g. see Table 5). In an important proviso, commenting on the reported reduction in livestock numbers following privatisation, a World Bank document notes that:

It is unclear to what extent the state sector production declines have been compensated by private production, or if the reluctance of state and collective farms to deliver products to state outlets at controlled prices magnified the estimation of declines (World Bank 1993b: 124).

Recent observers report that in all the Central Asian republics, a private marketing system is developing for livestock and their products (van Leeuwen et al., 1994).

Table 5 **Sheep and cow inventories by farm category,**
Kyrgyzstan, 1985–95 ('000 head)

	1986 ^a	1991	1995
Cows^b			
State farms	209	188	91
Private farms ^c	n.a.	0.1	38
Households ^d	219	304	357
Sheep			
State farms	8,765	7,707	1,559
Private farms ^c	n.a.	12	691
Households ^d	1,435	2,253	2,821

Source: ULG (1994c) from Goskomstat (State Statistical Committee).

Notes: ^aNo data for private farms and households given before 1986. ^bIn 1985, the total population of cattle was 1,056,000, of which 423,000 were cows. By 1995, the total population of cattle was given as 919,300 (of which 480,000 were cows). ^c'Private farms' here presumably refers to the new independent farms, sometimes translated as 'peasant farms' or 'farmer (peasant) holdings' set up from the early 1990s. For a detailed discussion of this latter term in the context of Russia, see Channon (1995). ^d'Households' refers to all household plots, both urban and rural, which produce substantial quantities of dairy products and meat (in addition to fruit and vegetables) for sale to the private markets. It is likely that in Central Asia, such plots far outnumber 'private farms' both in absolute terms and in the market share of commodities (Channon, 1995).

Middlemen owning trucks are now operating, buying animals, hides and wool from producers, transporting and selling (sometimes internationally, e.g. to China) at higher prices than those offered by the state organisations. This was observed by us in our visit in mid-1995. One effect of privatisation which has been noted is that, through investment in livestock, some families have begun to accumulate wealth (Popova in van Leeuwen et al., 1994).

One of the negative effects of livestock decollectivisation is the inability of individual families to operate as efficiently, on a smaller scale, as the large collectives under a socialist form of production – or as the large clans in pre-socialist times. Humphrey and Sneath (1995) note that for pastoralists in Inner Mongolia (China) where privatisation has been in effect for several more years, families have been assigned pasturelands, which has reduced their grazing flexibility, while most families cannot afford the level of mechanisation in the former collectives and thus have an increase in their labour requirements. This point has been noted for Kyrgyzstan, where private livestock owners are not grouping together to hire shepherds who can take the animals into the higher mountain pastures during the summer, as was done under the former collective system (ULG, 1994d).

3.3 The fodder squeeze

The dynamics of settled or migratory pastoralism in Central Asia may be viewed as a concertina. Long-range seasonal herding between distinct ecological zones represents the maximum stretch of the concertina, while settlement at a fixed point implies the greatest pressure on land and represents the squeeze of the concertina inwards. Throughout much of the last and present centuries, Central Asian pastoralist land use systems have been stretched or squeezed, according to prevailing political-economic programmes. Similar stresses were experienced in the pastoral systems of Inner Asia and Siberia. In the former Soviet ASSR of Buryatia, 'the settlement of the herds [had] meant that proportionally more fodder had to be produced and fed to the animals than would have been the case if they were moving over the pasture for a greater part of the year' (Humphrey, 1983: 181). Vitebsky (1990) notes the same tensions for Arctic reindeer herders in Siberia.

Pastoralists now are increasingly able to choose where they and their animals want to be along the continuum between full-scale seasonal migration and year-round stall feeding. The reasons why particular types of pastoralists will choose a particular point along this continuum should be of considerable interest to planners and researchers, since the accumulated consequences of these individual choices will have a major impact on the livestock economies of the region.

The degree of dependence on cultivated fodder varies according to the ecology of the grazing zones (Gilmanov, 1995). Thus, in Kazakhstan, expert opinion is that in

3.4 Unstable policy environment

The breakdown of inter-republic trade flows has caused disruption of agricultural production, distribution and processing. At the same time, price decontrols have resulted in terms of trade deterioration with potential repercussions for agricultural output and consumer standards of living. The World Bank studies (1993a and b) conclude that in the short run it may be advisable to exploit comparative advantage within the Commonwealth of Independent States, providing imports can be guaranteed. With a strategy of export development, longer-term trade patterns should be based on comparative advantages in international markets. Policy interventions in production and processing should be fiscal, replacing the formerly central-planned delivery quotas and input allocations. However, during the transition to a market economy, it is important for the republic governments to ensure sufficient food is available for poor groups, which would require government intervention. Clearly, these short-term needs must be balanced against long-run policy objectives, to avoid policy inconsistencies.

Currently, far-reaching economic decisions have to be made in an extremely unstable and volatile economic climate, quite apart from the changing political situation and the concomitant social transformation and dislocation. The upheavals of restructuring together with problems inherited from the former Soviet system have imposed huge debts on each new independent state. The Central Asian states are no exception and are owed large sums of money from Ukraine, Russia and other states of the FSU for natural gas and energy and in turn have run up large debts with Western countries. The burden of debt and the effect of budget deficits act as a real constraint on decision-making. In addition, plans that are underway to create a Central Asian Common Market (CACOM) as well as an Agricultural Free Trade Area within the CIS might also have an impact on economic options. In that case, choice of specialisation might well depend on what would be most beneficial to intra-CACOM and intra-CIS trade rather than the world market. It must be appreciated that the policy-making environment is subject to a number of influences, often at variance with one another, both domestic and external (both CIS and non-CIS). Numerous competing claims are made on relatively limited resources and decisions taken on a particular sector, such as livestock, do not always reflect rational economic (textbook) considerations.

4. Policy and research issues

4.1 Land tenure under decollectivisation

The privatisation of agricultural land is being promoted as an essential component of economic reform (ULG, 1994b: 33; Landell Mills, 1994a; Boye-Lord, 1995). Some EU advisors would like to see the introduction of rotational grazing under fenced conditions on the Australian ranch model, and view unfenced open pasturing as 'traditional' behaviour. However, these advisors feel that few herd owners want to fence now, due to a lack of capital and of confidence that private rights to grazing land are secure.

The advantages of land privatisation in this argument are that individual ownership will encourage on-farm investment and provide collateral for agricultural loans. The development of a land market should also create optimally-sized farm units, facilitate the transfer of land holdings to more efficient operators, and encourage farmers to base their management decisions upon market criteria of enterprise costs and returns. There are also, however, a number of technical considerations which apply particularly to rangelands and urge caution. In Central Asia, periodic localised shortfalls in natural feed supplies are a recurrent problem. Non-exclusive rangeland tenure regimes solve this problem by giving herders access to a variety of distant communal pastures, which facilitates herd movement. When feed is insufficient in one place, livestock are relocated rather than fodder.

If rangeland is subdivided and access to distant pastures is restricted, then livestock must stay where they are and feed must be grown and brought to them. This is the system which developed under collectivisation, with irrigated fodder production and mechanised transport compensating for declines in herd mobility.

Decollectivisation and further subdivision of the rangeland into private holdings would likely *increase* the dependence of individual small livestock owners on cultivated fodder. This would occur, however, when economic liberalisation had inflated the costs of mechanised transport, threatened the availability of cheap fodder, and raised questions about the environmental costs of irrigated fodder (discussed in the following sections). The impact of rangeland subdivision will differ according to the scale of the enterprise. Individuals who, by one means or another, can gain exclusive rights to large areas of rangeland could prosper by incorporating sufficient ecological diversity within one ranch so that livestock can be rotated between pastures on a mobile grazing system. It is rather the small livestock owners who would be disadvantaged by rangeland privatisation, by increasing their vulnerability to input and output markets which have either broken down or are evolving quickly and unpredictably.

Research issues

Current economic theory suggests that there is little to be gained from privatising natural resources that are intrinsically difficult to subdivide, or are of low or erratic productivity. Attempts to manage African rangelands generally confirm this position. In pastoral Africa, by far the most durable systems of property and resource control have been 'customary' tenure systems devised and managed by rural communities in response to changing commercial, political and demographic conditions. Little is yet known of comparable indigenous institutions in pastoral Central Asia, and there exist few theoretical or methodological certainties that can substitute for such knowledge.

