



TOTAL ECONOMIC VALUATION OF KYRGYZSTAN PASTORALISM

Abbreviations

ABCC	Agribusiness Competitiveness Centre (supported by World Bank)
ABMP	Agribusiness and Marketing Project (supported by World Bank)
GTZ	German Technical Cooperation
MOH	Ministry of health
MAWR&PI	Ministry of Agricultural, Water Resources & Processing Industry
NSC	National Statistic Committee
Som	Local currency
SVD	State Veterinary Department
SME	Small Medium Enterprises
TEV	Total Economic Valuation
UAE	United Arabian Emirates
WISP	World Initiative for Sustainable Pastoralism
VAT	Value Added Tax

Currency 1 USD = 38 som

Introduction

The following knowledge management report on utilitarian values associated to pastoralism and pastoralist areas was implemented by the NGO "Center for Development of Kyrgyz Nomadic Pastoralism" and the World Initiative for Sustainable Pastoralism (WISP), UNDP/GEF program. For the report creation was used the data collected by NGO "Center for Development of Kyrgyz Nomadic Pastoralism". The report is also a result of consultations and studyings with stakeholders (government bodies, pastoralist, NGOs, local governments). During report preparation¹ three workshops and a round table in local sites were conducted. Also additional data from National Statistic Committer, Ministry Agriculture Water Recourses & Processing Industry of the Kyrgyz Republic and International donor organizations was used. This report presents a holistic representation of the total value of pastoralism in Kyrgyzstan, using frameworks for Total Economic Valuation elaborated by MacGregor and Hesse (NED, 2006) and the report TEV of Kenyan Pastoralism (Kenya,2007) and highlights the strong economic rationale of the livestock sector, the significant contribution it makes to Kyrgyzstans' economy and environment conditions

Kyrgyz Pastoralism – is much more than simply a mode of livestock production; it is also a consumption system that supports Kyrgyz population, a natural resource management system, key to poverty reduction, development livestock contribution, decreasing external-internal migration and also support of the pastorable livelihood systems.

Policy decisions affecting pastoralism and dry lands/pastures cannot be safely taken in the absence of information over these existing contributions. Let's consider use of pasturelands as an agriculture arable land. These arable lands faced loosing of fertilizer, erosion processes, water shortage; these lands are also difficult to manage because of slope, lack of solar activity, and a short vegetation time. In this case use of these lands as pastures is a better way.

Table 1 shows trend of the changing land use in deal with agriculture and pasture lands. Today the amount of arable lands is decreasing. The reasons of these changes are indicated above.

Table 1: Land as agriculture and pasture uses and official designations 1993-2005 (thousands of ha)

Type of Use	1993		2001		2005
Arable land	1,384.8		1,367.4		1,333.9
Pastures	8,924.1		9,165.2		9,184.8
Sources: Govt. Resolutions Nos. 324, 479 and 521 on the Distribution of the Land Fund for 1993, 2001, 2005 respectively					

The multiple values of pastoralism must be understood and accounted-, whether they have a market value or not, whether they are produced or foregone. It is considerable that the report may be a crucial instrument to provide information for the livestock sector and pastoralism issues, to promote better decision for sustainable land, water and natural resources development and management, as means to poverty reduction and broad-based agricultural and economic growth.

These TEV framework looks beyond the immediate benefit on livestock and livestock production to consider the whole range of direct and indirect values, whether or not they are measurable. The value of pastoralism is often considered to equate to the value of livestock sales, sometimes perhaps also including the sale of certain by-products, such as dairy and hides and etc. While the direct and indirect values can be difficult themselves to quantify, and government data rarely disaggregates pastoral contribution to the economic from the rest of the agricultural sector, they do not capture the full value of pastoralism and livestock production sector.

The approach adopted in the TEV recognizes the incommensurability of some values but from the perspective of technical difficulties for their estimation rather than a scientific position based on the existence of deontological values and/or lexicographic preferences. Considering that WISP is working with local organizations and not with research groups, the NGO "Center for Development of Kyrgyz Nomadic Pastoralism" is attempting to highlight some key utilitarian values associated to pastoralism and makes a point about the lack of information regarding many other values and the inherent difficulties for their estimation. The knowledge management approach can be criticized because of:

- a) values are transferred out of time and place
- b) values are aggregated well beyond any theoretical justification
- c) future values need to be further development with working out of scenarios combine with research groups and government bodies

NGO "Center for Development of Kyrgyz Nomadic Pastoralism.

