



Review of the literature on Pastoral Economics and Marketing:

Central Asian, China, Mongolia and Siberia

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Overview

The pastoralists and rangelands of northern Asia form a vast and heterogeneous complex. The pastoral peoples include ethnic groups comprising many millions of people, as in the case of the Mongols, Tibetans and Kazakhs of China, Mongolia and Kazakhstan, to tiny relict populations in Siberia, numbering in the hundreds (see Table 1). Most of these people have been incorporated for many decades of the 20th century into the socialist centralised economies of the Soviet Union and communist China. Under these systems, livestock products were fed into state distribution channels for national consumption and export.

The pastoralists are now coping with domestic and global markets, in some cases integrating quite successfully as we shall see. The economic situation for pastoralists in these nation states is very dynamic, as new opportunities open up and former restrictive policies are dissolved. In the former Soviet Union, the state now plays little role in regulating or assisting the pastoral sector, but in China there are continual pressures from the government to adopt new practices such as fencing and fodder cultivation. Demand for pastoral products is growing, especially for meat, milk and specialised products such as cashmere from goats and reindeer horns. Unlike tropical Africa, animal fibres of sheep wool, cashmere and camel hair have been important livestock products that continue to provide significant income to pastoralists.

Asia contains the largest contiguous landmass of pastureland, stretching from the borders of eastern Europe to the Pacific Ocean, in a span of 7,000 km and comprising 25% of global rangelands (Kerven 2004). A defining geographical characteristic of the northern rangelands is the cold and snowy winters, with temperatures in Siberia reaching as low as -70°C and typically in central and inner Asia of -30°C . In addition to the common domestic species of sheep, goats, horses and cattle, more unusual types of animals are kept, including yaks, Bactrian camels and reindeer. Grazing occurs from permafrost tundra in the north to hot sandy deserts in the south, and at altitudes of over 4,000 metres above sea level.

The economic, social and political position of pastoralists varies considerably between the countries considered here. A crucial factor is the preponderance of pastoralists in the national population and the extent to which a country relies on livestock production. This is exemplified in the case of Mongolia, where the majority of the population are pastoralists, with a powerful political lobby, and livestock provide the mainstay of the national economy. At the other extreme is the situation of pastoralists in Kazakhstan, Turkmenistan and Russian Siberia, where the remote rangelands are the locus of recent exploitation of oil, gas and other minerals that generate enormous national wealth. Though the proportion of the rural population engaged in raising livestock may be great, as in Kazakhstan and Turkmenistan, the relative value of livestock is swamped by national revenues from minerals. Governments, donors, NGOs, commercial interests and researchers have tended to overlook the pastoral sectors of these countries. Nevertheless, these two countries are not necessarily self-sufficient in livestock food products and continue to depend on the pastoralists to provide meat and dairy products for the urban population. This applies particularly to meat, as national consumers have a strong taste preference for indigenous range-fed animals and can afford to pay a premium for this rather than chilled meat from suppliers such as Australia.

The pastoral populations of two other former Soviet countries, Tajikistan and Uzbekistan, have been largely ignored by their new independent national governments, in favour of the irrigated settled zones that produce cotton with a high export value and enriches local landowners. In Tajikistan most pastoralists live in the high mountain regions of the east, where marketing is hampered by international trade barriers and where a single donor organisation has taken responsibility for development. Uzbekistan has considerable numbers of pastoralists who supply meat and dairy products to the urban and arable population.

China stands out as having the highest number of pastoral peoples in Asia, though their numbers pale in comparison to the population of Chinese cultivators. The numbers of pastoralists in China are declining, however, as government policies encourage settlement and crop agriculture. Russian Siberia, on the other hand, has vast amounts of rangeland – even larger than China – which are however of very low productivity and support only a couple of million livestock and less than a million pastoralists.

In most of these countries, there are explicit national policies intended to promote agricultural diversification and agro-processing, to increase employment, add value to the national economies, and to raise the incomes of livestock-raising producers. These policies are not always implemented in practice, due to lack of commercial investment. There are nevertheless, promising prospects for market development of livestock products of wool, cashmere, meat and dairy goods.

Studies of the economic valuation of livestock and markets are rare indeed in the former socialist Asian countries, in distinct contrast to pastoral Africa where detailed work stretches back to the ethnographers of the 1940s, and includes many excellent recent studies by economic researchers and donor projects. The markets of the USSR and China command economies were highly centralised and controlled, with only a small quantity of livestock products sold independently. Data was collected by state statisticians and was intended for accounting rather than comparative valuation of production systems. Until a decade ago, Western researchers were seldom permitted access to the rural areas. Moreover, since livestock were privatised some decades ago, in general the focus of research has been on the impact of private ownership on rangeland condition, which is seen to be under threat. The exception has been two countries that have received a high level of donor aid; Mongolia and Kyrgyzstan. Here there have been numerous household surveys, participatory appraisals, anthropological researchers, and large-scale studies sponsored by major agencies such as the World Bank, GTZ and Asian Development Bank. In Mongolia and Kyrgyzstan, one can find quantitative data on the current value of livestock products to pastoral households and to the wider economy.

The conclusion is that in northern Asian countries with relatively many pastoralists, they are making a contribution to the domestic economy and exports, though this contribution may appear small by comparison with high-value minerals or crops such as cotton, rice or wheat.

Definitions of pastoralists as livestock-grassland based populations

To report on pastoralists' economic conditions and marketing first raises the question of "who are the pastoralists?". A convenient definition is provided in the study by the International Livestock Research Institute (ILRI) "Mapping Poverty and Livestock in the Developing World" (2002). The ILRI study is a key reference used in this report.

Definition of Livestock Grassland based systems:

Grassland-based systems (LG): >90% of dry matter fed to animals comes from rangelands, pastures, annual forages and purchased feeds and < 10% of total value comes from crops. Annual average stocking production rates are <10 livestock units (LU) ha⁻¹ agricultural land (i.e. high degree of importance of livestock in farm household economy) (ILRI 2002 p. 17)

Though this is not water-tight definition and some would take issue – many crop farmers keep animals and many livestock farmers depend to a large degree on wage employment, remittances and social security benefits in Asia – the ILRI classification allows a rough comparison of grassland-based producers across a number of diverse countries. However, it is far trickier to estimate the value of livestock products emanating from solely pastoral producers on a national scale. As crop farmers also keep animals and market their outputs, it is often impossible to state what proportion comes from pastoralists. Few sources even provide data on the contribution of livestock to GDP; most sources simply include livestock under "agriculture".

"There is no global production system map that adequately reflects the importance of livestock in agriculture. However, Seré and Steinfeld (1996) produced a global livestock production classification system which has since been widely used ...and a study on livestock–environment interactions (Steinfeld et al., 1997). Seré and Steinfeld built on FAO's agroecological zone work and included detailed country tables with disaggregated data by area, population, livestock numbers and livestock outputs for each production system category." ILRI 2002, p. 8

Table 1: Total Permanent Pasture (FAOstats), Livestock Grassland Area and population 2000 and percent of agricultural population (ILRI 2002, Table 2)

Country	Sq. km permanent pasture (FAOstats)	Sq. km grassland, livestock based (ILRI)	% of total land area (FAOstats)	Livestock grassland population (ILRI 2002)	% grassland population of all agricultural population
China	4,000,000	2,053,170	41%	19, 500,000	2.4 %
Kazakhstan	1,851,000	1,536,600	69%	4,700,000	68%
Mongolia	1,293,000	1,227,900	83%	2,051,000	84%
Siberia	3,500,000*	N/A	35%	> 1 million**	N/A
Turkmenistan	307,000	265,800	65%	1,537,000	43%
Uzbekistan	222,190	165,900	52%	1,478,000	6%
Kyrgyzstan	93,650	56,900	49%	256,000	7%
Tajikistan	31,980	26,200	23%	205,200	4%

* from Vycius 1999

** based on Russian Federation census of 2000. ILRI (2002) does not include most of the northern hemisphere.

Methods

The approach taken here is to present standard tables on livestock on a country-by-country basis from FAO and ILRI data sets, focussing on species kept by pastoral populations. Summaries are given of the extent of rangelands, numbers and ethnic composition of pastoralists, as far as possible. Each country study then provides some details from available literature, on the pastoral economic conditions and current marketing systems. Key points are summarised from case studies relevant to the topic. Sometimes little data exists, and in other cases there is an overwhelming amount of possible material, as in the case of China, which cannot be adequately covered in an exercise of this duration. The sources used are from personal collections and the internet. Access was enabled through institutional subscription to several bibliographic and journal databases. These include Edina (especially Commonwealth Agricultural Bureau abstracts), Science Direct, Web of Knowledge and Blackwell Synergy. Unfortunately, many useful sources are only available on a charge basis through the internet; these are abstracted or referenced here.

Central Asia

Introduction

The Central Asian region is defined here as the five countries which were termed Central Asia under the former Soviet Union; Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan and Tajikistan. There is limited current information for this region on pastoralism, livestock product marketing or the contribution of livestock to the national economies. Some of the reasons for the relative absence of up-to-date reports are discussed below.

During the Soviet era, considerable research and data collection was undertaken on the livestock sector of the Central Asian countries (see Channon and Channon 1990 for summaries from the Russian material). With the exceptions of Tajikistan and Uzbekistan, nomadic and semi-nomadic pastoralists were the principle indigenous groups within the countries, and were studied by early Russian scholars (Institute of Ethnography 1973; Khazanov 1994).

By the middle of the twentieth century, livestock production had been transformed into a major contributor to the rural and national economies within Kazakhstan, Kyrgyzstan and Turkmenistan (Kerven et al. 1996). Much research was devoted to livestock improvement, and statistics collected on livestock yields and distribution channels for livestock products. Since livestock output, as the case with other productive sectors, was centrally planned and controlled under the Soviet economy, meat, wool, milk, fibre, hides and skins were collected from state collective farms and distributed through state procurement orders to state factories and from there to consumer outlets. Most of these livestock products were destined for consumption within the Soviet Union as a whole and not exported outside of the common market; for example sheep wool, a major output from Central Asian rangelands, was made into winter clothing for the Red Army; meat was processed and distributed throughout the Soviet republics, while karakul (astrakhan) lamb pelts were prepared into hats and coats for Soviet citizens.

By the end of the Soviet Union in 1991, Kazakhstan alone produced one quarter of the USSR's lamb and one-fifth of its wool output. This came largely from the rangelands, which had been calculated by Soviet scientists to have 50% lower costs of production than in other, more intensive, production systems of the USSR. Kyrgyzstan and Turkmenistan were also major contributors of wool, meat and karakul pelts to the Soviet system.