Standard cost-benefit analysis is well suited to comparisons in which one or a small number of inputs, production factors or prices are substituted for each other in an economic environment which is otherwise stable. Cost-benefit analysis is ill-equipped to deal with situations in which property rights, production systems and prices co-vary and interact. But it is this latter situation which prevails in Central Asia and must be addressed in practical discussions about public policy (Bromley, 1993). Careful empirical analysis of functioning tenure systems and their evolution over time may provide the most reliable guide to reform.

4.2 Fodder – extensive versus intensive livestock husbandry

Winter fodder supplies – the scarcest resource in the harshest season – are the limiting constraint for Central Asian livestock production. Western donors involved in Central Asia have identified inflated fodder prices and diminished supplies as probable outcomes of agricultural privatisation. Cropping patterns are changing as subsidies are removed and state control of land and input distribution come to an end. These adjustments are likely to cause both a reduction in supply and a drop in demand for fodder as the real costs of production become evident (ULG, 1994a). On the supply side, rising prices for human food grains have induced producers to abandon the cultivation of low value livestock feed crops. Moreover, unless livestock owners receive much higher prices for their products, they cannot afford to use large quantities of expensive, commercially grown fodder.

These changes have ramifying effects which are at present poorly understood, but appear to alter the comparative advantage of different classes of producers. In settled areas, sudden and sharp increases in the cost of fodder have resulted in poor livestock nutrition and declines in production (Medeubekov, 1995). As output falls and incomes from livestock deteriorate, some herd owners find it increasingly difficult to purchase the supplementary feed needed to maintain their animals. Disinvestment then occurs, as animals which are no longer economically viable are slaughtered for home consumption, or sold off.

Other classes of livestock producer could be prospering under the new conditions. The beneficiaries may include herd owners located in open-range areas with year-round access to pastures, owners with supplementary sources of income (from wages or private business) who can afford to invest in their flocks by purchasing winter fodder, and lastly, those individuals who are able to accumulate large flocks that – despite low profit margins per animal – can generate net revenues large enough to sustain the families dependent on them. For these types of flock/herd owners, weathering the storm of fodder price inflation may bring prosperity in the long run, when input and product prices eventually adjust. However, for other types of livestock owners, the future is bleak. These include: those who are located in the colder or higher altitude regions, with no rights of grazing in warmer and lower pastures during winter; those without supplementary income; and those with small flocks who cannot afford to purchase winter fodder. These types of owners may have to abandon livestock-keeping, perhaps only retaining a few animals to provide supplementary food for the family.

The present system of livestock production is viewed by EU/TACIS advisors as biologically and economically inefficient,⁷ although it is readily admitted that livestock statistics are very unreliable and that no recent studies exist on pastoral livestock husbandry. Again, the prevailing prescription is to adopt rotational, *fenced* grazing systems, which it is believed will lead to higher (biological) output.

Care must be taken not to confuse technical efficiency with economic efficiency, or to replace explicit price controls with covert project subsidies for uncompetitive types of production (as, for example, being argued by some local senior scientists (Medeubekov, 1995)). When grass is cheap and cultivated fodder is expensive, the use of purchased fodder for survival or for maintenance feeding may be the most efficient use of this scarce input. The object of such a feeding strategy is not to directly increase output, but to maintain animal numbers through the period of greatest nutritional stress. The productive and reproductive phase of herd expansion then occurs in more favourable seasons, with the largest possible herd, and is sustained by abundant supplies of inexpensive natural forage. Despite relatively modest levels of output per head in these semi-intensive systems, low production costs may support profit margins which are better than those produced by more intensive feeding regimes.

⁷ In Turkmenistan, the EU/TACIS programme of advising the Ministry of Agriculture has not yet considered the extensive livestock sector, on the grounds that it is not very productive (Landell Mills, 1994b), although the great majority of the country's sheep are actually raised by extensive migratory methods in the desert.

Research priorities

That major structural adjustments are occurring in the livestock sector seems certain. How these developments affect local areas or particular classes of producers, or their ultimate effect on levels of output, remains uncertain and requires further research. Unless the cost of fodder is exceptionally low or livestock output prices are unusually high in a particular area, the new conditions would seem to favour large, heavily capitalised range-based units of production, but this needs confirmation.

In the meantime, both local officials and outside advisors will, in all probability, favour intensive systems of livestock husbandry. These systems prevail in advanced industrial countries, are perceived as modern, maximise output per animal, and provide a justification for lucrative contracts to develop infrastructure or supply inputs. State statistical services which ignore new sources of output or do not monitor new channels of trade will further exacerbate the difficulties of effective investment planning. Research on the advantages of extensive versus intensive livestock husbandry may be the best means of alerting planners to these monitoring and investment issues.

4.3 Land use – overgrazing and desertification?

Both national scientists and Western observers agree that pastureland is under pressure and that degradation is occurring in some parts of Central Asia. There is, however, little agreement as to the extent of the problem or its cause.

Some argue that excessive livestock numbers and overgrazing are to blame and that the effects are widespread (Gilmanov, 1995; World Bank, 1993a and b). Most of Kyrgyzstan's 8 million hectares of natural grazing land are degraded, according to some sources; pastures are not well maintained, fodder output is declining and there is significant scope to improve the quantity and quality of roughage produced (World Bank, 1993b). Similarly, EU/TACIS advisors in Kazakhstan generally expressed the belief that the livestock carrying capacity of the republic's pastures had been exceeded prior to the destocking which followed economic reform, and that larger animal populations could only be sustained through intensification. Some, but significantly not all, senior national scientists agree (Abdurasulov, 1995; Medeubekov, 1995). Some regional authorities are equally pessimistic, estimating that up to 60% of the arid areas of Central Asia are subject to desertification caused mainly by overgrazing and the cutting of fuelwood (Babaev and Kharin, 1992; Kurochkina, 1995).⁸

⁸ Desertification here is defined in terms of vegetation degradation (changes in species composition which lower the productive yield for livestock), wind and water

Other analysts point to arable farming as the source of damage, particularly the Soviet policy of increasing livestock and grain output through cultivation of marginal land subject to wind erosion (Asanov et al., 1992; Maul et al., 1993; Rozanov, 1990), and the removal of crop residues for livestock feeds, a practice which has reduced soil organic matter by an estimated 28% in the last quarter of a century (Maul et al., 1993).

Finally, a number of senior range experts in Central Asia have argued that the degradation of pasturelands in Kazakhstan is 'not so much because of saturation in numbers of animals and increase in the loading [stocking rate] per unit of area of pastureland as because of unsystematic grazing' (Alimaev et al., 1986: 14). 'Unsystematic grazing' refers here to the early and continuous use of pastures so that the vegetation has no opportunity to grow and re-seed, as a result of policies to reduce livestock mobility by concentrating animals and herders around water points and within settlements. By confining livestock within the 'fixed boundaries' prescribed under the Soviet collective system of farming, vegetation zones which had been used once or twice a year, were subjected to grazing three out of four seasons, or year-round, to the detriment of both the soils and vegetation (Asanov and Alimaev, 1990: 38).

Much the same argument has been advanced for Kyrgyzstan:

The key issue facing . . . communal grazing is the geographical and temporal distribution of grazing livestock on available pastures, rather than the total number . . . and aggregate grazing pressure (ULG, 1994a: 8).

Soil erosion poses a threat in some steep valley areas due to livestock concentrations around settlements. In these valleys over-use of nearby pastures is a result of the shortage and high cost of supplementary animal feeds following decollectivisation, and the under-use of distant upland pastures due to the costs of access (ULG, 1994a) or because herders are thought to be reluctant to leave the amenities of village life – schools, health posts, televisions etc.

Research priorities

The global significance of Central Asian rangelands is widely appreciated, as is the responsibility of both the international community and national governments in their management:

erosion, salinisation of soil (particularly as a result of poorly-managed irrigation) and causes which are technical, e.g. by mineral exploration or construction (Babaev and Kharin, 1992).