NGO "Center for Development of Kyrgyz Nomadic Pastoralism was created on the base of NGO SOS-LAND which has successful worked in this area during past decade in the Kyrgyz Republic. A current public activity is a new form of a relation public management and responsibilities for livestock and pastures after the changing in the structure of livestock

¹ Three workshops were conducted in Issyk-kul, Osh, Talas regions and round table was conducted in Bishkek

ownership (i.e. after USSR collapse). Therefore the NGO has built up a good relationship with pastoralists. At present time our NGO works on strengthening sustainable pastoral development, poverty reduction and environment management, working in a consultative manner through local, regional, national and international (as WISP) partnerships to ensure that appropriate policies, legal mechanisms and support systems are established to enhance the economic, social and ecological sustainability of the pastoral livelihood system. The aim of NGO is to provide the social, economic and environmental arguments for pastoralism to improve perceptions of pastoralism as a viable and sustainable resource management system.

Kyrgyz pastoralists

The Kyrgyz Republic is located in center of the Asian continent. Total area of the Kyrgyz Republic makes about 20 million hectares; the population is 5.1 million people. More than two thirds of all population of the country lives in rural areas for which the main source of the income is agricultural sector. There are seven regions in the Republic: Chui, Issyk-Kul, Naryn, talas, Jalaj-Abat, Osh and Batken.(2006). In the Kyrgyz republic the area of pastures takes about 9.1 millions hectares, almost half of all territory , forests takes about 4.2% territory of country. Agriculture is possible only on 5-7% of territory. The pastures are important sources of native habitat of various sorts of flora and fauna; therefore, management and sustainable use of pastures would have essential value for the protection of biodiversity. The pastures are also the important carbon sinks having essential value on climate change. The sustainable pasture use which could be promoted with this objective are improved pasture management practices, the introduction of pasture rotation, and reclamation of degraded land. By such means, the carbon stored in soils could be substantially increased². Thus land use changes which are beneficial to local communities would, in addition, fulfill a global environmental objective.

The Kyrgyz people- are one of the most ancient people of the central Asia. The first documentary mention about Kyrgyz is dated on 201 year B.C. Historically formed main employment of the Kyrgyz people during many centuries was the nomadic and semi-nomadic mobile pastoralism having extensive nature. Therefore in all the regions of the Kyrgyz republic have nomadic pastoralism (See figure 1) and at the present time Kyrgyz republic has not a close specialization in the agricultural of economy sectors i.e. farmer that are working in plant cultivation in the same time he manages with livestock sector. And “farmer” can have a sense like “pastoralists” because he has animals to get pasture services through delivering his animals to other person for looking after them.

Conceptualizing the value of Kyrgyz pastoralism

At this stage in the report the TEV framework is expended to provide a holistic overview of economic value in the pastoral context.

Part of the challenge in interpreting data is the new approach of assessment to working out of argument for policy decision makers on the livestock sector development. Though there is not a great deal of data on pastoralism in the Kyrgyz Republic, and some of the date that exists is of questionable veracity, a few attempts have been made to quantify the gross contribution of pastoralism to the Kyrgyz economy. In subsistence pastoral economy the difference can be striking. However, it is immediately clear that many values do not lend themselves to such simplistic compartmentalization. At this stage, the categorization of values, as direct or indirect, is less important than making sure that all key values are captured.

Direct values

Value	Data Source, type and quality
Livestock sales	NSC before 2007, viable data from surveys by NGO “Center for development of Kyrgyz nomadic pastoralism. Reports of international organizations.
Milk sales	NSC, massmedia “Bazar-Tamyry”, “Agropress”, and local surveys
Hides and skins	NSC, State department of veterinary, State veterinary laboratory
Subsistence	NSC, Case studies to estimate subsistence meat/milk use
Transport income	n.a..