In the first half decade after the collapse of the USSR, a number of studies were undertaken of the economic value of livestock to the newly-independent Central Asian nations. International financial institutions, including the World Bank and Asian Development Bank, commissioned sometimes quite detailed analyses to monitor the impact of market restructuring being promoted by these institutions. Restructuring covered privatisation of the state-owned meat, wool, leather and dairy factories and privatising productive property of land and livestock. Studies were also required in preparation for making loans and grants; for example ADB 1997 in Kazakhstan, the World Bank Sheep Project in Kyrgyzstan. These studies provide a baseline for assessing the changes in the pastoral livestock sector during the early stages of transition from the command to the market economy in the 1990s.

By the end of the 1990s, however, international donors and financial institutions were paying less attention to the rural livestock economy, for several apparent reasons. Oil and gas revenues in Kazakhstan and Turkmenistan were taking off, transforming investment incentives and leading donors to declassify these countries as poor or developing. In Kyrgyzstan, the World Bank Sheep Project had been a relatively large investment with disappointing results, causing other donors to be more wary of supporting big scale agricultural projects. Moreover, commercial and subsistence cropping became important sources of private household income in the rural economy, after state farm employment ceased in the mid 1990s. In the irrigated basins of the major rivers, cotton, rice, wheat and fruit trees became increasingly essential as sources of cash or food for newly-impooverished rural households. At the same time, in several Central Asian countries the numbers of livestock plummeted during the economic crisis of the post-Soviet deconstruction (in Kazakhstan, Kyrgyzstan and Tajikistan). The revival of wheat, cotton and horticultural crops has attracted the consideration of donor assessments and projects, to the exclusion of livestock in most instances. For example, the most recent World Bank (2005) Poverty Assessment Update for Tajikistan does not once mention livestock in the 95-page document.

A less obvious reason for the lack of international attention to the extensive livestock sectors of the Central Asian countries was the sheer remoteness of the rangelands and their distance from capital cities. When studies were conducted, they usually missed out the isolated desert and mountain communities where pastoralists have continued to raise livestock using extensive grazing methods on state land, reporting only on peasant farms of mixed crop-livestock production using private land in the more favoured ecological zones (e.g. World Bank 2005 a and b, for Kazakhstan). This lack of awareness of range-based livestock systems in Central Asia contrasts markedly with the situation for example in East Africa,

where international personnel have visited the game parks that are surrounded by pastoralists and their animals, that have also had multiple studies carried out by researchers.

In the present day, livestock remain very significant to many rural households in all the Central Asian countries; primarily they are a source of food and savings to be encashed when necessary. Village households aim to have at least one dairy cow and a few goats or sheep, for home consumption and slaughtering for social or religious events. In Turkmenistan, cows are often replaced by camels, kept for their milk, even in the capital city of Ashgabat. Milking goats have become popular but are scarce and very expensive. Village households with more resources of money and family labour try to accumulate more smallstock that can readily be sold at rural markets for \$50 or more per head. A common strategy for making some extra money is to buy young cattle or smallstock, fatten these by hand-feeding in stalls and later sell at a profit. As the national economies have grown in the past half decade, incomes have risen in towns and demand for meat and dairy products has increased, keeping the price of these commodities high by international standards.

The picture varies across the Central Asian countries. Where mineral wealth has been rapidly developed, as in Kazakhstan and Turkmenistan, the absolute contribution of livestock to the overall economy and exports has shrunk accordingly. Nevertheless, considerable numbers of people in these countries still live in the rangelands and rely on raising livestock for much of their income. Though the impact of mineral wealth is filtering through (but slowly) to these rural communities, they still define themselves as pastoral and provide essential foodstuffs to the nation. Kyrgyzstan's rural economy remains as the most livestock-dependent, though rural incomes from cropping have grown significantly since the end of support from the Soviet Union. Dairy, wool and cashmere products are contributing more each year to Kyrgyzstan's exports, though not near to the levels at the end of the Soviet period. Uzbekistan's large semi-arid areas provide grazing for many of the country's animals and their products sustain the settled urban population that constitute the greatest number in Central Asia. However, export of one of the main livestock products (karakul lamb pelts) has declined. Tajikistan has the least number of rural people reliant on livestock, but again, there are almost no other livelihood alternatives to pastoralism in the dry high mountains.

In all the Central Asian countries, the majority of agricultural land is semi-arid or arid pasture, which cannot be developed for crops without irrigation. Relatively good domestic prices for meat and dairy products have allowed the dwellers of the rangelands to raise cash incomes in the post-Soviet period, while continuing to subsist on the food provided by their animals.

Exports of live animals and livestock products are likely to be considerably underreported in state statistics, as much cross-border trade bypasses official channels, relying on bribes at border posts or avoiding borders altogether. There are many examples of this trade; yaks and cattle driven across from Tajikistan to the urban markets of southern Kyrgyzstan; sheep leaving western Kyrgyzstan to supply the populous Ferghana valley of Uzbekistan; horses taken across the mountains of northern Kyrgyzstan to sell in the richer communities of south Kazakhstan; cashmere goat fibre being trucked over the borders of eastern Kazakhstan and Kyrgyzstan to China; meat taken from northern Kazakhstan to Russia; karakul lamb pelts being sold without state permission from Turkmenistan to Russia. The true value of livestock exports to each of the Central Asian countries and their populations cannot therefore be computed.

Kyrgyzstan

Predominance of Rangelands

Rangelands cover an estimated 49 percent of the country, (93,650 sq km) or about 80% of agricultural land. An additional 12 percent of the country is classified as forest land without forest cover, which means they are largely shrublands utilized as grazing land. Arable land only makes up about 7 percent of the country and is concentrated in the valley bottoms and foothills. Most of the rangelands are located at altitudes between 1,000 and 3,500 m, in intermontane valleys and mountain slopes. About one-quarter of the country's rangelands are found at elevations greater than 3500 meters (Miller 2001)

Animal husbandry is the dominant form of agricultural production in the central, southern and eastern mountainous regions of the Kyrgyz Republic, and rangelands are the principal source

of forage and fodder for livestock. The subalpine and alpine meadows in the mountains provide summer grazing for livestock and grazing land in the valleys and foothills provide spring, autumn and winter grazing.

The livestock-dependent population of Kyrgyzstan was 256,000 in 2000 which was 5.4% of the total population (ILRI 2002), and 20% of the agricultural population (FAOStats).

Contribution to GDP and Domestic Economy

Nationally, livestock now form 10% of GDP, while crops comprise 8.4% (World Bank 2005). At the end of the Soviet period, livestock contributed one third of GDP (World Bank 1993). Overall, livestock contribute 12% of average rural households' fixed assets (the remainder being land and housing). In the poorest southern Batken region, the share of livestock in household assets rises to over 20%.

Employment on livestock absorbs only 8% of the labour force compared to 45.4 % in crop agriculture. These figures indicate the low labour intensity of livestock employment, especially relative to the value generated per labour input compared to crop farming.

Table 2: Number of Livestock 2005 (FAOstats)

Livestock	Number
Sheep	2,965,220
Goats	808,397
Cattle	1,034,890
Horses	361,141

Note: Excludes pigs and poultry. There are several thousand yaks in southern Kyrgyzstan.

Table 3: Kyrgyzstan Livestock Production 2005 (FAOstats)

Production	Metric tonnes	Kg/person/year
Meat (exclude poultry and pigs)	196,000	37 kg
Milk	1,178,000	233 kg
Wool	10,000	
Hides and skins	21,740	

Note: Excludes pigs and poultry

In the post Soviet economic crisis, sheep were consumed and bartered away for food and Kyrgyzstan's sheep numbers fell from 10 million in 1992 to 3 million by 1997 (Kerven 2003a). Urban demand for mutton drove up meat prices, as state meat distribution channels ceased. Private traders began marketing live animals from pastoral areas, in response to urban demand. During the same period, the international price for wool prices declined and as a result, pastoralists switched from wool to meat breeds (van Veen 1995 and Farrington 2005).

Since 1999, the smaller, poorer farms of the south have grown more quickly than northern farms, demonstrating that small farm size is not a constraint to growth. Rapid growth in livestock output, typically for commercial reasons, appears to have been the main source of this growth (World Bank 2004).

Contribution to Exports

The share of livestock products in exports by value (17% of all agricultural exports) is much less than crops, especially cotton and sugar from beets (crops total 80% of agricultural exports). The FAO figures for meat exports do not include live animals. However, it is known that live animals are unofficially traded across the borders with Kazakhstan, Tajikistan and Uzbekistan.

Table 4: Total value of livestock exports 2004 (FAOstats)

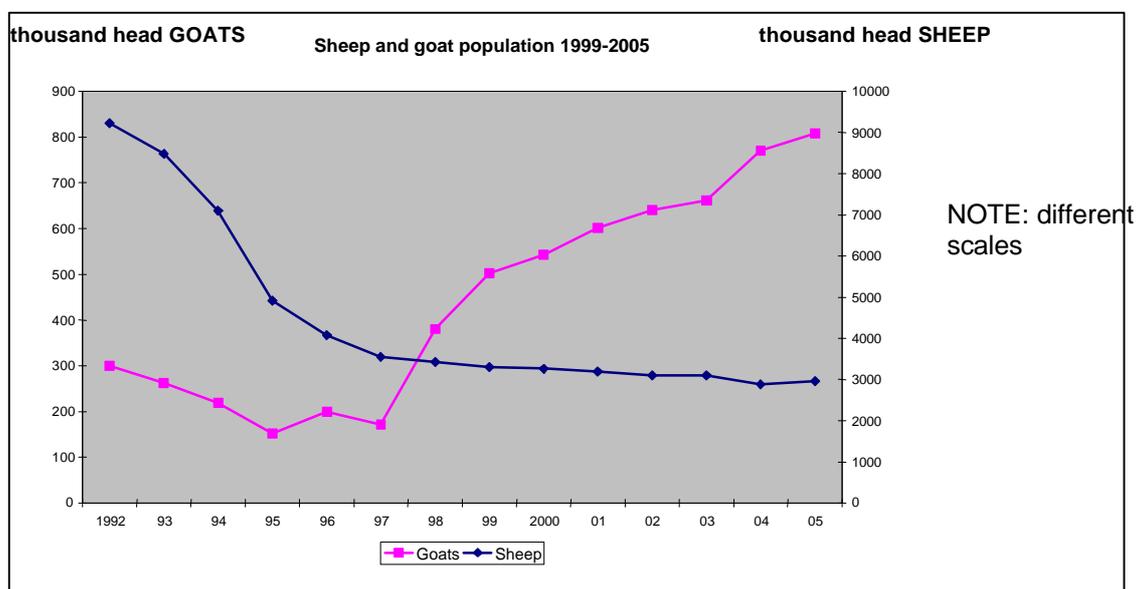
Livestock exports including processed	000 \$
Dairy	7,416
Hides and skins	5,194
Goat fiber and cashmere	2,679
Wool	2,387
Meat	840
Total	18,516

Cashmere from goats as a new source of income and exports

The indigenous goats of Kyrgyzstan produce cashmere, a fine downy undercoat, which has a high value on international markets. Since the late 1990s, Chinese cashmere factories have been purchasing raw cashmere from Kyrgyz livestock owners. In 2005 and 2006, goat owners received up to \$25 per kg for raw cashmere. One goat produces up to 300 grams of cashmere. There are an estimated 600,000 cashmere goats in Kyrgyzstan, mainly located in the south and eastern highland areas of Osh, Naryn, Jalalabad and Issykul provinces. In some regions of southern Kyrgyzstan, cashmere sales have become a major component of livestock income. Kyrgyzstan's official export of cashmere in 2004 was worth \$2.7 million – but much is smuggled to China - compared to export of sheep wool worth \$2.4 million.