It is the responsibility of the Newly Independent States to provide the socio-economic and political conditions necessary for preservation, sustainable use and improvement of rangeland resources. Taking into account the global significance of the rangelands of the FSU as [a] biospheric carbon reservoir and biodiversity resource (in addition to their prime role as livestock production resource) . . . international cooperation and assistance in rangeland studies, management and conservation are highly desirable (Gilmanov, 1995: no page number).

Despite these concerns, important questions about the extent and causes of degradation remain unanswered. Either singly or in combination, arable farming, nomadic settlement and the sheer weight of livestock numbers have all been implicated by various regional and international authorities as agents of localised and/or generalised degradation. No single, authoritative interpretation prevails.

Rangeland degradation and desertification were topics of vital concern to Soviet science in Central Asia, as they are to the donor community today. This general review cannot undertake a detailed reappraisal of Soviet rangeland research in terms of current ecological theory. But it is clear that Soviet environmental science was strictly compartmentalised along disciplinary lines, such that it covered most of the subject matter but employed few of the integrative analytical methods of modern ecology. An assessment of the empirical legacy of this research would be a major undertaking. Despite the difficulties of bridging both theoretical differences and historical changes, such a review would provide the most reliable estimate of the probable environmental impact of current economic changes. It is also a project that Central Asian and Western scientists could undertake with mutual respect to comparative advantage.

4.4 Nomadism versus settlement

In Central Asia, nomadic pastoralism evokes powerful emotional responses. Early Soviet planners viewed nomadism as primitive and sought to civilise the Central Asia nomads through settlement (Bacon, 1966; Channon and Channon, 1990). These experiments killed many people and livestock, but laid the foundations for collectivised Soviet agriculture. More recently, the collapse of Soviet rule has fostered the rediscovery in Central and Inner Asia of national heroes representing a romanticised tribal and nomadic past. A potential return to migratory pastoralism is viewed very negatively by some EU/TACIS advisors, with statements such as 'We can't allow them to go back to the old [pre-Soviet] system . . . when only the fittest survive and there's no growth in flocks . . . it's not compatible to be traditional and have modern [social] facilities'. It is crucial, however, to distinguish between migratory livestock husbandry as a production system adapted to certain environmental conditions, and as a cultural ideal.

In fact, mobility need not imply a loss of contact with urban culture. Historically, many pastoral peoples in Asia, Africa and the Middle East maintained strong economic and social ties to cities (Khazanov, 1984); integration with urban life is still essential for some mobile Inner Asian pastoral systems (Humphrey and Zhimbiyev in Humphrey and Sneath, 1995); the provision of modern services for nomadic populations is not technically impossible (Sandford, 1978) and herd mobility need not imply household mobility, especially when herds produce for markets and households purchase their necessities.

Migratory livestock-keeping is a response to a particular set of environments, each of which reaches peak carrying capacity in a different time period. Mobile herds can then move from zone to zone, region to region, avoiding resource-scarce periods and exploiting optimal periods in each area they use. In Central Asia the clear-cut seasonal changes of the temperate zone led to regular seasonal and 'meridional' (cross-latitude) migrations (Alimaev et al., 1986). In summer, water was the main priority and in winter, fodder (Khazanov, 1984). Distances varied: for Kazakhs, seasonal migrations could be up to 1,500 km across the desert-steppe-mountain ecological zones, and in the high mountains, Kyrgyz vertical pastoral migrations varied from a few dozen kilometres up to 200 km (Schillhorn van Veen, 1995).

These movements permitted mobile livestock producers to maintain, within a wide geographic region, a total livestock population and levels of productivity in excess of that which could be sustained by several separate herds confined to their individual areas (Behnke and Scoones, 1993). This 'in the language of modern specialists . . . [is] the basic law for the rational use of pastureland' (Alimaev et al., 1986). Pastures are used from the onset of maturity up to the time of their greatest productivity, and then abandoned before excessive damage is caused by either trampling or grazing. This type of usage requires mobility, and some Central Asian scientists are therefore arguing for a return to the large-scale rotational use of seasonal pastures, in a form of industrial nomadism which employs modern organisational techniques and inputs (Asanov and Alimaev, 1990).

The economic and environmental advantages of mobility have recently been well-documented in a series of detailed case studies of Inner Asian pastoralism undergoing change (Humphrey and Sneath, 1995). Based on comparative research in Mongolia, Inner Mongolia (China), Xinjiang, Tuva and Buryatia, the 'findings challenge the idea that sustainable pastoralism in Inner Asian steppe regions can be achieved without retaining pastoral mobility' (Humphrey and Sneath, 1995: 3). The same has been argued for the case of Arctic reindeer pastoralists formerly within the Soviet Union (Vitebsky, 1990).

Research issues

Research on land tenure, fodder utilisation and the environmental impacts of grazing would address the technical underpinnings of industrial nomadism. What remain are institutional questions regarding the organisation of pastoral communities vis-à-vis local government, in order to facilitate service delivery to dispersed pastoral households. Central Asian governments have considerable prior experience in service delivery to semi-nomadic and scattered populations (van Leeuwen, 1994), but rural settlement patterns, government funding levels and local community organisation are all changing. Recently NGOs, major multilateral and bilateral donors have pioneered methods for servicing pastoralists in Africa (Scoones, 1994). Discussions of service delivery for Central Asian pastoralists could fruitfully begin with a comparison of these very different sets of experiences.

5. Proposed research seminar

As a recent study concluded:

Researchers know little of modern private livestock farming. During the Soviet period . . . anthropologists did not explore this subject at all, since few private farms existed . . . Private animal husbandry in Central Asia [now] has a crucial influence on the process of economic and social change in the Central Asian republics. It has therefore become a subject which really needs scientific attention from the republican governments, animal husbandry specialists and others involved (Popova in van Leeuwen et al., 1994: 80).

It is apparent that some key issues have not yet been closely studied, while there is demand among policy-makers and international donors for guidance and information on these issues. An opportunity exists for policy-oriented research, in collaboration with local scientists who are experiencing reductions in research funding from the newly independent governments and are, at the same time, trying to identify a new role for themselves. Local scientists expressed a keen interest in developing joint research programmes with Western-based range and livestock research institutes.

Some of the key issues identified can be summarised as follows:

- Development of land markets under market conditions for livestock. Will some livestock owners (which?) try to gain control of the best pastures – either through legal or extra-legal means? How should best pastures be valued? What should be the role of legislation in allocating control over pastureland to individuals and groups?
- The concertina squeeze and stretch – subsidised fodder allows the migratory cycle to contract; market price for fodder pulls out the concertina. How will pastoralists adapt their grazing systems under market conditions?
- What is the future role of winter fodder? How will new market input costs be translated into product prices and consumer demand (national and international) for livestock products. Will meat become a luxury consumer item? What should be the role of government in setting prices and subsidies?

It is proposed to set up a programme of multi-disciplinary field work under the joint supervision of a local research institute in each country through ODI. Junior and senior researchers would undertake field work in Central Asia for several months at a time, in collaboration with local colleagues from the institutes, on the main themes of the research. The research would be policy-oriented, along the lines

followed by the Institute for Development Studies, University of Sussex, programme *Policy Alternatives for Livestock Development in Mongolia* under the direction of Dr Jeremy Swift (PALD, 1993).

The first step in planning this collaborative programme is to bring together those interested in participating. This will be done in London at ODI by inviting Central Asian scientists to meet with us and with researchers from Britain and the USA who have relevant backgrounds and interests. The purpose of the seminar would be to define the content of the joint research programme, specify the participants and agree on timing, field sites, reporting and other details. The results of the seminar would be the basis for a full-scale research proposal for funding.

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7. Bibliography of works in Russian

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Key words and phrases, English–Russian.