Direct values-Unmeasured

Value	Data Source, type and quality
Employment	Case studies to estimate Labor costs for pastorlism in Chui region. NSC
Social capital	NSC.
Transport service	n.a. it is difficult to estimate because the pastoralists rare use vehicle transport. For destination of pasture they use traction

² First and Second National Communication of the Kyrgyz republic under the UN Framework Convention on Climate Change, Bishkek 2007

Indirect values-Measured

Value	Data Source, type and quality
Inputs to tourism	Direct revenue from tourism calculated by State Department of tourism. It is not available to get clear picture inputs of pastoralism to tourism (handicrafts, parks, forests)
Input to agriculture (manure, traction, transport)	Manure, traction transport. It is not available to monetize these actions
Forward and backward linkages to the economy	This value includes the veterinary services,
Taxes and levies	Tax revenues can be assessed from local and national records, although records may be weak <u>due to corruption.</u>

Indirect values-Unmeasured

Value	Data Source, type and quality
Ecological and rangeland services	Protecting and enhancing watersheds. Prevention of mudslides, impede the formation of landslides and avalanches in the mountains, regulate the water discharge in rivers making it more even during the year
Agricultural services	Financial role livestock towards in agricultural
Global goods	Value of pastureland natural resources, biodiversity and scenery
Socio-cultural values	As perceived by pastoralism
Animal genetic resources	2 institutions are willing to pay to preserve rare breeds.

Quantifying the values

The Livestock sector- a Key Component of the National Economy.

The Livestock sector is one of the strongest components of the rural economy. Livestock accounted for 44 percent of both total agriculture sector output in 2004 and half of the sectors impressive growth from 1992-2004 (Table 2). The growth observed in livestock sector due mostly to a strong increase in producer prices and a small increase in productivity³. Among private farmers, who have been the main engine of agriculture sector growth since Independence, livestock output has growth almost two times faster than crop output. The export of dairy products, animal hides and wool also demonstrates the sub sector's ability to compete on international markets and there is ample potential to increase the production and exports (See table 3).

Table 2. Composition of Agriculture Sector Output and Growth 1992-2004

	Gross Output 2004(mil.Som)	% of total Output	Change in Output 1992-2004
Private Farms-Crops	21,449	37	3,516
Private Farms-livestock	10,386	18	6,491
Household Plots-Croups	8,774	15	202
Household Plots- livestock	12,456	25	139
Large Enterprises-Croups	2,663	5	17
Large Enterprises- livestock	553	1	11
Total-Croups	32,886	56	160
Total-Livestock	25,396	44	161
Total-Aggregate	58,282	100	161

Data indicate orders of magnitude rather than actual growth, as they are based on changes in nominal values.
Source: NSC

Table 3. Commodity composition of trade, Kyrgyz Republic, 1999-2004 (mil \$)

Commodity	Exports		Imports	
	1999	2004	1999	2004
Animal and animal products	1.5	12.0	3.7	7.9
Hides and skins	2.8	9.3	0.6	1.9

Source: ADB, 2006

³ According to figure 2 the general growth of animal populations have been started since 1996 and in 2003 it aggregated only 5% and according to NSC the prices only since 1999 to 2003 has raised 50%

Small-scale farmers (household plots and private farmers own more than 96% of cattle and sheep, 97% of horses and 85% of poultry). The main measurement of pastoralists wealth is the number of the livestock. Table (table 4) below shows disparateness so that it can be seen that poor families have up to three sheep/goats, and rarely a cow or a horse. Poor families do not possess a car or agricultural machinery.

Households with average income, according to respondents, have ten times more livestock than poor families. Some families have Soviet era cars. Like poor families, households with average income do not possess agricultural machinery.