The estimated quantity of raw cashmere available in Kyrgyzstan is 120 tonnes which is 1% of Chinese production of 12,000 tonnes.

Figure 1: Sheep and goats in Kyrgyzstan



Kazakhstan

Predominance of Rangelands

Pasture is the principal form of land in Kazakhstan, comprising 68% of the land area with 1,851,000 sq km (FAOstats 2005). Most of the pastureland is semi-arid to arid, receiving less than 300 mm precipitation per annum (often in the form of snow rather than rain). The pastures cover widely-varying ecological zones, from sandy desert dominated by woody shrubs, to short and long-grass steppes on the plains, and include alpine mountain meadows

grazed in summer at altitudes of up to 3,000m. The climate is severe continental, with very cold and snowy winters in which temperatures may fall to –30C, to hot dry summers with maximum temperatures of 50C. A defining feature of much of the pastureland is that arable agriculture is impossible without irrigation. However, in northern Kazakhstan which receives higher precipitation of up to 500mm/year, much of the traditional pastures used by Kazakh nomads was converted to crop growing, initially by Russian peasant settlers in the 19th century and later under the Virgin Lands campaign of the Soviet period during the 1950s when pasture was ploughed up into wheat fields. Some of this land is again being used as pasture in the post-Soviet period.

Livestock raising in the dry rangelands is very extensive, with approximately 25 ha of pasture for every animal unit. By comparison, Mongolia has 11 ha pasture/animal, Australia 10 ha/animal, Argentina 2.5 ha/animal and the UK 1 ha/animal.

The livestock-grassland population of Kazakhstan is given as 4.7 million in 2000 (ILRI 2002) which would represent 69% of the rural population of 6.8 million or 30.5% of the total population (FAOstats). However, as noted earlier, by no means all of these people are livestock-dependent pastoralists.

Contribution to GDP and Domestic Economy

During the latter part of the Soviet period, livestock accounted for between 50% to 60% of agricultural output, while the agricultural sector as a whole made up 31% of net material production (a Soviet measure of output).

Table 5: Kazakhstan Number of Livestock 2005 (FAOstats)

Livestock	Number
Sheep	11,286,700
Goats	2,122,400
Cattle	5,203,900
Horses	1,110,100
Camels	123,000

Note: Excludes pigs and poultry

If the various types of livestock are converted to sheep equivalent units - 1 large stock (cow, horse, camel) = 5 sheep, the total livestock units (not including pigs) is 145,064,000 which amounts to 21.4 units per head of rural population. The mean rural family size is 5 people, this is more than 100 livestock units per family. Many rural households keep one or two milk cows in their backyards, and a few sheep or goats for home consumption and for sale when cash is needed. Even in provincial towns, office workers, teachers and other formally-employed people try to keep a few livestock in this manner. The contribution of livestock to family welfare and household livelihoods is thus quite considerable. Urban families sometimes also invest in livestock which are kept by their rural relatives, as a source of income growth and social insurance (Kerven 2003b).

Table 6: Kazakhstan Livestock production 2005 (FAOstats)

Production	Metric tonnes	Kg/person/year
Meat liveweight (exclude poultry and pigs)	511,400	33.3 kg
Milk	4,695,800	306 kg
Wool	27,000	
Hides and skins	61,301	

Meat (liveweight) produced from the extensive livestock sector – mainly beef and mutton - at the end of the Soviet period was 1,729,800 tonnes (World Bank 1994). Current production is

now only 30% of this amount. At the end of the Soviet period, it was estimated that annual per capita consumption of meat in Kazakhstan was 71 kg, and of milk 307 kg. (World Bank 1994) The number of cattle is just over half, while the number of sheep is about one third of the pre-independence period.

From World Bank 2005 Kazakhstan's Livestock Sector – Supporting its Revival.

“Kazakhstan’s livestock sector has a significant, but under-exploited development potential. Livestock production has been a key economic activity in Kazakhstan for centuries and continues to be a major source of employment, food and income for the rural population. Kazakhstan’s vast grasslands provide an important production base, and improved local and world market prices provide opportunities for livestock development, especially for the emerging small and medium size producers.

The livestock sector in Kazakhstan enjoys several areas of comparative advantage that could allow the sector to contribute substantially to income, growth, employment and export opportunities in rural areas. These sources of comparative advantage are found in the vast but underexploited rangelands, the flexible, low-cost production structure of the smallholder farms, and the availability of low-cost by-products from large-scale crop production (feed grain and oilseed meals).

Future growth of the livestock industry is likely to be driven largely by the capacity of the industry to capitalize on the sources of comparative advantage that have emerged from a decade of transition. There are significant opportunities for growth in the domestic market in the medium term and export opportunities in the longer term. The increase of national income raises demand for livestock products in Kazakhstan....Current livestock exports are low, but a good potential exists for niche, high-value products in distant markets, as well as for more traditional products in the regional markets (Russia, China, other Central Asia republics). But opportunities also differ regionally. For example, the northern oblasts already have a good potential for meat exports to Russia.

Because smallholder farmers now produce the bulk of the national livestock production, they constitute an important element of the livestock sector. After a decade of transition, small farms have come to dominate livestock production, generating around 80% of national production.

Before the transition, the livestock sector contributed 60 per cent to agricultural GDP. To date, it contributes 42 percent. Income from livestock represents 76 per cent of agriculture income of rural households, which translates into around 15 per cent of total household income according to the 2002 household budget survey.

1. The lion’s share of livestock production derives from backyard- and family farms that, in 2003, produced 87 % of the meat, 91% of the milk, 49% of wool, 49% of eggs and 43% of Karakul skins.
2. One positive feature of the fast growing oil and gas industry and the overall economic growth and household income growth it generates, will be the rapid expansion of the domestic market. Rising incomes will expand demand for livestock products, notably for processed livestock products in the urban areas, and provide significant market-driven growth opportunities for the domestic livestock industry, provided it can compete with imports.

Around 60 % of the poor reside in rural areas. The average poor household has 1.4 head of cattle and an equal number of sheep. Unlike for crop cultivation, many more rural households sell livestock products (52%) with sales being less prevalent among the poor (38%) than the non-poor (55%). The sale of livestock products substantially contributes to the overall household income. Meat shows the largest sales-to-production ratio of any major home-produced good (0.36), whereas those of milk (0.12) and eggs (0.15) are lower. Subsistence farming is prevalent, but does not cover total food needs. For the poor, a fifth of consumption can be attributed to own-production. Livestock production, therefore, provides an important safety net function and has traditionally an important role for consumption and income in rural areas.”

From World Bank 2005 Agricultural Competitiveness Project:

“Agriculture contributes 8 percent of Kazakhstan’s GDP and employs 32 percent of its economically active population.... During 1998–2003, ... agricultural production [grew] by an annual average of 10.5 percent.... Crop production, which rose in real terms by an annual average of 19.5 percent, is responsible for most of this growth. Livestock output in real terms grew by just 3.4 percent. Despite the recovery of agricultural production, its share in the economy shrank because of strong growth in other sectors, particularly in the extractive petroleum industry. The government is encouraging diversification of the country’s economy to reduce its dependence on oil, whose price volatility and resulting fluctuations in revenues make budget management challenging. Agricultural development is an important element of its strategy”.

Progress of livestock marketing in Kazakhstan in last 2 decades (based on Kerven 1998; 2002; 2003b)

1. Rigid state central state control, but some private sales allowed, and black marketing, up to mid 1980s
2. Perestroika: loosening of state control, more private marketing permitted, mid 1980s to 1990.
3. Loss of state control in early period of independence (1991). Barter and expropriation of livestock assets from state farms, without mediation of currency, 1991-1995
4. Withdrawal of state agencies from processing and distribution 1995-97
5. Rapid rise of unregulated private entrepreneurship for live animal marketing, in response to private urban demand for meat after collapse of state marketing channels; international slump in wool prices led to collapse of domestic wool processing and exports
6. Appearance of market “mafia”, controlling access to markets and rent-seeking, by emerging new kin and political power groups, 1998-1999
7. Investment by foreign firms in rehabilitating Soviet wool, dairy and leather processing factories, late 1990s
8. Joint venture domestic/foreign firms gaining market share of dairy and wool processing, creation of new rural-to-urban supply chains, late 1990s
9. Entry of new international buyers for raw output of wool (Russia and India), leather and cashmere (China), karakul (Afghanistan) and decline of former market destinations (Russia); late 1990s
10. Consolidation of commodity supply chains by expanding domestic processing firms with some government investment, 2003 onwards
11. Organised vertical integration of raw output supply chains (wool, cashmere, dairy) from source to domestic processing to export, 2003 onwards
12. Re-entry of the state into regulation and standardisation of livestock product sales 2004 onwards (eartag required on animals, standards laboratories)
13. State extraction (taxation) and investment in processing and export business, 2003 onwards
14. Indigenous investment into development of livestock product processing factories (dairy, skins, wool, meat and cashmere) 2004 onwards

Contribution to Exports

The value of livestock exports is now very small, compared to end of the Soviet period. In 2004, the total value of livestock exports was about 12 million dollars, mainly from hides and skins at 7.5 million, followed by wool at 2.6 million dollars (FAOstats). Livestock contributed only 2% of all agricultural exports, with wheat leading at 55% of the value. It is recognised that meat is unofficially exported from northern Kazakhstan to Russia, but the quantity and value is not known.