Livestock

livestock rearing	zhivotnovodstvo
animals	zhivotnye
large livestock/long horned cattle	krupnyi rogatyi skot
cattle	skot
cow	korova
cattle breeding	skotovodstvo
small livestock	melkii rogatyi skot
sheep	ovets
ewe	matka
ram	baran
goat	kozel
sheep breeding	ovtsevodstvo
fine-fleeced strain	tonko-runnaya poroda (Kyrgyz)
karakul (breeding)	karakul (karakulevodstvo)
camel	verblyud
camel breeding	verblyudovodstvo
horse	loshad'
yak	yak

Pasture

pasture	pastbishche
free pasture	volnyi vypas

⁹ In Moscow in June 1995, John Channon consulted the following specialists: Dr S. Nikol'skii, agricultural specialist and former Minister of Agriculture in Crimea, now Agricultural Division, Institute of Humanities and Economics; Dr E. Serova, Head of Agrarian Section, Institute for the Economy in Transition, Moscow, and senior adviser to government on agriculture and chief assistant on agricultural reform, Gaidar's Institute; Prof. Ikonnitskaya, senior specialist drafting new land law, Institute of State and Law.

pasture/common	vygon
pasture/range management	organizatsiya pastbishchnogo khozyaistva
pasture plant	pastbishchnoe (kormovoe) rastenie
meadow-pasture economy	lugopastbishchnoe khozyaistvo
summer pasture	dzhailoo
winter pasture	kstao/zimovka
forage/fodder	korm
fodder base	kormovaya baza
desert	pustynya
desertification	opustynivanie
arid zones	aridnye zony
ecology	ekologiya
<i>Economy</i>	
prices	tseny
market	rynok
economy	ekonomika; khozyaistvo
market economy	rynochnaya ekonomiya
market system	rynochnaya sistema
government policy	pravitel'stvennaya politika; gosudarstvennaya
politika	
outputs	produkty; produktsiya
private farmer	chastnyi (samostoyatel'nyi) fermer
expenditures	izderzhki
state quotas/orders	zakupki
subsidy	dotatsiya; subsidiya posobie
(government) support	podderzhki
<i>History</i>	
nomad(s)	kochevnik(i)
nomadic community of Kazakhs	kochevoe obshchestvo Kazakhov
Kazakh nomadic-pasture community	Kazakhskaya pastbishchno-kochevaya obshchina

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8. Abstracts in English of selected works in Russian by Susanne Channon

Arranged in alphabetical order, by first author's name, or first Russian word of title.

The Present State of and Prospects for the Development of Livestock Husbandry in Kyrgyzstan (Sovremennoe sostoyanie i perspektivny razvitiya zhivotnovodstva Kyrgyzstana) by Y.A. Abdurasulov, plenary session paper for an International Conference on Ways of Intensifying the Livestock Industry in a Market Economy, Bishkek (Frunze), 1995.

Key words: Kyrgyzstan; animal husbandry

Kyrgyzstan is an agrarian country with developed livestock husbandry methods. Its dominant position in livestock husbandry depends on a large quantity of natural mountain pastures (87% of total area) in the Republic, and on a unique centuries-old tradition amongst the people. In the current century this tradition has several times undergone significant changes and is now on the threshold of huge further changes.

Up to the 1930s an extensive system of native animal husbandry persisted in Kyrgyzstan. Between 1930 and 1960, the development of pedigree animals took place, using local native breeds and cultivated strains, which created the following: two strains of large cattle (the Ala-Too and the Aueliatin); three strains of sheep (Kyrgyz fine-fleece, Tyan-Shian semi-fine fleeced and Alaisk semi-coarse wool); one strain of horse (Novo Kyrgyz); and two strains of goat (Kyrgyz downy and woolly) which were relatively highly productive and well-adapted to extreme mountain conditions.

During 1960–90 the number of genetically-valuable and productive animals in the Republic increased and improved steadily, reaching its apogee in 1985–90. At that period, there were 10.2 million sheep with an average shearing of 3.2 kg wool; 1.2 million large cattle giving an average yield of 3,200 kg milk per year; 0.3 million horses; and 0.4 million goats. Those years, as opposed to previous and following periods, can be considered the golden age of animal husbandry in Kyrgyzstan, based on public or communal ownership.

In the most recent period, 1990–95, the initial stage of transition to the market is characterised by fundamental changes in livestock husbandry in Kyrgyzstan. The number of animals has declined, productivity is falling, feeding and maintenance conditions are worsening as is the quality of products, the rate of breeding selection

work is falling and many technological processes have been breached, as have economic links and traditional state channels for the sale of products. All these factors are conditioned by the transition from state (public) forms of ownership to private. Seemingly alarming at first glance, these processes actually have a beneficial and normalising effect. The principle of a planned number of animals on former *kolkhozy* and *sovkhozy* no longer applies, but neither have there been negative consequences. Under market conditions the major criterion defining the number of livestock per farmer is supply and demand. The current reduction in the number of animals can be considered the first effect of the market mechanism. This is in accordance with the strategy for optimising the number of animals in the Republic. Misgivings that this will undermine the foundation of the Republic and its people are completely unfounded.

The following numbers of animals, with minor fluctuations, are suggested as optimum: 6–8 million sheep, 0.8–1.0 million large-horned cattle, 0.6–0.7 million horses, 0.4–0.5 million pigs, 3.5–4.0 million birds (poultry).

Another no less important aspect, which is also a moot-point, is breed-zoning. In the past, the breeding of strains in a particular region was regulated by state bodies. Under market conditions, this principle is totally inapplicable since the prerogative lies with the private farmer who, when carrying out profitable production under competition, must react to supply and demand. Essential correctives must be introduced, notwithstanding the disappearance of certain breeds which currently exist and the creation of completely new ones.

Cattle breeding entails the development of new, highly productive specialised milk and meat strains to increase the volume of milk and beef production significantly. This is required, firstly, because of constant consumer demand for milk and meat products; secondly, because of a respectable level of sales of these products in neighbouring Central Asian states and China; thirdly, because of the increase of tourism and business in the country (which increases demand); and fourthly, to improve the ecological soundness of industrial production.

In sheep breeding a trend towards the fine-fleeced variety has prevailed. Demand for merino wool on the world market over recent years has risen steadily. Research has established that despite myriad artificial fibres with all their favourable attributes (such as ease of washing), there is still a demand for items made from pure natural wool. The wool of the Kyrgyz fine-fleeced sheep takes fifth place behind the renowned world leaders: Australia, New Zealand, Argentina and the Republic of South Africa. For the young Republic of Kyrgyzstan this is undoubtedly a high rank. Currently fine-fleeced sheep production suffers from a lack of marketing and low pricing compared with world prices for wool. In 1994 the average price on the world market for 1 kg merino wool was US\$5.30; at that time Kyrgyz wool was being bought for \$0.30 to \$0.40. As a consequence, and after specialist studies of the problem by Australia, the USA and the World Bank,

US\$37 million has been allotted to Kyrgyzstan to assist in developing the sheep industry.

There is a need to increase milk and meat production through sheep-breeding. Mutton is not a viable commodity because it cannot compete with poultry or the specialist lamb producers of New Zealand, Europe and South America. Therefore it is necessary to concentrate on milk products from sheep breeding – sheep's milk cheese (*bryuzy*) is considered a delicacy throughout the world and is a product of high quality.

Creating a market infrastructure is a major problem: the old system has not broken down completely and a new one has not been created. All types of farmers need to be re-educated, and the entire infrastructure needs developing. Also various controls (e.g. inspections, monitoring) are required from an ecological point of view – for the population's safety, the monitoring of pasture, the control of sick animals etc.

Methods are needed to safeguard productivity, to concentrate on marketing and improving technology and the genetic value of animals. A legislative basis needs to be established for livestock in accordance with international standards and laws. There is a need to protect farmers and their families working in difficult mountain conditions, and to protect them from sharp price fluctuations in both internal and external markets. There is a need to concentrate on processing, packaging, preserving and transporting products, and to create the appropriate conditions for exports.

Nor is scientific management easy – agrarian institutions are all short of money, the most talented workers have been lost to the most prestigious organisations, and there is a weak material technical base, low wages and a lack of social protection.

Under land and agrarian reforms, all *kolkhozy* and *sovkhozy* will be reorganised into private farms and they will have to learn a different life to that under the system of state organisation. Various experimental stations (centres for the scientific management of animal husbandry) will be created with the Republic's land fund. Management, marketing, testing and certification, ecology and the preservation of the environment, biotechnology, making stock-inventories, conservation and the rational use of the genetic resources of agricultural animals and occupational safety at work will all have priority status.