Rich families own substantially bigger heads of sheep/goat, horses and cattle. These households have one and sometimes two cars, and their own agricultural machinery

Table 4 Households profile in Chui Region

	Number of sheep/ goats, heads	Number of horses, heads	Number of cattle, heads	Availability of a vehicle	Agricultural machinery, pieces
Poor family	2.9	0.2	0.4	0	0
Average family	29.5	2.25	2.72	0.38	0
Rich family	250	24.8	13.8	1.37	1.3

As we see the sector substantially contributes to the national economy by providing high value food, income, employment and foreign exchange. There are also significant indirect benefits which include reduced risks to human health, more sustainable use of arable land and pastures, access to lucrative markets and the possibility to add value to livestock products. According to table 5 the Kyrgyz republic has more than half of territory of pastureland (see table 5), however the livestock sector gives only 25.396 mln. som of output in 2004. There are two reasons to explain why livestock sector gives less output than crop sector. The first one is a changing ownership and dramatically decreasing amount of livestock after USSR collapse. The second one is a seasonal pasture use so more then half of pasture land is used in summer season. Now days there is an incentive measure to develop livestock sector creating by government. It will be discussed in following sectors

Table 5: Pasture Land Use (as of January 1, 2004)(thousand of ha)

Total Area of pasture, thousands	regions	Percent
590	Batken	6,4
1638	Jalal-Abat	18
1350	Issyk-Kul	14,9
2795	Naryn	30,4
1283	Osh	14
633	Talas	7
859	Chui	9,3
The Kyrgyz Republic		
9 188,000 ha		100 %

Source: "Agro press" # 9, January 2004.

Figure 1: Livestock region in Kyrgyzstan



The livestock sector employs about 30% of the total labor force from Agricultural economical sector (58 - 65% of total country population are engaged in the Agricultural sector). The comparison of people and livestock population by regions gives us difference senses (See table 6). For livestock calculation the Kyrgyz Republic as well as Central Asian Countries uses "Sheep Equivalent Unit (SEU)"⁴. The SEU is used to calculate pasture capacity, government statistic and etc.

Table 6: People, involved in livestock sector (% from labour resources), and number of animals in seven pastoral regions of Kyrgyzstan (thousands of SEU), (2006)

region	People, %	Cattle,	Yak	Horses	Sheep and Gouts	Pigs	Poultry, million
Republic	21.0	1074.8	21.9	345.2	3876.0	77.7	4278.9
Batken	22.6	103.9	1.2	7.6	415.9	0.3	243.6
Jalal-Abat	6.6	188.7	0.2	51.1	641.1	1.2	667.7
Issyk-Kul	50.2	140.7	8.3	63.9	587.9	13.3	604.3
Naryn	20.8	115.0	7.5	89.1	662.0	0.0	203.0
Osh	27.0	251.1	3.9	73.1	792.4	0.7	607.5
Talas	22.8	564.0	0.2	21.7	358.8	1.4	235.1
Chui	22.2	208.0	0.3	37.6	395.4	59.2	1619.6
Bishkek city		1.7		0.2	5.6	1.3	69.7
Osh city		8.6		0.4	15.2	0.1	26.8

* - calculated using data from table 7
Source: NSC 2006

Table 7. Labor recourses and Employment in regions (thousands)

Parameters	2005						
	Batken	Jalal-Abat	Issyk-Kul	Naryn	Osh	Talas	Chui
Population persons	398,9	920,0	166,3	300,0	1,0 million	213,6	754,461
Able-bodied persons	228,4	343,8	153,4	246,0	577,1	116,8	420,050
Economically active	149,6	321,4	153,4	87,9	388,6	82,4	335,790
Registered Unemployment	21.6	31.5	14	12.7	18.4	5.7	

Source: modified table from ADB project "Agricultural Strategy Formulation"

Using table 5, 6 and 7 we calculated density of animals per hectare and Density of people are involved in livestock sector.

Table 8. Estimation of livestock sector for attracting people and increasing number of animals

region	Total amount of animals in SEU (thousands)	Density of animals per hectare, ha /1 SEU	Density of People are involved in livestock sector ha/pastoralist
Batken	528.6	1.12	6.53
Jalal-Abat	881.1	1.86	27.00
Issyk-Kul	800.8	1.69	16.17
Naryn	873.6	3.2	44.86
Osh	1120.5	1.15	4.75
Talas	944.7	0.67	13.03
Chui	641.3	1.44	5.14

Attempt to estimate labor and animal resources affecting on pasture resources and possibility further development of Kyrgyz livestock sector was made in table 8. Batken, Chui, Osh region have sufficient people that were involved in livestock sector. Density of animals per hectare in majority of regions indicates a good condition for sustainable pasture⁵ use especially in Naryn region. Talas region befalls margin situation between sustainable pasture use and overgrazing.