Cashmere marketing as a new income source for pastoralists

Marketing of cashmere – the fine downy undercoat produced by goats in climates with cold winters – has progressed rapidly in Kazakhstan since 2004 (Kerven et al. 2005). In the semi-arid rangelands of the southwest, local goats yield excellent quality cashmere that has been tested and is comparable to the world standard of Chinese and Mongolian cashmere. Livestock owners from these regions have recently been receiving higher prices for their cashmere from local traders, who are becoming more aware of quality differentials and paying more for superior quality. The first cashmere processing factory in the country started operating in spring 2005, processing 150 tonnes from Kazakhstan. Some international organisations are seeking ways to support cashmere development as a niche commodity in the agricultural sector. Sales of cashmere bring much-needed income to the poorest segment of rural communities; households with few animals, no cropland or employment options. Interest in Kazakh cashmere is spreading, as upscale European fashion houses seek alternative sources of fine grade material that is in short supply worldwide and largely controlled by the Chinese market.

Contribution of cashmere sales to poorer livestock-owning households

The structure of livestock ownership and sales in these dry rangeland areas indicates that goat ownership, and the income from their cashmere, is particularly significant for the poorest households, as defined by livestock wealth.

A household survey was conducted in 2004 of 60 randomly-selected livestock producer households in three villages in Zhane Kurgan district, Kyzyl Orda Oblast (GL CRSP 2005). The villages were in the semi-arid rangelands (precipitation of less than 150 mm/year). The questionnaire covered the period January 2003-April 2004 and included questions on cash income obtained from sales of the various livestock products.

Analysis of sheep and goat ownership revealed that half the survey households owned less than 40 smallstock. Among these poorer households, one-third owned only goats, compared to the richer households, among whom 11% have only goats. Overall, goats made up 22% of the smallstock in the three sampled villages. The mean number of sheep owned by households was 67, with a median of 25 head and a maximum of 600 head. Mean numbers of goats owned was 27 with a median number of 20, and a maximum of 120 head. Households in these drylands cannot not grow any crops but some cultivate small irrigated vegetable gardens. Employment is limited to a few local government positions as teachers or village administrators. Remittances and state pensions are an important source of cash income for the poorest households.

The poorest households with between 1-20 smallstock obtained 32% of their livestock cash income from goats, with 11% (mean \$21) of cash income from selling cashmere. Seventy percent of households had medium-sized flocks with 21-100 smallstock and obtained 38% of their cash income from goats of which 8% (mean \$63) was from cashmere and the rest from selling live goats. Large flock owners with 101-500 smallstock obtained the bulk of their cash income - 60% - from selling sheep, and a mean of \$49 from selling cashmere. Households with the largest flocks of more than 500 smallstock gained 74% of their income from selling sheep and \$154 from cashmere sales.

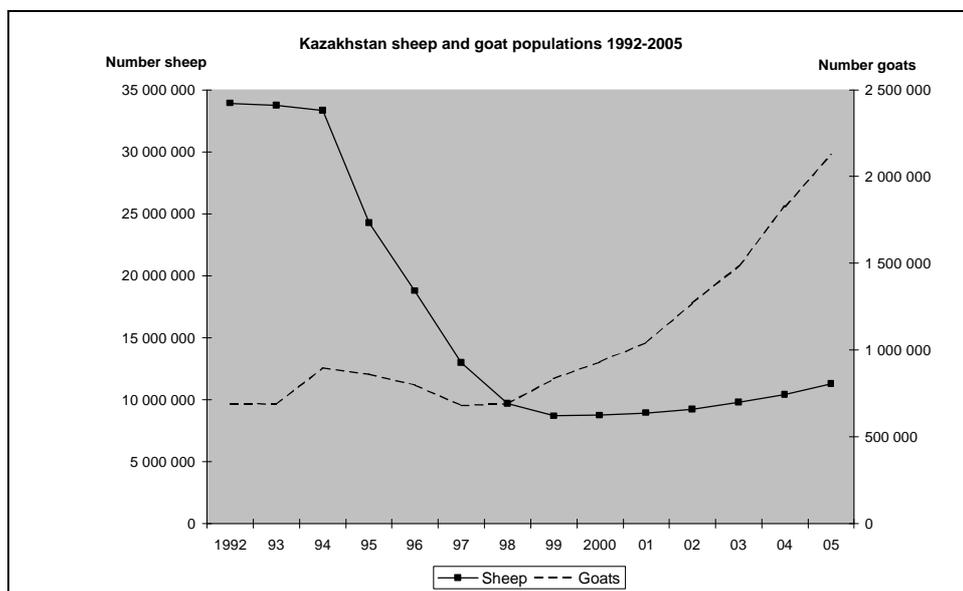
The increase in prices for cashmere from 2004 to 2005 suggests that the value of cashmere sales will have been proportionally greater for the poorer households in this region.

Value of goats to rural economy (based on Kerven 2005)

Goats are important to rural households quite apart from cashmere sales income. The population of goats is increasing faster than other livestock species, according to farmers and agricultural officials in south and southwest Kazakhstan, as people are restocking after great losses of livestock in the mid 1990s following privatization of state farms. Goats reproduce faster – kidding twice a year and often producing twins - than the other livestock species, and therefore farmers find them more profitable as a means of building livestock holdings. In 2003 Zhane Kurgan district (Kyzyl Orda province) had 130,000 sheep and 45,000 goats and a human population of 68,000. In Sheili district in 2005, the number of goats was 60,000 compared to 50,000 sheep, according to the district agricultural office. These smallstock numbers were 10% of the population in the early 1990s when each state farm managed

60,000 head. Nationally, as Figure ** shows, the trend since 1998 has been for a much steeper rise in the numbers of goats compared to sheep.

Figure 2: National trend in sheep and goat populations from 1992-2005 (FAOstats) (on two different scales)



Tajikistan

Predominance of Rangelands

Permanent pasture in Tajikistan is 31,980 sq km which is 75% of the agricultural land area (FAO Stats). The total population is 6.5 million of which 76% are rural. The grassland-based population in 2000 was 205,200 people (ILRI 2002), representing less than 5% of the total rural population. Livestock-dependent peoples (pastoralists) are located in the high altitude Pamir mountains of the northeast, including the autonomous region of Gorno Badakshan (Robinson 2005). In these areas, livestock are by necessity the main source of livelihood, due to the short number of growing days for crops, low precipitation and lack of irrigated land.

Table 7: Tajikistan Number of Livestock 2005 (FAOstats)

Livestock	Number
Sheep	1,782,000
Goats	975,000
Cattle	1,303,000
Horses	74,600
Camels	40,000

Note: Excludes pigs and poultry

Contribution to GDP and Domestic Economy

Table 8: Tajikistan Livestock Production 2005 (FAOstats)

Production	Metric tonnes	Kg/person/year
Meat liveweight (exclude poultry and pigs)	42,000	6.6 kg
Milk	500,800	79 kg
Wool	2,900	
Hides and skins	7,460	

Reported exports of livestock products are negligible amounts of wool and sheep skins, with the exception of cattle hides, with an annual value of \$17.2 million in 2004. This represented 8% of all agricultural exports, which are dominated by cotton.

FROM World Bank 2005 (Jan) (NOTE: Livestock not mentioned in 95 page report)

“Although Tajikistan remains the poorest CIS country, with a GDP per capita of around US\$200, the economy has grown well over the last four years. Tajikistan’s GDP grew at 8–10 percent annually, compared to 5–8 percent per year for the seven poorest CIS countries. Agriculture represented between 17–22 percent of GDP over the period, with cotton contributing about one quarter of agricultural output. Cotton accounted for one third of export value. “

FROM FAO 2001

“The production of meat and dairy products also declined compared to the availability prevailing during the FSU time but the actual consumption levels are not among the lowest of other LIFDCs. According to official data on meat and milk production the annual per capita availability is now 9.5 kg of meat and 50 kg of milk.”

The dry matter production capacity of the pasture land (about 3.6 million hectares) is reportedly a sufficient resource base for the existing animal population. However, [there was] overgrazing and agricultural erosion of spring transit pastures near to the growing areas.On the other hand, high value feeds are totally missing, and fodder production has been drastically reduced during the last ten years. At present, the area cultivated under fodder crops is 40 percent of that in 1991, accounting for about 10-15 percent of what was produced in 1991. Fodder production has declined due to land diversion in line with a general agricultural decline in recent years due to the structural problems relating to inputs and irrigation.

Livestock has declined mainly due to civil conflict, the reduced capacity of households to access pastures and fodder and the overall disruption of the state/collective sector. At present the restocking process is performing well in numerical terms but genotype maintenance and breeding improvement are no longer practiced. Access to veterinary services and protection against diseases are also problematic for the private sector. Many private customers cannot access the veterinarian services either because they are not available or because they are too expensive.

No deaths of livestock resulting from drought have been reported. However, as a result of the disruption of the veterinary service, some diseases have started to become endemic such as Brucellosis, TBC and in certain parts of the country, F&M disease and Anthrax.”

Uzbekistan

Predominance of Rangelands

The area of permanent pasture is 222,190 sq km which is 81% of the agricultural land (FAO Stats). According to Makhmudovich (2001) the grazing land of Uzbekistan is 23.6 million ha, of which 75% (17.8 million ha) are in the semi-arid to arid zones. The rural population is 64% of the total of 26.9 million. The grassland-based population in 2000 was 1.5 million (ILRI 2002) or nearly 9% of the rural population of 17.1 million in 2005.

From Makhmudovich (2001)

"The desert with annual precipitation from 100-250 mm is the zone of irrigated farming and Karakul sheep, which were 44% of the smallstock population in 2000. Each animal type is characteristically distributed in its own agro-ecological zone. Milk cattle are mainly found in irrigated croplands near urban centres; beef cattle in mountain zone pasture areas; Karakul sheep production systems are mainly in deserts; lastly meat-wool and ram production systems and horse breeding are concentrated in the better-watered foothills and mountain zones of the Fergana valley in the eastern part.

Karakul lambs yield astrakhan pelts used for luxury hats and coats. The Karakul sheep are kept in the arid zones depend on natural grazing lands of deserts and foothills; sown and improved pastures; fodder harvested or purchased for additional feeding in critical periods. The distinguishing features of Karakul sheep-rearing are:

1. maintained year-round on natural grass with seasonal movements;
2. maintenance of livestock and grazing system depends on periodical variation of yield by year and season of the year;
3. in some seasons and lean years the sheep may be driven beyond their base territory.