Overall, animal husbandry in Kyrgyzstan is at a crucial stage – the economy of the Republic and the welfare of the people are dependent on effective reform of the livestock sector.



Ala-Tau Cattle of Kyrgyzstan (Alatauskii skot Kyrgyzstana) by M. Akynbaev, journal article in *Molochnoe i myasnoe skotovodstvo* (Dairy and Meat Livestock Husbandry), part 3: 3–5, 1992.

Key words: cattle-breeding; Kyrgyzstan; milk yields

There are two types of cattle in Kyrgyzstan: Ala-Tau and Aulieatinsk. The former is the most widespread in all *raiony* and *oblast* with the exception of Talassk. In 1990 there were 798,000 Ala-Tau cattle in the USSR, of which 400,000 were in Kyrgyzstan. This breed was developed in 1950 in Kyrgyzstan and in a few *raiony* in Kazakhstan by crossing Kyrgyz cattle with bulls of the Shvitsk and Kostromsk breeds and by pedigree work with hybrids. Specific features of the breed are: solid constitution, strong skeleton, well-developed muscular system and compact frame, extremely important for surviving in hilly and hilly-steppe conditions.

Milk indicators are satisfactory. Improved breeding and veterinary practices in past years have led to a significant increase in the milk yield. In *kolkhozy* and *sovkhozy* in 1970 the yield per forage cow was 2,123 kg and by 1990 it had risen to 3,072 kg (regional variations revealed specialist farms with milk yields per cow ranging from 3,277 to 4,322 kg). Some individual farms achieved even better results with yields in 1991 ranging from 4,815 kg to 5,340 kg. High-productivity strains have been created within the Ala-Tau breed. This breed not only demonstrates high milk yields but also good meat quality. One of the particular features of the cattle is that such rich forage conditions result in cows with a good growth and weight rate. At the present time work is continuing in Kyrgyzstan to develop a highly productive milk strain of cattle with adult cows yielding 5–6,000 kg of milk per year with a fat content of 3.9–4.1%.



Improving the Utilisation Technology of Kazakhstan Grasslands (Sovershenstvovanie tekhnologii ispol'zovaniya aridnykh pastbishch Kazakhstan) by K.A. Asanov and I.I. Alimaev, journal article in *Vestnik sel'skokhozyaistvennoi nauki Moskva* (Bulletin of Agricultural Science in Moscow), part 8: 13–19, 1991.

Key words: pasture; regulated pasture; Kazakhstan

It has been established that the present practice of pasture-utilisation in deserts and semi-deserts has a negative influence on soil fertility. As a result, over the past twenty years there has been a considerable deterioration of the moisture and physical properties of the soil, while the humus content has decreased on average by 48%. It is noted that regulated pasturing stabilises the humus content and has some evident advantages compared with free pasturing. The possibility for self-rehabilitation of the pastures has been shown, rendering unnecessary the resowing

of the fields in pasture rotation in the light sand soils which dominate the arid regions of Kazakhstan.



The Pasture Economy of Kazakhstan (Pastbishchnoe khozyaistvo Kazakhstana) by K.A. Asanov, B.P. Shakh, I.I. Alimaev and S.N. Pryanishnikov. Alma-Ata: Gylym, 1992. 423 pp.

Key words: Pastures; pasture plants; Kazakhstan; livestock-husbandry

More than 180 million hectares of Kazakhstan (some 70% of the entire territory) is occupied by pastures which condition the traditional types of livestock husbandry specific to the area. Sheep breeding, camel breeding, meat-cattle breeding and stud-horse breeding are based on the use of pasture forage, the latter accounting for more than 50% of the annual feed intake around the Republic. The Republic's pastures also define its ecology although past decades have seen an acute deterioration in their condition. Restoring and maintaining the productivity of these pastures now and in the future is impossible without a sound understanding of the ways in which they are influenced by people and agricultural animals.

Individual topics covered include: the pasture economy of the Republic; basic types of pastures and their characteristics; pasture administration; natural pasture zones; the superficial improvement of natural pastures; plants of natural and sown pastures; the bioecological bases of the use of pastures; demand linked to the quality of pasture forage; pasture yields and methods of defining them; the creation of sown pastures and hay fields; seed introduction and seeding; and the experience of pasture economy in Australia.

This book is the first teaching aid in Kazakhstan for training specialists in pasture economy. It is intended for students of agronomic, zootechnical and hydro-melioration in higher educational establishments and for specialists in the Republic's agricultural production.



Issues in the Development and Transformation of Deserts in the USSR (Aktual'nye voprosy osvoeniya i preobrazovaniya pustyn' SSSR) by A.G. Babaev, (ed.). Ashkhabad: Ylym (Academy of Sciences, Turkmen SSR), 1981. 238 pp.

Key words: deserts; Central Asia and Kazakhstan; ecology; arid zones

The work is a Festschrift for M.P. Petrov in which his colleagues and students continue the study of his ideas and methods in relation to the changes in arid zones of the USSR. It examines such issues as the ecological system of deserts of Central Asia and Kazakhstan as the basis of rational use, reproduction and preservation of

biosphere resources, unresolved issues in the struggle with desertification, and the dynamics of sand relief.

The book describes ecological types of desert in Central Asia and Kazakhstan and discusses prospects for their development; the geography and development of sandy deserts; unresolved problems of sand relief in deserts; natural regionalisation of south-east Karakum; the relief of deserts and the struggle with advancing/moving sands; the history of desert landscape study; space photographs for the geomorphological mapping of Turkmenistan; landscape maps for local extrapolation; large canals of Central Asia and the struggle with desertification; arid soils of Soviet Asian plains; the influence of conservation policy on the restoration and preservation of high-yielding pastures of the Karakum; the biological productivity of arid zones vegetation and its future use; the ecology of sand-hardy plants of Karakum; the history of the geographical study and development of the deserts of the USSR.



The Economy of the Kazakhs at the End of the 19th and Beginning of the 20th Centuries (Khozyaistvo kazakhov na rubezhe XIX–XX vekov) by G.F. Dakhshleiger (ed.). Alma-Ata: Izdatel'stvo 'Nauka' Kazakhskoi SSR, 1980. 256 pp.

Key words: Kazakhs; economy; nomadic; pasture

The book gives a short historical description of the economy of the Kazakhs from ancient times to the end of the 19th century and beginning of the 20th centuries. A detailed characterisation of livestock breeding and land cultivation is provided, on the basis of ethnographical and statistical materials. Typological tables and maps containing information about implements used in Kazakh agriculture are also included, as are sections on cultivation, types of cattle, seasonal pastures (the pasture area being divided by season: winter (*kstau*), spring (*kokteu*), autumn (*kuzeu*), and summer (*zhailyau*)), types of watering places, the direction of nomadic routes, the means of threshing and transportation of the harvest.



Problems in the Development of Camel Husbandry in Kazakhstan (Problemy razvitiya verblyudovodstva v Kazakhstane) by T.D. Dzhakupov and A.O. Abdrakhimov, journal article in *Zhivotnovodstvo* (Livestock Husbandry) part 6: 14–16, 1986.

Key words: camel-husbandry; Kazakhstan

A speedy solution to the Republic's food programme is to be based on rapid development of all branches of livestock husbandry, including camel breeding. With regard to the latter, Kazakhstan occupies the leading position in the USSR.

More than 50% of all camels in the Republic annually produce more than 65% of camel meat, a considerable proportion of wool and also milk.

On average there are 170 camels per holding, though a significant number are concentrated in three specialist *sovkhozy*: two in Mangyshlaks *oblast* and one in Alma-Atinsk *oblast* (each with between 4–6,000 head). There are large specialised cost-accounting (*khozrashchet*) camel breeding *sovkhozy* with 1,000 or more animals (e.g. in the *oblasts* of Kzyl-Ordinsk, Dzhambulsk, Chimkenst and Gur'evsk). Nevertheless, almost half the households have no more than 50 camels, another group from 60–100 and only 9 possess more than 1,000 camels. This illustrates the dispersion around households where camel breeding occupies only a secondary activity. Experience over many years shows that the optimal size for a camel-milk farm is 1,500–2,000 camels and for camel meat 2,500–3,000. It is generally well known that a deepening of specialisation increases the level of concentration of production. Mechanisation of labour is also extremely important for intensification of camel breeding. The productivity of camels, measured in wool per animal, depends on breed, size, maintenance, though data are provided on all milk, meat and wool.