⁴ One head of cattle corresponds to 5 SEUs and a horse corresponds to 6 SEUs

⁵ Norm for grazing animals were taken from MAWR&PI and Giprozem institute for sustainable pasture management. According to this norm the pastoralists can graze 1.2 -1.3 SEU per hectare

Livestock population

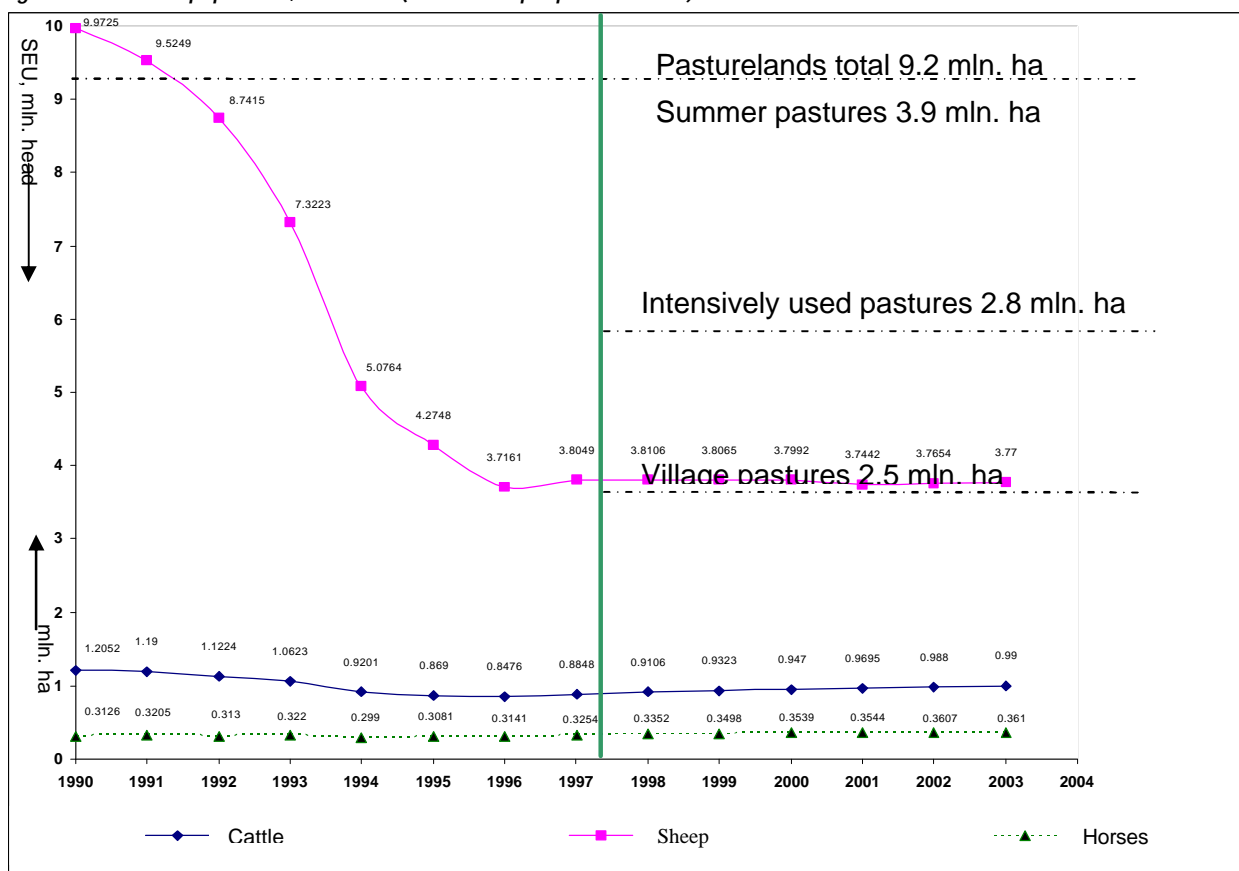
Livestock numbers are difficult to estimate and in fact the logic of the pastoral system dictates that livestock numbers must fluctuate over the space of a year. In Kyrgyzstan relies on livestock diversity to harness diverse pasture resources and typical pastoral herds and flocks include grazing cattle, horses, sheep and goats, pigs and poultry. Pastoralism also relies on a diverse array of livestock products, including milk, hides, meat and etc.