Contribution to GDP and Domestic Economy

Livestock in the desert pasture areas plays an important role on low productive lands (17.5% million.ha) of the arid areas located in Karakalpakstan and six other regions. Over 2.3 million people live in the desert pastures where karakul sheep, goats, camels, horses and other animals (over 9.0 million head) are maintained that provide the country with 20% of the meat, 10% milk, 40% wool, 35% skins, and 100% of karakul lamb skins (Yusupov 2003)

Table 9: Uzbekistan Livestock Production 2005 (FAOstats)

Production	Metric tonnes	Kg/person/year
Meat liveweight (exclude poultry and pigs)	520,000	19.4 kg
Milk	4,300,000	160
Wool	16,000	
Hides and skins	60	

Table 10: Uzbekistan Number of Livestock 2005 (FAOstats)

Livestock	Number
Sheep	9,500,000
Goats	1,000,000
Cattle	5,400,000
Horses	145,000
Camels	25,000

Note: Excludes pigs and poultry

Exports of livestock products from Uzbekistan in 2004 (latest available data) were negligible, confined to raw sheep wool and skins (most probably karakul lambs), with a total value of quarter million dollars.

From Makhmudovich, 2001 (FAO) In 2000 Uzbekistan produced on average 35.5 million tons of milk, 821,700 tons of meat, 15,700 tons of wool and also 712,000 Karakul lamb pelts. Most livestock products are consumed locally and sold on local markets to procurement organizations, state and private enterprises. Until recently Karakul pelts were an export product, but by 2001 the state order was cancelled; only a small number (40,000 pelts) were exported, and most were sold locally.

Turkmenistan

Predominance of Rangelands

The Karakum desert covers approximately 80% of the country, and 307,000 sq km or 93% of the country's agricultural land is pasture, predominately desert pasture. Almost all cropland is irrigated either from rivers which rise outside the country or from the Karakum canal.

According to ILRI about one and a half million people live in the rangeland areas of Turkmenistan, or nearly 35% of a total national population of 4.5 to 5 million people. Reliable agricultural statistics for Turkmenistan are unavailable. The data in Tables ** and ** cannot be taken literally, but do give a general impression of the importance of livestock in the country and the potential role of milk and meat for national food supplies. Due to government restrictions, there is no official export of either meat or live animals, which is all targeted for domestic consumption.

Table 11: Turkmenistan Number of Livestock 2005 (FAOstats)

Livestock	Number
Sheep	13,000,000
Goats	370,000
Cattle	2,000,000
Horses	16,000
Camels	40,000

Note: Excludes pigs and poultry

Table 12: Turkmenistan Livestock production 2005 (FAOstats)

Production	Metric tonnes	Kg/person/y ear
Meat liveweight (exclude poultry and pigs)	193,000	38.5
Milk	1,400,000	279.2
Wool	20,000	
Hides and skins	34,899	

Independent Turkmenistan operates a centralized agricultural economy modelled on the agricultural reforms that were being implemented in the Soviet Union in the late 1980s, just prior to Turkmenistan becoming independent. Households are permitted to lease productive agricultural assets such as livestock and land from the state, and private ownership of livestock is common. But private ownership of agricultural land is rare and confined to small, irrigated plots, and there is no private ownership of pastures or water points.

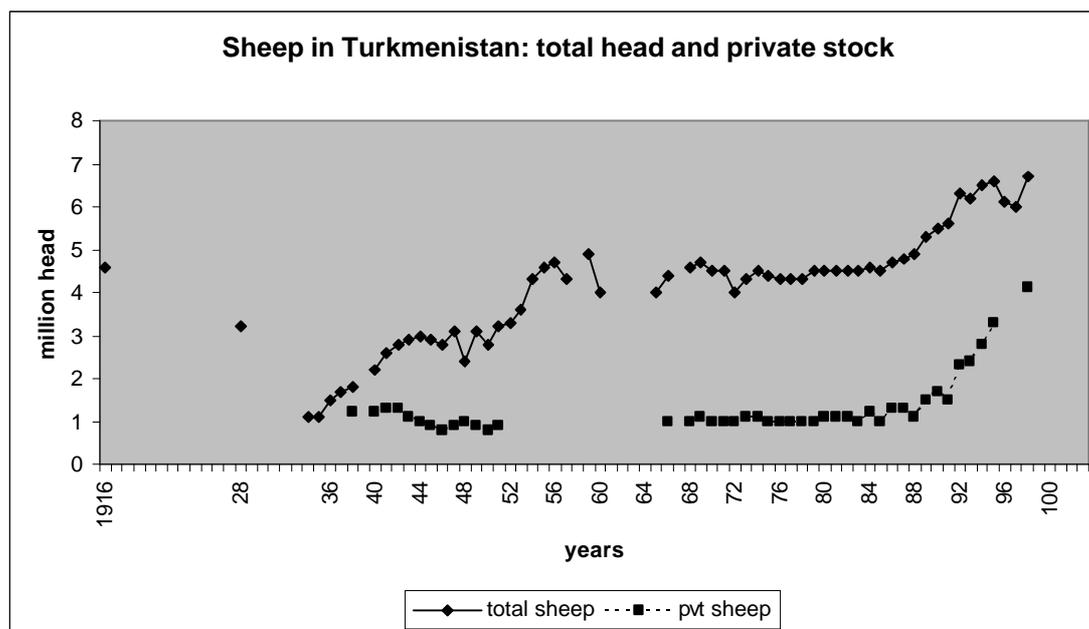
Figure 3 'Sheep in Turkmenistan total head and private stock' gives an indication of the changing importance of private livestock ownership after independence. A modest proportion of the national flock was always privately owned in the Soviet period, but private ownership expanded rapidly after 1990 until private owners now hold over half of all sheep, according to official figures.

The distinction between private and state-owned livestock is important because how animals are owned influences the way they contribute to the national economy. The owners of private animals are free to sell their animals or livestock produce to consumers, butchers or middlemen, usually at open-air markets on the peripheries of major towns. The trade is largely unrecorded and estimates of commercial offtake are not available.

The situation is different for state-owned animals which are meticulously enumerated because they are government property. As a result of this intensive monitoring, the contribution of this segment of the national flock to the national economy can be estimated with reasonable

accuracy. Under the leasehold system in Turkmenistan, shepherds that tend state-owned animals no longer receive a salary from the state or their collective farm, as they would have done under the Soviet Union. Instead, they are entitled to a proportion of the offspring of the flock or herd under their care in return for meeting production targets, replacing any state-owned animals that died or were lost, and bearing all the costs of herd maintenance - including all costs of transport, fodder provision, hired labour, pump purchase or repair, or, if necessary, the leasing of access to water points or pastures. Neither the state nor the collective farms provided shepherds with subsidised services or inputs.

Figure 3: Change from state to private ownership of sheep



Shepherds with breeding flocks of ewes were the single most common type of contractor in the livestock sector. The terms of their contracts assumed a 95% lambing rate with half of the lamb crop going to the shepherd and half to the collective farm. For example, for a flock of 1,000 ewes, presumed lamb production would be 950 with, at weaning, 475 head going to the shepherd and a similar number to the collective farm, with the farm having first claim to female animals. The shepherd bore all risks and purchased all inputs. The shepherds were responsible for shearing and kept all wool, and were entitled to slaughter a set number of animals for home consumption and to receive advances on their share of herd output prior to weaning.

According to shepherds' the terms of these contracts allowed a skilled and diligent shepherd to make a modest profit in most years, the exception being periods of drought, extreme winter weather, or disease epidemics. In sum, state-owned privately leased flocks were routinely productive enough to maintain a shepherd and his family despite an annual unrecompensed loss to the shepherd of 42 lambs per 100 ewes, on top of any animals sold by the shepherd to meet production costs. In other words, if these flocks had been owned by a commercial company rather than the state, they would have yielded annually a net profit clear of all costs including labour of 42 lambs per 100 ewes.

In this system, private animals were 'untaxed'. The rate of surplus extraction by the state from any particular pastoral community therefore depended on the balance of private versus state-owned animals held by the community. Behnke et al. (2005) surveyed a total of about 50,000 head of small ruminants at two study sites in 2002. At one study site in central Turkmenistan, sheep holdings were evenly divided between private and state animals; at another site in eastern Turkmenistan state-owned animals constituted about 80 percent of all holdings. Only the male offspring of state flocks were available for slaughter, since females were kept as replacement breeding stock, but the state also received most breeding females when they were eventually culled at the end of their reproductive life. It is therefore possible to calculate the rate of surplus extraction by the state from these pastoral communities. Assuming that half of the offspring of state-owned flocks were male, the government

immediately appropriated 12.5 percent of all offspring at the central study site, calculated as follows : 0.5 (the proportion of state-owned sheep in the region) x 0.5 (the state's share of offspring) x 0.5 (the proportion of males) = 12.5 percent. At the eastern study site the comparable extraction rate was 0.8 (the proportion of state-owned sheep in the region) x 0.5 (the state's share of offspring) x 0.5 (proportion of males) = 20 percent.

Quite apart from the private sale of animals and animal products on the open market, these calculations reveal the significant pastoral contribution to the state budget in the form of 'rent' paid by pastoral communities for the use of natural resources that were wholly owned and allocated by the state. If the two study sites are typical, the balance of state and privately owned sheep at these sites also suggests a substantial over-estimation of the number of private animals in official government statistics (Figure **) and a corresponding underestimation of the financial contribution of the pastoral sector to government incomes.

Mongolia

Predominance of Rangelands

Mongolia is one of the world's most pastoral nations, with 83% of the land classified as permanent pasture with an area of 1,293,000 sq km, making 99% of agricultural land area.

Pastoralists

The total population of Mongolia estimated by FAO in 2005 was 2,667,000 people. ILRI (2002) estimated that 77% of the national population lived in rangeland areas, slightly more than the proportion that do so in Somalia (76% of the national population) and probably the highest of any nation in the world.

Contribution to GDP and National Economy

As Mongolia is very much a pastoral nation, livestock are a major contributor to the national economy in terms of employment, food supplies and value added through domestic processing.