In *oblasts* such as Mangyshlaks with large areas of desert and semi-desert pasture, dual-purpose camel breeding (i.e. for milk and wool) is especially well developed. However, while pasture in these zones is advantageous for camel breeding, there is a lack of water and other resources. In the Republic as a whole, the output of camel meat fell in the 11th Five-Year Plan and at the time of writing (1989) camel breeding in Kazakhstan remains one of the most backward branches of livestock husbandry. Small farms make the introduction of complex mechanisation and new technology more difficult, while demand for camel products remains unsatisfied. In future, effective exploitation of the huge area of pasture in desert and semi-desert zones must be based on deepening specialisation and optimal concentration of production, more rational use of natural forage areas, all with minimal expenditure of labour and other resources. Compared to other branches of livestock husbandry, capital investment per unit is lower. An optimal level of development for camel breeding has been worked out by specialists in the Institute.



Experience and Problems of Economic Reform of the Agro-industrial Complex in Kazakhstan (Opyt i problemy ekonomicheskikh reform v agropromyshlennom komplekse Kazakhstana) by G. Kaliev and A. Satybaldin, in *Mezhdunarodnyi sel'skokhozyaistvennyi zhurnal* (International Agricultural Journal) 3-5: 24-28, 1993.

Key words: Kazakhstan; agricultural reforms; private farms; market economy; prices

Agriculture is the most important sector of Kazakhstan's economy, contributing more than a third of GNP and employing 40% of the workforce. Recent years have witnessed profound socioeconomic changes with the development of various forms of ownership and production. The key link in the transition of the agricultural sector to market relations is in land reform. A legislative base is already in place whereby a variety of forms of ownership and types of enterprise may be chosen.

Reform of collective and state farms (*kolkhozy* and *sovkhozy*) have led to the creation of associations of agricultural producers, joint stock companies, independent (private) farms and cooperatives. Yet the process has been far from smooth and difficulties have been experienced. The majority of *kolkhozy* and *sovkhozy* are not able to adapt to the market without fundamental structural and ownership reforms. Although 1992 witnessed increased harvests of grain, fodder crops, potatoes and vegetables, enabling these products to be traded at prices affordable to consumers, in animal husbandry the volume of production and the sale of products significantly decreased. The output of meat on all categories of farms in 1992 fell by 18%, that of milk by 16%, eggs by 13% and wool by 11% while the number of cattle and poultry has been declining. As a result of the sharp fall in supplies of livestock products on account of state purchases, the output of meat by processing enterprises fell by 41%, sausage products by 38%, whole milk products and animal oil by 32%. Consumer demand for important food products could not be satisfied. Farms in 1992 saw no benefit in producing meat, milk and other products.

Three major problems face the agricultural sector. The dissolution of the USSR led to a breakdown in the centralised supply system, while the market has been developing only gradually. Freeing the market from the former system of command management has proved difficult and new market forms have been slow to emerge. The third problem is destabilisation of the financial system. In the initial phase of transition (up to 1995) direct regulation of prices for agricultural products is to be rejected, being limited to indirect regulation, through for example, taxes and credits. The principle approaches to de-nationalisation and privatisation in 1993-95 are set out in the National Programme of the Cabinet of Ministers and President Nazarbaev.



Kazakhstan: The Market in the Agricultural Sector (Kazakhstan: rynek v APK) by G.A. Kaliev, A.A. Satybaldin and S.T. Tursunov. Almaty: Kainar, 1994. 319 pp.

Key words: Kazakhstan; market reforms; agricultural restructuring; property privatisation

The authors consider how present conditions stimulate the renaissance of peasant owners who had become, during the Soviet era, apathetic wage-labourers. This is examined in terms of the theory and practice of agricultural reform which was carried out in pre-revolutionary Russia, the USSR, and the developed nations of the world. The authors advance their conception of how economic reform in Kazakhstan's agricultural sector should be implemented. Reforms should include land reform, changes in ownership relations, state regulation of the agricultural market, labour relations and administrative systems of production. The stimulus of the market is to be used as a basis for creating motivation, and increasing labour productivity. Agricultural reforms must address: the demand for food, the creation of a market for agricultural products, market infrastructure, the development of land relations, price and financial policy, education and supply of personnel.

Also considered are: the problems of economic restructuring in *kolkhozy* and *sovkhozy* in the transition to market relations; the methods and principles for the privatisation of property in agricultural enterprises; problems in the development of private (peasant) farms; and the economic mechanisms by which enterprises under different forms of ownership operate. A brief glossary of economic terms and references is included.



Pastures in Uzbekistan (Pastbishcha Uzbekistana) by A. Kayumov, in *Sel'skokhozyaistvo Uzbekistana* (Uzbekistan Agriculture) 2: 50–51, 1977.

Key words: pastures; Uzbekistan; fodder

The last inventory (1 November 1974) showed that some 29,593,100 hectares were suitable for use as pasture out of a total area of 44,884,400 ha. This area can be divided into several characteristic zones by altitude and by types of fodder (*korm*). The most important zone is plains, occupying 83.1% of the Republic's area which is suitable for sheep grazing and characterised by five types of natural pasture (shrub and semi-shrub, saline, foothill, mountainous, alpine) with differential yields. Data revealed that 90% of pasture, though notable for its poorer yield, is suitable for karakul sheep.

Special measures for pasture amelioration have been undertaken by the Ministry of Agriculture with certain plots on specific farms being annually designated for such improvement. In 1964–73 such plots, covering a total 249,250 ha, were apportioned

on 22 *kolkhozy* and 60 *sovkhozy*. Yet research revealed that pasture improvement was not realised. In 1973 sowing of wild-growing fodder grasses covered only 76,786 ha on 44 *sovkhozy*. Various problems need to be resolved in order to ensure the steady melioration of pastures, taking account of such factors as precipitation levels, sowing the correct seed for the appropriate conditions and methods of soil improvement.



The Present State of and Prospects for the Development of Sheep-breeding in Kazakhstan (Sovremennoe sostoyanie i perspektivy razvitiya ovtsevodstva Kazakhstana) by K.U. Medeubekov, paper in plenary session of an International Conference on Ways of Intensifying the Livestock Industry in a Market Economy, Bishkek (Frunze), 1995.

Key words: Kazakhstan; sheep-breeding; intensive

On 1 January 1995 there were 17,380,000 sheep in Kazakhstan comprising 8,199,000 fine-fleeced (47%), 1,559,000 semi-fine fleeced (9%) 3,984,000 meat-tallow (23%) and 3,638,000 karakul (21%). There were also 1.2 million horses and 145,100 camels.

The breeding of sheep, horses and camels in Kazakhstan has enormous potential both in currency terms (export of wool, horse meat, leather and fur articles, milk products etc.) as well as in realising the food-producing programme. Not only do livestock supply indispensable scarce raw materials for food, textiles, fur and leather industries, but also provide important dietary supplements, particularly food products for children. The development of these branches of livestock breeding is conditioned by natural climatic conditions and centuries-old traditions.

Unfortunately, the development of sheep, horse, camel and goat breeding over the last 10 years has been characterised by a lack of growth in productivity. The main reason for this lack of satisfactory development is the slump in production, and the failure to resolve the problems of creating a stable fodder base. The Institute's research shows that insufficient fodder leads to a significant loss in the potential capacity for meat and wool production. This has a knock-on effect for the textile industry (i.e. wool and raw materials) because the feeding of sheep falls below the recommended norm, resulting in wool which is substandard and which ends up being used in inferior products, unsuitable for the world market.

A further influence on the state of sheep, horse and camel breeding is work on selective breeding, which has been deteriorating every year. Even such a powerful technique as artificial insemination of sheep is not fully used. In meat-tallow sheep breeding, for instance, this method is used by 50–60% of farms. None of the breeding or stud farms are fulfilling their functions, and the shearing of wool

should be 1½ to 2 times higher than in farms geared towards the market (*tovarnye khozyaistva*).