Although driven mainly by domestic demand⁶, the Kyrgyz livestock sector is the only net exporter of livestock products in Central Asia region.

It is notoriously difficult to gather reliable data on pastoral livestock populations, partly because of reluctance of producers to divulge such information and partly owing to the high degree of fluctuation in such herd and flock sizes.

Data from Giprozem presented in Figure 2, illustrate the year-on-year change in livestock numbers and quantity of seasonal usage of pasture in Kyrgyzstan between 1997 and 2003. This data is presented to provide an indication of change over time, although the period covered is short. These data indicates the frequent assertions that pastoral livestock populations are either exploding or imploding.

Figure 2. Livestock population, 1990-2003 (million sheep equivalent units)



Source: reproduced from Penkina. 2006 quoting *Giprozem* figures. The totals of the main categories of pastures differ somewhat from other *Giprozem* totals used, e.g., in Table 13 below.

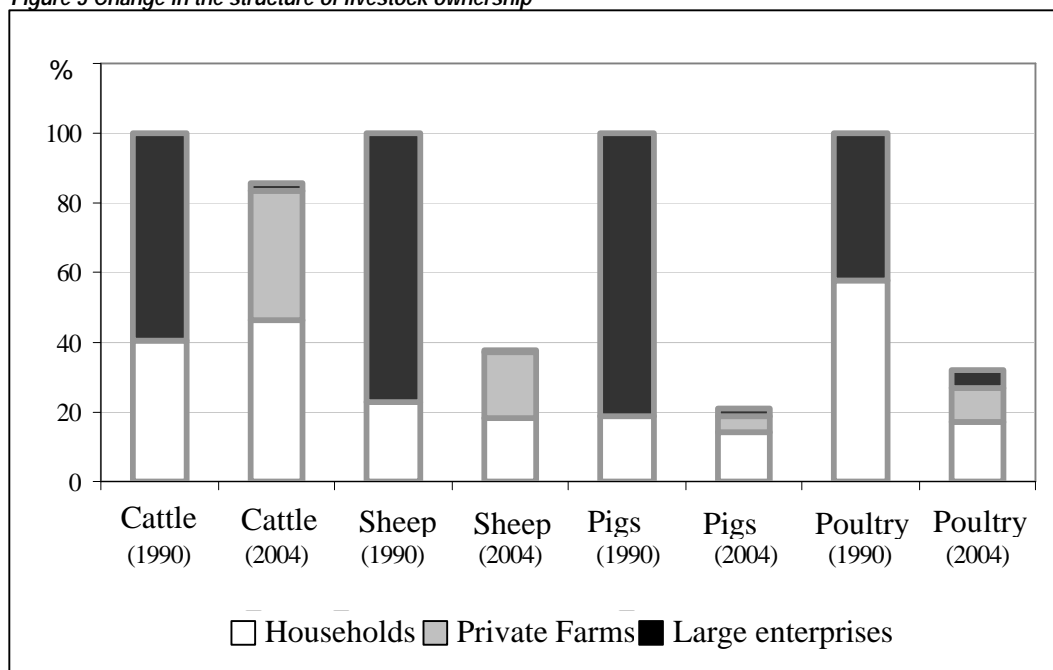
Note: One head of cattle corresponds to 5 SEUs and a horse corresponds to 6 SEUs

Livestock numbers dramatically fell from 1990 to 1996, and have remained fairly stable since, apart from a gradual recovery of cattle (see figure 2). Following the dissolution of the collective and state farms and the distribution of their livestock to the former workers, as large numbers of animals were sold or slaughtered. There has been a massive change in the structure of livestock ownership and the nature of livestock production systems. Large enterprise production has all but ceased. This resulted in abnormal age structures of the national herd and grossly distorted succession ratios, slowing the subsequent expansion of the industry. This decline was especially pronounced for pigs, poultry and sheep, as the severe financial problems faced by large enterprises, made it difficult for them to buy feed and replacement stock. Cattle and sheep have also assumed greater importance relative to poultry and pigs, consistent with the underlying pasture resource base for livestock production.