Table 13: Livestock populations in Mongolia, 2005 (FAOstats)

Livestock	Number
Sheep	11,686,400
Goats	12,238,000
Cattle	1,841,600
Horses	2,005,300
Camels	256,600

Table 14: Livestock Production in Mongolia, 2005 (FAOstats)

Production	Metric tonnes	Kg/person/year
Meat liveweight (exclude pigs and poultry)	194,500	72.9
Milk	359,000	134.6
Wool	15,000	
Hides and skins	56,208	

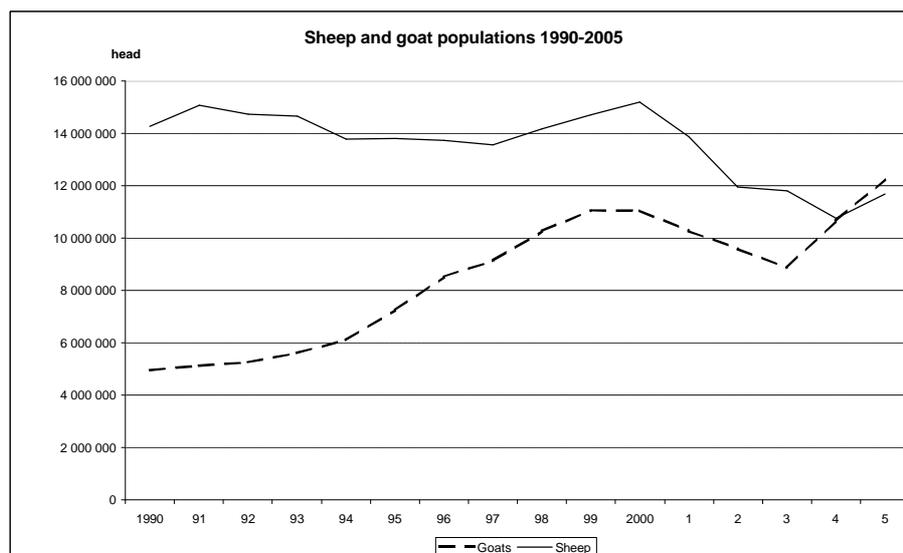
Cashmere production

Mongolia is the world's second-largest producer of cashmere after China, and produced 3,200 tonnes of raw greasy cashmere in 2004, from around 11.4 million goats. "The

importance of the cashmere industry to the Mongolian economy is clear: it provides income and employment for over a third of the population and raw cashmere and cashmere products are Mongolia's third largest export" (Lecraw 2005:1). Chinese manufacturers purchase about half of the raw cashmere directly from Mongolian producers to export for processing in China where manufacturing costs are lower.

The number of cashmere goats has doubled since the collapse of the Soviet Union in 1991, despite losses in 2001 and 2002 due to severe snow disasters. Note the familiar story of goat populations expanding at the expense of sheep populations (Figure **). But here the changes are (unlike Kazakhstan) so clear that they can be displayed on a figure with only one scale for the vertical axis.

Figure 4: Sheep and goat populations from 1990-2005 (FAOstats)



Contribution to Exports

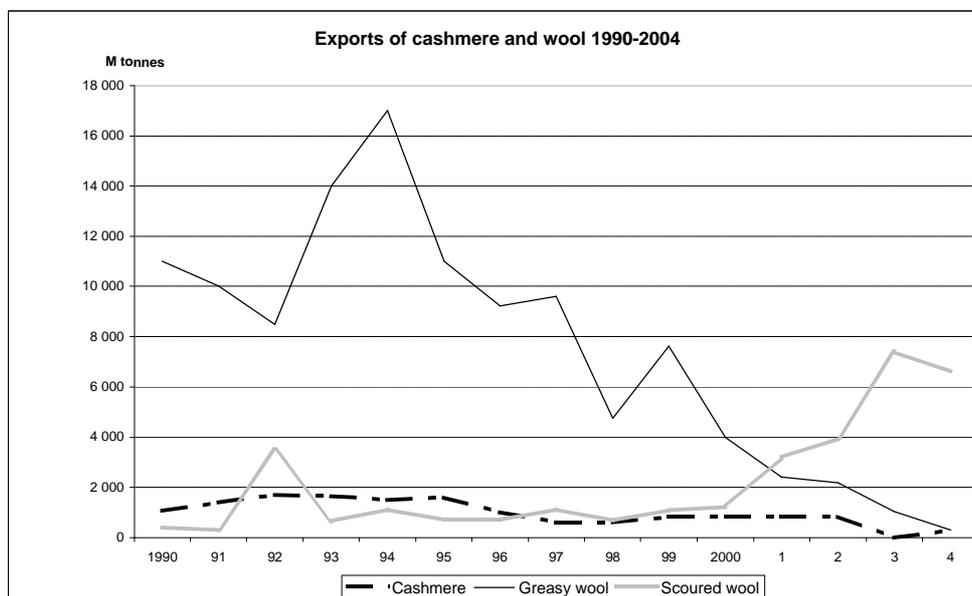
Livestock products made up 83% of agricultural exports in 2004 (FAOstats), dominated by cashmere exports at 30 million dollars – nearly half the total value of agricultural exports - though perhaps half the annual cashmere production is smuggled out to China and does not therefore appear in official statistics; the real export value is estimated as 97 million dollars (Lecraw 2005; World Bank 2003).

Table 15: Export value of livestock products 2004 (FAOstats)

Livestock exports including processed	000 \$
Dairy	40
Hides and skins	3,463
Goat fiber and cashmere	30,191
Wool	6,591
Meat	7,725
Live sheep	4,200
Total	52,210

Export of cashmere and wool does not present a simple picture. Fine goat hair exports have fallen off recently (possibly because of domestic manufacturers successfully bidding for scarce supplies against exporters, or a shift from official to unofficial export?) and there has been a shift from greasy to scoured wool as domestic processing has expanded.

Figure 5: Changes in exports of cashmere and wool 1990-2005 (FAOstats)



Cashmere contribution to herders' income

Over the past decade, sales of cashmere have become the single largest source of income – an average of 59% of total income- to Mongolian livestock owners with more than 300 animals (Gobi Initiative 2003). An earlier study by the World Bank (2003) found that households with more than 100 head of livestock gained about half their income from cashmere sales in 2002, while the poorest rural households gained 20% of their income from this source, with the bulk of their income derived from government pensions and allowances. About one third of Mongolia's population is engaged in herding cashmere goats (Lecraw 2005). The Bank concluded that cashmere "is a principal source of livelihood for Mongolia's poor".

At the beginning of the 2005 season in April, Mongolian livestock owners were receiving up to \$40 per kg of raw cashmere when selling to Chinese buyers at the border. At the same time in Kazakstan, livestock owners were receiving a maximum of \$15 kg, while some Kyrgyz farmers were able to get \$20 kg. In 2004, the average price for raw cashmere received by Mongolian livestock owners was \$22 kg. Producer prices in Kazakhstan and Kyrgyzstan were about half of this.

China

Predominance of Rangelands

Pasture land comprises 72% of all agricultural land and 41% of the total land area (Zhibiao 2005). The total area is 4,000,000 sq km (FAOstats) which means that China has the third largest pasture area in the world, after Australia and Russia. The pastoral provinces and regions (termed "grassland") extend in a band from the extreme south west, west and northern China, defined by their low precipitation, extremes of heat and cold, or too steep, saline or rocky for crop cultivation. There is a vegetation gradient from east to west, from tall grasses to desert and steppe moving westwards. At least seven distinct climatic zones can be recognised within the grasslands (CID/Winrock/SRM/New Mexico 1983 and Hu and Zhang 2001). The area of grassland is respectively two and three times bigger than that of cropland and forest.

Longworth and Williams note that the four border pastoral provinces or regions of Heilongjiang, Inner Mongolia, Xinjiang and Tibet represent almost 40% of China's land area, and that these ethnic minority regions traditionally formed the buffer zone between central Han China and other powers beyond the borders – in particular, the Mongol empire, Russia, Japan, and India. Over the past decade, the central Chinese government has been concerned to develop the western rangelands, “to secure more fully the strategic border regions that are populated by minority ethnicities by raising the low standards of living (Williams 1997: 308).

Pastoral groups

Because of its sheer size, China probably has the most people living in rangeland areas in the developing world: 19.5 million people, or about 1.5% of the national population of 1.3 billion (ILRI 2002; FAOstats). An early, comprehensive but now outdated English-language work on pastoralists in China is Longworth and Williamson (1993). They note that not all the population living in the officially-designated 12 “pastoral administrative units” are pastoralists, and that many pastoralists also live in provinces not classified as pastoral (p. 25). In the mid 1990s, the population living in officially-designated “pastoral counties” was estimated as 39 million people, but some of these were undoubtedly oasis cultivators or traders rather than pastoralists;

“...China has a huge pastoral industry of geopolitical significance, though scholars do not often realize it. Dwarfed by the numbers and political centrality of ethnic Han cultivators, minority pastoralists in China remain obscure, marginalised on the fringes of Chinese geography, scholarship, and national economic priorities...Northern China contains the world's third largest grassland, which supports the world's largest population of sheep and goats (Williams 1997: 308).

Since the study by Longworth and Williams was carried out in the 1990s, there have also been large-scale state-sponsored immigrations of non-pastoral agricultural peoples into the pastoral regions, e.g. Inner Mongolia and Xinjiang (Banks 2003; Thwaites et al. 1998; Williams 1997). With the soon-to-be-completed railway into Tibet, more immigrants are expected into this traditionally pastoral region (Bauer 2005). Moreover, as the market economy has boomed, some pastoralists with more herd wealth have given over management of their animals to non-pastoral Han Chinese (e.g. Kazakh pastoralists; Bedunah and Harris 2005). The explicit state policy of settling pastoralists has also converted many former livestock-keepers into mainly crop agriculturalists (e.g. Banks 1997 for Xinjiang; Williams 1996 for Inner Mongolia).

Most of the pastoral peoples belong to ethnic non-Han Chinese minorities, including Mongol, Tibetan and Kazakhs. However, there is by no means a direct correlation between ethnicity and pastoral occupation. According to the Population Census of 2000, 4 million people (17%) of Inner Mongolia's population were counted as ethnic Mongols, (Wikipedia). In Xinjiang Autonomous Region, one million out of 17 million were classified as pastoralists – Kazakh, Mongol and Kyrgyz – by the late 1990s (Banks 1997). The 2000 Population Census states that Xinjiang Autonomous Region contained 1.35 million Kazakhs, 150,000 Mongols, 174,000 Kyrgyz and 38,000 Tajiks, all groups who traditionally practiced pastoralism. The numbers of ethnic Tibetans is a matter of dispute between the PRC and Government of Tibet in Exile, but the government Census claims some 5 million ethnic Tibetans, of which 2.4 million live in the Tibet Autonomous Region and the rest in the Tibetan plateau areas of the provinces of Qinghai, Sichuan, Yunnan and Gansu.