Thus, the Kazakh Cabinet passed a resolution (No. 246) on 13 March 1995 'On state support for specialised sheep breeding farms', which devised measures for supporting livestock production, and which included subsidies for wool. It was intended to raise the quality of wool produced and to raise significantly the quota of more valuable wool types – merino, crossbred and semi-coarse wool for carpets. This will be possible by utilising genetic stocks of the best native and foreign breeds and by organising nutritional feeding of sheep according to recommended norms.

Production of mutton should meet the demands of the market economy. Previously in Kazakhstan the most widespread and cheapest way of producing mutton was by fattening sheep; by strictly organising the rearing and feeding of lambs, young animals and adult livestock on balanced rations, the output of mutton can increase (to 30–32 kg), as can that of lamb, mutton and sheepskin.

The processing of wool is also an important issue. It is necessary to create special wool processing industries – at the moment only one-quarter of all wool produced is processed domestically – by building new technological enterprises. To control wool quality it is necessary to create a scientific research (technological) institute to examine processing, technological conditions and their standardisation, certification and rational use in the internal market. This will facilitate exports on an international level. There is a need to organise separation and processing of wool fat (lanolin) as a secondary product which is also important for the cosmetic industry.

Another section covers tanning (e.g. sheepskin coats). In Kazakhstan more than 14 million sheep and goat skins are processed annually, but the increase in raw material does not correspond to an improvement in quality. Sheep are marketed in poor condition, there are breaches in the technological method for the removal of hide and these, together with other factors, means that only 30% of skins are satisfactory.

Milk products could be increased by organising the milking of sheep into shepherd teams or brigades, which would make it possible to obtain 10 to 20 litres of milk with a fat content of 6–7%. From this quantity it is possible to obtain 7 kg of *brynza* (sheep's milk cheese) and 5 kg of high quality cheese per ewe. This would necessitate mobilising travelling cheese-processing mini-factories.

After a definition is provided of extensive and intensive livestock development, it is argued that the latter is more suitable for Kazakhstan. A transition to new, more progressive technologies and systems of organising labour would lead to improved genetic and productive characteristics in animals. Intensive development could be

accomplished by stabilising livestock numbers as well as through inter-breeding. By the year 2000, with a general improvement of feeding and by maintaining a reduction in sheep numbers, productivity and processing of their products is predicted to grow slightly. The average shearing of wool per animal would be 3.65 kg, the production of mutton 10.6 kg, and overall production would be 113,100 tonnes of wool and 328,600 tonnes of meat, which is higher by 9,600 and 49,200 tonnes respectively as compared with 1992.

Productivity of horses is projected to increase by the year 2000 to 114,800 tonnes of meat and 57.4 kg (slaughter weight per head per annum) against 68,300 tonnes and 41 kg in 1993. It is assumed that the quality of animal products will simultaneously improve. With the existing level of feeding maintained to the year 2000, the optimum number of animals is 27 million sheep, 2 million horses and 200,000 camels. As to fodder, 61–65% of the total feed comprises natural herbage from pastures, and 35–39% from stall fodder, including only 7–8% of concentrates.



The Formation of Intra-farm Prices for Distant Sheep-breeding (Formirovanie vnutrikhozyaistvennykh tsen v otgonnom ovtsevodstve) by B.S. Mirzaliev, in *Ovtsevodstvo* (Sheep Breeding) 2: 4–6, 1992.

Key words: distant sheep-breeding; prices; market

With the transfer to market relations and de-nationalisation of property, a number of state enterprises (stud farms, pedigree farms etc.) will be preserved and will work on the basis of intra-farm leasing. Thus, for these farms, particularly for distant sheep breeding of karakul, intra-farm prices need to be established.

With the development of leasing (mainly by families) and agreed prices, the relationship between the price mechanism and production expenses must be worked out. It is complicated, however, because virtually everywhere in Kazakhstan karakul breeding takes place on wide-spread and distant pastures and, correspondingly, the permanent and temporary stopping places of herders (*chabany*) depend on weather, climatic, water and pasture conditions. Beginning from spring until the depths of autumn the brigades of herders move to new pastures up to eight to ten times (sometimes more) depending on the season and the duration of the task (mating, lambing, shearing etc.), the grass or herbage of the pasture, and the presence of natural or man-made water sources. The nomad-herders continue moving with the flocks for 230 to 250 days a year and the distance from winter homes and pastures (*zimovki*) is between 300–500 km.

Under such conditions it is impossible to define precisely expenditure on feed and water supply, transport, construction; in other words, production costs. Therefore calculating an agreed price will provoke many conflicts between the herder-lessees,

chiefly over the cost of products, the length of time taken to obtain products, and the amounts of payments for leasing pastures from the state.

This article sets out methods for working out such prices, taking into account the type of karakul, state purchase prices and the agreed prices for skins. The herder-lessees will make agreements for 5–6 years, i.e. up till the end of the cycle for using animals. After the end of the period the lessee can extend for one or more cycles. It concludes by stating that karakul sheep husbandry in favourable years can depend for 90–95% of feed requirements on natural pasture which does not have a cost attached. It is better to establish planned prices for feed annually.

Furthermore, in years of unfavourable weather karakul sheep herding lessees in search of pasture will need to lease land from other *raiony* and *oblasts*. Before the transfer to self-financing (decollectivisation) these pastures were used gratis but now they have a price. Thus to insure a reserve of feed, planned prices remain at the level of the past year (up to March/April of the present year) and new prices must come into force from May this year after correcting for weather and climate.



Natural Conditions, Animal Husbandry and the Forage Base of Deserts (Prirodnye usloviya, zhivotnovodstvo i kormavaya baza pustyn) by N.T. Nechaeva and A.G. Babaev (eds). Ashkhabad: Izdatel'stvo Akademii Nauk TSSR, 1963. 486pp.

Key words: deserts; Central Asia; animal husbandry; forage

The first two parts of the book cover natural conditions of Central Asian deserts and ways of developing them and includes discussion of: different types of desert, types and maps of desert vegetation, landscape research as a method of studying deserts, the water system of soil types and of sand in the semi-desert zone, productivity of plants in the arid zone; sand, fauna, epidemiology and epizoology of the Kara Kum canal, and moving sand and the struggle against it.

The final part of the book is concerned with desert livestock husbandry and the feed base and covers: livestock breeding and the pasture economy of deserts; the feed base of sheep-breeding in the desert zone of Central Asia and Kazakhstan; developing a system of herder sheep breeding in the Turkomen Republic; ways of intensifying the pastoral economy in the southern Central Asian lowland plains; special features of the rational use of desert pastures in Uzbekistan; artesian irrigation as a new source for strengthening the feed base of karakul sheep breeding in Uzbekistan; improvement of pastures and field fodder production on karakul farms of Uzbekistan; methods of improving pastures of gypsum (soil type) desert; fundamental improvements of desert pastures of southern Turkmenia; the agricultural development of Ustyurt and the irrigation of its pastures; the pasture economy of Kazakhstan deserts and prospects for developing livestock breeding;

shrub deserts of Kazakhstan and their development; desert feed resources from the example of Kzyl-Ovdinsk *oblast* in the Kazakh SSR; agrometeorological conditions and pasture plants in Kazakhstan; climatic and weather conditions in the organisation of industrial processes in livestock rearing; the nutritional value of pasture forage in the sandy desert of Karakum; the organisation and economy of desert pasture sheep rearing.



Natural Forage Resources of Turkmenistan (Prirodnye kormovye resursy Turkmenistana) by V.N. Nikolaev. Ashkhabad: Ylym (Academy of Sciences, Ministry of Agriculture, Institute of Animal Husbandry and Veterinary Science, Turkmensk SSR), 1972. 190 pp.

Key words: pastures; forage; sheep-breeding; Turkmenistan

The book contains the results of many years of research to inventory the pastures on plains and mountainous regions of Turkmenistan, the quantitative and qualitative aspects of the basic pasture areas and their value. Special sections of the book are devoted to an analysis of the present level of sheep rearing in different natural geographical regions of Turkmenistan, and the use and character of the irrigation of pastures.