⁶ The most livestock productions from the regions are directed to the Bishkek or Chui Region (the capital of Kyrgyz Republic)

Among smallholders, the earlier dominance of livestock production on household plots has been overtaken by new, private farmers. But while these smallholder farmers have sharply increased production and sales, they have yet widely to adopt modern production techniques or to raise productivity significantly. Livestock marketing arrangements also remain rather rudimentary, despite the rapid growth of livestock product sales. The challenge now is to complete the transformation of smallholder agriculture as the basis for sustained livestock sector growth.

Figure 3 Change in the structure of livestock ownership



Source: NSC, 2004

The shift from public to private livestock ownership⁷ also dramatically changed the nature of production systems (see Figure 3) smallholder production systems now predominate, and among smallholders, private farmers have steadily replaced household plots as the main source of output and sales. While household plots have continued their active involvement in livestock production, as before Independent, their limited access to land and capital has constrained their ability to expand output as far and as fast as private farmers. The private farming sector has driven the growth in livestock sector output, while livestock output in the household sub sector has stagnated. In terms of the number of animals, the changes virtually offset each other, and the net effect has only modestly positive: I.e., the decrease in animals held by household farms has been offset by the increased number of animals in the private farms sub sector. Householders, however, remain important – especially in dairying.

According to a questionnaire survey⁸ the average monthly income of households in Chui pastoral region is 3,356 soms per household (approx USD 1006/annum/household). On the assumption that an average household consists of 7 people, average annual incomes equal about 5,750 soms/head/annum (about USD143/head/annum). This is considerably below the 2001 general national poverty line which was set at 7,500 soms/head/annum. The survey revealed that nearly 16% of households do not receive any income and rely on subsistence farming entirely.

Table 9: Number of Livestock farmers (pastoralists) and average herd sizes in 2003

	Number of farms with livestock	Average herd Size per farm	% of farms with less than 10 animals
Cattle	374,384	2,8	98
Sheep and goats	208,798	13,2	57
Houses	151,830	2,2	98

Source: NSC, 2003 Livestock Census

The majority of livestock farmers in Kyrgyzstan today are small (see Table 9). They prefer to act individually, selling to a trader for a discounted price if it means a quick sale. Marketing is rarely based on a planned strategy for disposing of surplus products. Instead, animals are sold when cash is needed to cover school fees, social obligations, food purchases, or health care needs. Smaller farmers are more likely to sell at a discount, having less time and money to spend on marketing and market access, less capacity to bargain with traders, and less

⁷ In 1991 after USSR collapsed the public animals which possessed to kolkhoze were distributed among all kolkhoze members

⁸ The questionnaire survey was made by NGO “EI-Pikir” in Chui region, 2005

access to market information. However, because of their ability to vary production levels and consume the products in the household, and because a wide choice of marketing channels, there is a certain resilience built into these systems. The challenge now is to enable these systems to become the basis for sustained supply of low-cost, high-quality and safe livestock products.

Households and the majority of private farmers generally consume around 40% of their milk production and sell the remaining 60% in either raw or processed form. These proportions are similar for meat production. Sales of young animals are limited because, in the face of greatly limited access to credit, smallholders rely on breeding their own replacement stock. Hides, skins and wool are sold more readily, because this is an active market for these products and because processing skills and capacities of the farmers are limited. Table 10 presents the manner of livestock products.

About half of all products marketed are sold through inter-market-traders, and a somewhat lesser quantity is sold directly to final consumers. There are few direct sales to processors, and almost nothing is marketed through marketing associations or cooperatives because these are only emerging.

There is substantial seasonality in the sales of livestock products. Most milk sales take place during summer; in winter, with lactation rates low, the majority of households consume all of their own milk.