By the end of the 1990s, six provinces or autonomous regions were mainly pastoral: Inner Mongolia, Xinjiang, Tibet, Qinghai, Sichuan and Gansu (Hu and Zhang 2003). Other provinces with relatively large numbers of pastoralists and amount of pasture land are: Ningxia, Hebei, Shanxi and Liaoning.

Figure 6: Ethnolinguistic groups in China (1967)



Source: <http://www.lib.utexas.edu/maps/china.html>

China - Ethnolinguistic Groups from Communist China Map Folio. U.S. Central Intelligence Agency, Directorate of Intelligence, Office of Basic Geographic Intelligence, 1967

Contribution to domestic economy

The dry remote regions of China’s pastoral lands have long been important suppliers of livestock products to the central economy and beyond. The traveller Own Lattimore described how in the 1920s :

“The markets for wool and hides, goatskins and furs, grew so rapidly that they could not be supplied by the parts of Manchuria and Mongolia nearest to the Chinese border. The demand was felt further and further away in the hinterland, and caravan owners grew rich in bringing down produce from the most distant pastures of Outer Mongolia [now the Republic of Mongolia], Chinese Turkestan [now Xinjiang] and the Tibetan border plateaux” (Lattimore 1929:7).

The Kazakh nomads of Chinese Turkestan were described by American missionary women in the 1920s as having “great wealth in live-stock and also in pelts, in skins and in wool, and bales of these goods were stacked besides the encampments, ready to sell to travelling traders, who collected such merchandise for firms in southern Siberia” (Cable and French 1942, p. 148).

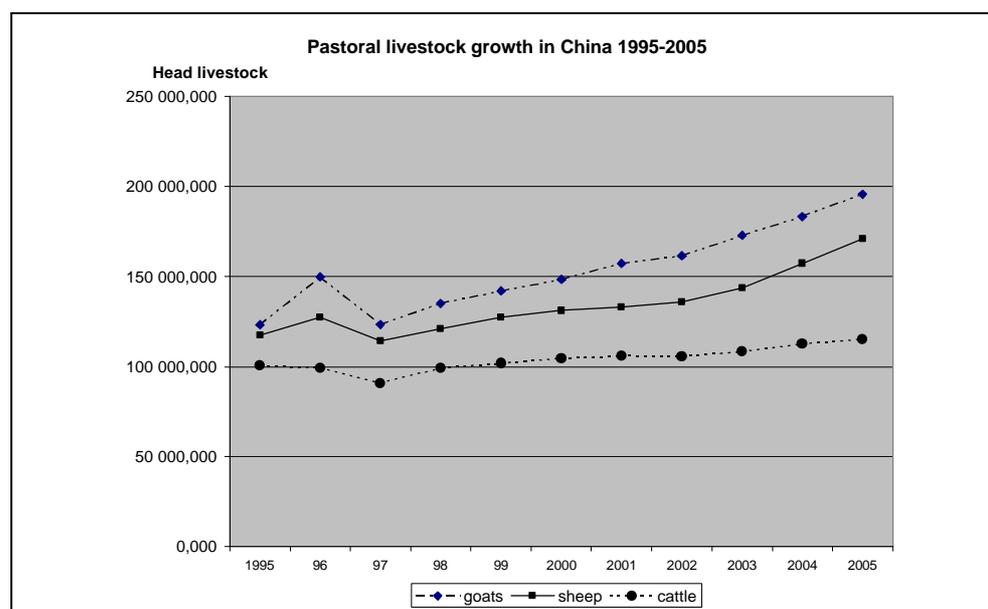
The grasslands now support one quarter of the cattle and one third of the sheep in China, producing 45% of the country’s beef and mutton, one quarter of the milk, 44% of wool and nearly half the cashmere from goats (Zhibiao 2005). Figures given in Hu and Zhang (2003) from the Chinese National Bureau of Statistics are higher, at 70% of the sheep, all the camels, 25 % of cattle and goats, 44 % of horses, as well as some 15 million yaks in the Qinghai-Tibetan plateau. Earlier data suggests that the pastoral zones of Inner Mongolia and Xinjiang were the main national production areas of mutton, beef and wool (Longworth and Williamson 1993). Studies of Inner Mongolia, for example, indicate that the share of livestock

output in agriculture has declined relative to crops, as non-pastoral farmers have migrated into former rangelands (Williams 1997).

In 1999 according to official figures in Hu and Zhang (2003), the six mainly pastoral regions produced 38% of the country's mutton, 28% of milk, 61% of wool and 31% of goat fibre (cashmere). However, as pork and poultry from the settled agricultural areas is the main source of meat in China, the overall contribution of the pastoral sector to national meat production is relatively low.

Production of mutton and goat meat has increased 2.5 times in the past ten years, while beef output has doubled (FAOstats). Between 1995 and 2005, the number of cattle rose by 15 million, sheep rose by 53.5 million, while the number of goats rose by 72.3 million. Horse and camel numbers declined in the same period, perhaps due to increasing use of motorised vehicles replacing animal transport.

Figure 7: Relative increase of goats compared to sheep and cattle (FAOstats)



In the fifty years from the establishment of the People's Republic in 1949 to 1999, the share of animal product value in the total agricultural production rose from 12.4% to 28.5%, reflecting rising living standards which led to increasing demand for animal products: "Animal products had a sellers market before the 1990s and supply was insufficient. Thereafter, animal production was dramatically promoted and farmers now have to face furious competition in a buyers market" (Hu and Zhang 2003: 94).

There has been a lack of economic information on the pastoral sector of China, as noted by one international scholar in the mid 1990s "...little published ethnographic data are available...The need for information from this area only grows stronger with China's own reassessment of its importance for continued national development. Within a domestic agenda, China hopes to increase the dietary intake of protein among its citizens by eating more red meat (Williams 1997: 308).

Research by both Chinese and international scholars on China's pastoral areas has long been dominated by the subjects of overgrazing, grassland degradation, desertification and its amelioration, as well as policies and regulations to control degradation. There have been very few analyses of the marketing of livestock products, nor the contribution of pastoral products to the national economy.

One such study is by Hamann, (1999) on Kazakhs in Xingjiang province of China. The study found that in the early 1980s when the ownership of livestock was privatized to households from state farms, Kazakh pastoralists rapidly increased the numbers of their animals and sales rates to urban markets. Livestock numbers held by Kazakhs doubled in the 1990s:

"The main reason for this development is a growing demand for meat, which reflects the general increase in living standards in Xinjiang and results in increased prices for animal

products. Moreover, the importance of and access to open markets improved steadily” (Robinson, Finke and Hamann, 1999).

Another study demonstrating pastoral response to changing market opportunities is on Tibetan nomadic pastoralists in Sichuan province (Levine 1999). Based on anthropological fieldwork in the early 1990s, she writes that:

“Serthar pastoralists participated in markets in ways that can be described as ‘modern’ and sensitive to factors of supply and demand, since households sold more of those items whose prices have increased...Different groups engaged in somewhat different economic strategies, depending on their resource base and access to town. Participation in markets, moreover, was a longstanding phenomenon...even before they were incorporated in a nation-state, Serthar individuals were familiar with money and responsive to pricing. They would withhold valuable pastoral products, primarily butter and wool, to sell and then purchase desired market commodities [mainly grain]” (Levine 1999: 162).

However, contrary to government injunctions, the pastoralists were reluctant to sell their animals, though households with more livestock wealth or greater market proximity did sell a greater proportion of their animals to towns, for meat. This reluctance arises from a combination of Buddhist religious beliefs regarding animal life, and pragmatic tactics to preserve as many animals as possible to survive the frequent blizzards and epidemics.

Table 16: Livestock populations of China, 2005 (FAOstats)

Livestock	Number
Sheep	170,882,215
Goats	195,758,954
Cattle	115,229,500
Horses	7,641,320
Asses	7,919,000
Camels	262,000

Not including pigs and poultry.

Table 17: Livestock Production in China, 2005 (FAOstats)

Production	Metric tonnes	Kg/person/year
Meat liveweight (exclude pigs and poultry)	11,938,014	9
Milk	28,670,480	21.6
Wool	400,000	
Hides and skins	2,533,746	

Contribution to exports

In the mid 1990s, one commenter wrote “Within an international agenda, China hopes to expand exports not only in meat and leather products but also in light industry, which relies heavily on [wool and cashmere] provided by sheep and goat husbandry (Williams 1996: 308). To a large extent, this goal has been achieved a decade later.

China is a major exporter of crop products such as maize, beans, tea, fruit and nuts; livestock products from the pastoral sector do not contribute significantly to agricultural exports, at only 3.5%. However, one product stands out as a major contributor to export value, and that is processed cashmere, which makes up 50% of the total value of livestock product exports by 2005. Exports of scoured wool more than trebled in the ten years from 1994 to 2004, though due to the falling world price of wool, the value of wool exports only increased by 50% in this period (FAOstats). Beef exports from the pastoral sector have also risen in recent years (Brown et al. 2000).

Table 18: Value of livestock product exports, 2004 (FAO stats)

Livestock exports including processed	000 \$
Dairy	55,148
Hides and skins	33,187
Goat fiber and cashmere	300,600
Wool	64,522
Horsehair	7,557
Meat	144,647
Total	598,104

Excludes pigs, poultry and fur animals

Wool marketing

In the last decade, China has become one of the main wool producers in the world, which has drawn pastoral producers further into the world market. This follows from Chinese government decisions made in the late 1980s, to decentralise and privatise wool processing, in part as a policy to develop the remote pastoral regions of wool production and increase the incomes of pastoral producers, for political reasons (Brown and Longworth 1995).

Cashmere marketing

China has 78 million cashmere goats that annually yield 12,000 tonnes of raw cashmere and produces 65-75% of the world's cashmere (China Forum 2005). Most of the cashmere goats are raised in the western and northern pastoral zones of Inner Mongolia, Xinjiang and the Tibetan plateau, where they thrive on the shrubby, sparse and low output vegetation. World demand and consequently prices for cashmere has risen sharply in the last few years, as Chinese companies began manufacturing low quality mass market garments and the liberalisation of the Chinese economy fomented domestic competition which bid up prices for cashmere (Westhuysen 2005).

Rising demand has led to pastoralists in China increasing their goat flocks relative to other livestock species, as they could gain more profit from selling raw cashmere in the Chinese market economy (Longworth and Williamson 1993). For example, pastoralists in the remote Tibetan plateau gained a substantial part (up to 70%) of their income from selling cashmere in the 1990s, despite government price controls and quotas on flock sizes. Prices that nomads received for cashmere rose 10 times from the beginning to the end of the 1990s, while sheep wool prices remained the same (Næss et al. 2004). In the central Tibetan plateau, "although sheep and yak are important for producing the necessities of life...pashmina (cashmere) is the major source of monetary income" (Phuntsog et al. 2004). This trade is many centuries old but has boomed in relative years relative to sheep wool sales (Ahmed 2004).