The recommended system for the rational use of pastures is given, noting the prospects for sheep rearing and ways of consolidating the forage base. Other issues covered are: the general features of natural conditions (climate, relief, soils, surface, subsoil, waters); the study and development of pasture; the classification of pastures; brief characteristics of pastures and hay meadows (on the plains, mountainous pastures, mountainous hay meadows); the valuation of pasture-feed quality and the capacity of pasture to support small livestock; the irrigation of pasture areas; the organisation of pasture use (in recent years, and the inter-farm and intra-farm distribution of pasture); the consolidation of a feed base for sheep rearing (the extent of feeding sheep during winter); the organisation of fodder production for sheep rearing on irrigated lands; the improvement of pastures; measures for the study and development of natural forage resources.

An appendix covers: seasonal dynamics; the nutritional value and feed-capacity of Turkmen pastures, and average yield per annum, for small livestock; a glossary of Latin, Turkomen and Russian names of plants mentioned in the text.



Ways of Increasing the Productivity and Rational Use of Pastures in the Country's Arid Zones (Puti povysheniya produktivnosti i ratsional'nogo ispol'zovaniya pastbishch aridnoi zony strany). Materials from an All-Union seminar. Alma-Ata: Vostochnoe otdelenie VASKhNIL. Alma-Ata, 1989. 83 pp.

Key words: pastures; fodder; Karakul sheep-breeding; desert; Central Asian republics

The work deals with the current state and future development of fodder production in Kazakhstan, the improvement and rational use of the natural area in the arid regions of the country, problems of developing cultivated pastures, and the creation of forest plantations to protect pastures in the desert and semi-desert fodder areas. It is also concerned with the effects of intensifying the pasture economy of karakul sheep breeding, the use of pastures in large fenced enclosures (including enclosed sown pastures in the northern desert) and with improving pastures in desert and semi-desert zones of southern Kazakhstan.

The introduction, selection and growing of wild fodder plants for desert and semi-desert pastures and hayfields of Uzbekistan (as well as the experience acquired in improving desert pasture from the Uzbek pasture amelioration construction unit) are also considered, as is seed production for wild growing fodder plants in Chimkent *oblast*, and the use of wind power in regions of desert and semi-desert pasture.

Other issues cover: intensification of fodder production in the flood-lands of rivers and on lands with flood-plain irrigation; the agrobiological bases for creating and using arid pastures; the use of underground water for fodder production in regions of remote livestock production; the evaluation of the variability of pasture productivity using photometric and aerospace information; agrometeorological evaluation of yields of improved desert pastures; electro-mechanisation of agricultural processes of pastoral livestock raising; the current and future development of pastures in arid and semi-arid zones; and insect pests of arid pasture plants.

On individual republics, there is the improvement and rational use of arid pastures in Kyrgyzstan and the improvement and rational use of pastures in Turkmenistan. Topics specifically relating to Kazakhstan cover: the mechanisation of work on the improvement of natural pastures; remote sensing data in evaluating and forecasting the yield of natural fodder lands; and project experience and the development of enclosed cultivated pastures in Kazakhstan. A further item covers the improvement of pastures in Dzhambulsk *oblast*. There are also papers on non-Central Asian republics.



Recommendations for the Technology of Using Large-enclosure for Natural Pastures in the Arid Regions of Kazakhstan (Rekomendatsii. Tekhnologiya krupnozagonnogo ispol'zovaniya prirodnykh pastbishch aridnykh raionov Kazakhstana). Alma-Ata: Ministerstvo sel'skogo khozyaistva i prodovol'stviya respubliky Kazakhstan (Kainar), 1991. 23pp.

Key words: Kazakhstan; natural pastures; large-enclosures; arid zones

The natural climatic conditions of the arid regions (*raiony*) of Kazakhstan permit the keeping of sheep, horses and camels on pastures from 8 to 12 months a year, sustained by cheap, annually renewed, natural fodder resources (up to 85% of these animals' annual feed-demands). Natural pasture was and remains the basic forage base of sheep, horse and camel rearing, and to a much lesser degree beef cattle production. In years when pastures were in a good state all these were highly profitable, but in recent years the condition of pastures has worsened, profitability was lower, in some cases leading to losses.

One of the basic reasons that pasture productivity declined was the organisation in arid regions of a large number of sheep breeding *sovkhozy*. The creation of permanent farms with boundaries defining their land use led to the destruction of the former ways of nomads, who moved seasonally from place to place. At present (1991), mobile grazing under this system (in sandy areas and tugai in winter, to steppe and mountain in summer, moving to desert and semi-desert plains in spring and autumn) is being disrupted everywhere. As a result, arid pastures which were used formerly for only one or two seasons a year by a smallish number of stock have begun to be eaten away and trampled under new conditions whereby the pastures are used for three seasons (spring, summer and autumn), with a considerable area in use all year round.

Furthermore, the semi-arid areas have to procure hay virtually every year. Thus, the means of using natural pastures has become 'system-less', as the nomadic system of moving on and letting land regenerate has disappeared. By ignoring the biological characteristics of forage plants and the scientific basis for the stocking rate, exploitation of pasture in the majority of arid regions has already led to a decline in yield, an increase in degraded pasture, and to wind and water erosion. It was thus decided to strengthen specialisation in livestock husbandry and transfer a significant number of animals to over-winter stabling. This requires the introduction of new technology on pastures in arid regions, developing winter stabling for ewes through the cultivation of fodder and the sowing of hay meadows.

Also covered in the pamphlet are the biological/ecological bases for the rational use of desert and semi-desert pastures; enclosed pastures; pasture rotation; the number and size of plots; the establishment of land use for, and the organisation of labour in, herder/shepherd brigades; and the supply of water.

In the early 1980s specialists in the Institute were concerned with developing existing technological improvements and with the rational utilisation of pasture in the desert, semi-desert, steppe and mountainous zones of the Republic.



Spring–autumn Pastures in a System of Pasture-rotation (Vesenne–osennie pastbishche v sisteme pastbishcheoborota) by A.A. Zotov and M.I. Adenov, in *Ovtsevodstvo* (Sheep-breeding) 1992, part 1: 20–22, 1992.

Key words: natural pastures; pasture rotation; fodder; sheep breeding; Kyrgyzstan

Natural pastures in Kyrgyzstan, as in other areas of the country, play an important role in strengthening the fodder base for sheep rearing. In spite of the large area of pasture, however, animal requirements in 'green feed' are unable to be fully satisfied because of low yields. In particular, acute shortages of feed occur in the spring–autumn period when 34% of animals are supplied with fodder (*korm*). Because of over-use and the failure to use a pasture system, degradation of pastures is taking place, reducing the yield and worsening the quality of feed (*korm*). Geobotanical research in the Republic in recent years has shown that desertification has occurred over 540,000 hectares because of the failure to regulate the pasturing of sheep on the steppe spring–autumn pastures. Thus, urgent measures are necessary to halt subsequent degradation of natural pastures and to increase their productivity.

In mountainous regions rational use is the basic way to protect yields because the complicated relief makes pasture improvements through agrotechnical measures extremely difficult. Studies of the efficiency of various methods of grazing sheep on the higher mountain pastures found that on average for 5 years the highest yield of herbage or grass was observed with the single pasturing of sheep in the 'grass withering' phase; it was much lower in the pasture-rotation system and lowest where there was no pasture system. In evaluating yields in fodder units, i.e. by calculating the nutritional value of fodder (*korm*), the highest yield of pasture was noted in a plot (*uchastok*) of rotational pastures and in the annual single use of grass in the phase where mowing commences. The most objective criterion for evaluating the effectiveness of using pasture is its productivity, i.e. the amount of forage actually consumed by animals from one hectare. Verification of the various ways of using spring–autumn pastures rationally was carried out in 1986–90 on a *sovkhoz* in Alaisk *raion* in Oshsk *oblast*, the pasture yield on a plot in pasture rotation being higher than in grazing without a system. (Similar calculations were made in terms of the income received.) The research conclusion revealed a preference for grazing in a system of pasture rotation which gives annual increases in yield and productivity of grasses.



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Telephone +44 (0)171 487 7413

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