One consequence is that pastoralists began to favour keeping goats over sheep, which have usually been the preferred livestock species. This trend is widely reported, e.g. Bedunah and Harris (1999) for Kazakh herders in Gansu province; Ahmed for the Changtang region of Tibet (2004).

Longworth and Williamson (1993) comment for Inner Mongolia:

"Goats outnumbered sheep until the late 1970s but there had been a steady upward trend in the sheep population for about fifteen years prior to 1983. Sheep became more popular again in the late 1980s when wool prices rose to record levels...goat numbers almost doubled between 1983 and 1991 while the sheep population declined by more than 10%. The swing back to goats since households have been free to choose has been motivated by higher prices for cashmere relative to wool...and the easier care factor (lower costs) associated with goats compared with sheep, especially fine wool sheep" (p. 215)

The response of pastoralists to good market opportunities by raising more goats has however caused grave concern among Chinese officials and scientists responsible for the grasslands: for example, a professor at the Eco-environment Institute of Inner Mongolia (the main source

of China's cashmere goats) recommended that the herders must "change the nomadic herding manner" by sedentary winter feeding, planting fodder crops and enclosing rangelands with fences, in order to stop further desertification (China Forum 2005, p.175). Others are more outspoken, referring to the "long-term backward raising method of herdsmen [tending goat flocks]" (China Forum 2005, p.103).

The Chinese government recognises the pastoral contribution of products to the national economy and exports but is re-organising the methods of extensive mobile pastoral production, to reduce the perceived level of degradation and poor animal husbandry.

Siberia (Russian Federation)

Siberia refers to the geographic region of Asian north Russia, extending eastward from the Ural mountains to the Pacific Ocean and southward from the Arctic Ocean to northern north-central Kazakhstan and the borders of Mongolia and China. All but the extreme south-western area of Siberia lies in Russia, and it makes up about 58% of that country's territory with an area of 10,007,400 sq. km. In the most northerly Arctic region, there are 3,500,000 sq. km of tundra on which domestic reindeer graze (Vycius 1999). Siberia contains numerous small ethnic groups, some of which remain as reindeer pastoralists and are selling products from their herds. The last Population Census of the Russian Federation (State Committee on Statistics of the Russian Federation Vol 4. Nationalities, Languages and Citizenship 2002) contains numbers of people self-identified as members of the various ethnic groups (www.Wikipedia). In total there are some one million people who traditionally pursued reindeer pastoralism, but the numbers currently engaged in this way of life cannot be easily estimated.

Of the world's five million domestic reindeer, about 2.4 million are in the Russian far north (Konstantinov 2005). With Siberian reindeer herding we are talking about relatively modest numbers of exotic animals spread over a vast distance....the equivalent of 2.5 million very small cattle. To put this in perspective, there are an estimated 38.5 million cattle in Ethiopia alone, and 2.6 million head of cattle in Zambia. Nevertheless, after the economic shocks of the post-Soviet period, many of the reindeer pastoralist groups are now organised into ethnic associations and some have become successful at private marketing reindeer products of meat and antlers and are actively sourcing new markets.

Figure 8: Ethnic groups with pastoral occupations in Siberia



At the end of the first post-Soviet decade, Krupnik (2000) observed that in many areas across Siberia, the reindeer herding economy of the native people went into a deep recession during the collapse of state support and transition to market economies in the 1990s. By the early 2000s, some groups had experienced great loss of their pastoral livelihoods – in Kamtchatka it was reported that reindeer herding has crashed almost completely since 1990 and likewise for Chukotka (Stammler 2002). However, the reindeer stock decline was not universal and there were winners as well as losers.

Pastoral Peoples

To the west of the Ural Mountains, the Komi-Zyryan, roughly corresponding to Komi republic, enjoy a degree of autonomy within Russia. The number of Komi in 2002 was 293,400. In the northern part of their region, the Komi continue to practice reindeer herding.

The Nenets form the largest of the indigenous groups of northwestern Siberia (41,300) and are distributed over an area of taiga and tundra that extends from the White Sea in the west to the Yenisey River in the east. They were traditionally divided into the tundra Nenets, reindeer pastoralists who migrated with their herds between the tundra and taiga margins, and the much less numerous taiga, or forest, Nenets, with an economy based on hunting and fishing combined with small-scale and intensive reindeer husbandry. Closely related to the Nenets are the Nganasan (pop. less than 1,000), inhabitants of the Taymyr Peninsula to the east of the Yenisey; and the Enets (pop. around 200).

The Khanty (pop. 28,700) and Mansi (pop. 11,400) are closely related groups that inhabit the low-lying swamp and forest country around the Ob River and its tributaries. Their economy was traditionally based on hunting and fishing, but they adopted reindeer husbandry from the Nenets. The Selkup (pop. 4,250) were in their traditional economy very similar to their Khanty neighbours. They were hunters and fishermen living within the forested regions of the Ob basin. Northern Selkup kept domestic reindeer, which were used solely for transport. The Ket (pop. 1,500) traditional livelihood was based on hunting, fishing, and trapping for fur; only a minority kept small reindeer herds.

Summary of Encyclopaedia Britannica article on ethnic groups of northeast Siberia, by Tim Ingold

East of the Yenisey, the dominant and most numerous ethnic group is that of the Sakha (also known as Yakuts, pop. 443, 850). They are distributed over a large area centred on the Lena River, roughly corresponding to Sakha republic (Yakutia). The more southerly Sakha have retained an economy based on the husbandry of cattle and horses supplemented with

agriculture. Farther north, however, the Sakha adopted the hunting, fishing, and reindeer-herding economy of their neighbours.

The principal indigenous population of the mountainous taiga country stretching eastward from the Yenisey River as far as the Sea of Okhotsk are the Evenk, formerly called Tungus, (pop. 35,500). Their territory is vast, including about a quarter of the whole area of Siberia. The southern Evenk, inhabiting the regions of Transbaikal and the upper Amur basin, are principally horse- and cattle-keeping pastoralists. Otherwise, the forest-dwelling Evenk were traditionally reindeer-keeping hunters and trappers. Domestic reindeer were used primarily for transport and were both milked and ridden. Related to the Evenk are the Dolgan (pop. 7, 260) and the Even (also known as Lamut, pop. 19,500). The Dolgan inhabit the taiga and tundra south of the Taymyr Peninsula and have adopted many of the reindeer hunting and herding practices of their northern neighbours, the Nganasan (pop. 834).

The far northeastern region of Siberia is the home of the Chukchi (pop. 15,800), Itelmen (pop. 3,200) and Yukaghir (pop. 1,500). They are divided between inland groups practicing reindeer pastoralism and coastal, sedentary groups with an economy of maritime hunting and fishing. The Yukaghir appear to have adopted reindeer husbandry not long ago from the Evenk. Their numbers have been severely depleted, however, and only two groups (designated Kolyma Yukaghir and Tundra Yukaghir) have survived to recent times.

In a recent book on the Eveny of eastern Siberia, Vitebsky (2005) writes that their world is changing, just as the world has changed for all reindeer people, pre-eminently the Sami of Scandinavia, who show a way toward a kind of "reindeer globalism" that might enable the Eveny to sell reindeer meat as a delicacy to distant markets, export reindeer hide and fur and retain some of the old ways.

Stammler (2002) website on his dissertation project at the Max Planck Institute (Halle, Germany), fieldwork 2000-2001. When nomads meet the market: Property and economy among reindeer herders of Yamal, Western Siberia.

"The Yamal-Nenets Autonomous Okrug at the first glance looks like a success story in reindeer herding, continuing even in the difficult times of transformation after the Soviet Union. The number of domestic reindeer is constantly increasing, up to 523, 000, which is the largest concentration in Russia and the world. Selling the main production of reindeer, meat and 'panty' (fresh antlers), is no problem for the herders, since private commercial enterprises compete with the still existing 'Sovkhoz' (state farms). Thus, reindeer herding provides a secure basis for economic existence and the indigenous cultural identity of the herders. Such a development is unique in the Post-Soviet Russian North, where reindeer herding in all other regions either collapsed or is experiencing a major crisis. It is even more remarkable, given that Yamal provides 90% of the Russian natural gas production and the share of the native population is only 5 %."

"A number of factors seems to determine Yamal's starting point at the beginning of market-oriented reindeer herding: Yamal throughout the Soviet times had the biggest share in privately owned reindeer, and herders themselves clearly opted for the development of their private herds after the Soviet union".

"Yamal herders soon after the breakdown of the planned economy succeeded rather well in marketing their reindeer meat and antlers (panty) to various competitors. In the first decade after the Soviet Union, reindeer herding was the most stable branch of the local economy, so that more and more families opt for a live on the tundra rather than in the villages with material and social problems common throughout the whole former Soviet bloc".

Stammler reports on the second congress of Russian reindeer herders in 2002, organized by the Russian Association of Reindeer Herders (www. This was an important political event for Russian reindeer herding, since it was only the second congress after the collapse of the Soviet Union. One issue discussed was the regional administration's plans to build a big processing plant for reindeer meat according to international standards. A Yamal delegation was present at the last trade-fair in Berlin, "to study the possibility for Yamal reindeer meat to enter the European market". Another topic was that of overgrazing as herds grew:

"A herder called for a rational incentive to slaughter: If enterprises would pay better prices for meat, they would slaughter. But now for some cents per kg (actually the highest price seems

to be around 20 roubles, which currently equals 0.64 US cents), it is not worth doing it, so they rather let their herds grow, although this is bad for the pastures. For the local Department of Agriculture, the hope therefore lies in the planned meat processing plant. A Murmansk oblast (western Siberia) delegate reported about their successful cooperation with a Swedish enterprise for reindeer meat processing.

“Another topic mentioned by the ...[officials] was the need to regulate the activities of private commercial traders, who travel ...across the tundra selling vodka and other goods for meat and velvet reindeer antlers (panty). The [officials are] concerned about them working without licenses, not paying taxes and exploiting reindeer herders. The herders, on the other hand, seem to welcome this possibility for additional income. They do not differentiate between the abovementioned commercial traders and the officially registered private diversified reindeer enterprises. They have seen, that the latter also can be criminal or can bankrupt, so for them all are ‘kommersanty’.”

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