Table 10 Manner of livestock production (thousands metric tons)

Manner of livestock production	Years								
	1990	1992	1994	1996	1998	2000	2002	2005	2006
meat	451.1	401.6	358.0	323.4	329.8	346.2	355.5	318.782	321.123
Milk	1185.0	960.9	871.6	885.3	972.7	1105.2	1173.0	1197.640	1212.098
Eggs*	713.8	591.0	201.6	159.6	175.8	207.6	243.1	317.504	328.746
wool	39.003	33.676	21.163	12.237	11.473	11.696	11.595	10.596	10.578
Skins & hide*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.929912	1.046358

* - mln. Pieces
Source: NSC, 2006, "Agro press" # 9, January 2004

The livestock contribution to country economy and some statistic data which relates to the livestock sectors that describe current situation. Contribution of agricultural sector to GDP is 47.5%. The Kyrgyz Republic can be accounted as a country with high agricultural potential. With regards to contribution of livestock sector to national economy is 20.9%. As more than 96% of cattle and sheep, 97% of horses and 85% of poultry are owned by small-scale farmers (household plots and private farmers), growth in livestock production has also made a significant contribution to the reduction of rural poverty. By increasing both incomes and wealth, livestock production has improved the welfare and reduced the vulnerability of all but the very poorest rural households. Even among rural households in the bottom income quintile, the value of livestock assets increased by approximately 50% from 1999 to 2002, and sales of crop and livestock products increased 4.5 times. The significance of pastoralists as livestock owners estimate as 16% from population of Kyrgyz Republic.

Direct values of pastoralism in Kyrgyzstan

The direct value of livestock can be measured and calculated with operating government statistics and other survey reports done by international institutions and local organization (NGOs, government bodies). But it is difficult to calculate such valuation because of systematic data absent. Most data was taken from NSC, survey reports of WB, ADB, government bodies and NGOs. NGO "Center for Development of Kyrgyz Nomadic Pastoralism" provided its own data.

Using data from these sources we have calculated Value of National Pastoral Herds (See table 11)

Table 11. Value of Pastoral Herds and off take (2006)

	National Herd (thousands)	Average Price per unit, som	Standard deviations of price	Asset value (Mln. USD)	% offtake	Value of offtake(Mln. USD)
Cattle	1074.8	15 000	7071,068	424.3	5	21.2
Sheep	3876.0	4 500	1724,98	459.0	36	165.2
Horses	345.1	25 000	9291,573	227.1	2.5	5.7
Total	5295.9			1110.4		192.1

Source: for calculation of the table were used data from NSC, newspaper "Bazar Tamyr" 2006

According to government data the table 11 shows value of offtake only 192.1 mln. USD. If we compare with Asset value the value of offtake has small part of asset value (17.3%). It explains that much market activity is made by unregistered bargains. Table 11 also shows high standard deviations of prices that also influence on the receiving accurate data. Taking account all these comments and mention that livestock numbers must fluctuate over the space of a year no less then 50% to increasing we can conclude following points

- The majority of livestock market activities are made by unregistered bargains (data do not allow the consumption and exchange of livestock within pastoral the pastoral community)
- The NSC or other governmental data need to use for estimation of value offtake in livestock production and calculation of value offtake more closely to accurate data
- The table shows high difference of prices. The price depends of animal quality, location and demands. (Many producers slaughter their animals after fattening them on summer pastures and before the onset of winter when feeding costs are high and there is notable weight loss).

The main production objectives of livestock sector are not to increase herd size. This sector economy also aims to increase milk yield, leather production, maintain an appropriate herd structure for short and long term reproductive success, and ensure disease resistance by selective breeding. Such national herd heterogeneity reflects and enhances a diverse production base, and flexibility of the system is an insurance policy that sustains livelihoods and promote conservation (it particularly attitudes to mobile livestock sector or mobile pastoralism)

Dramatic decline and subsequent stagnation in household incomes, combined with rising food prices, led to major changes in the demand for and consumption of livestock products (See table 12). Household incomes fell particularly sharply in rural areas where income levels are lowest. In consequence, consumption of meat and eggs fell by 50% and 27% respectively from 1995 to 2003, and dairy product consumption declined by 48%. Since about 2000, aggregate consumption of livestock products has finally begun to recover due to economic growth and rising incomes, especially in urban areas.

Table 12: Trends in Livestock Product Consumption

	Year			% of change	
	1995	2000	2003	1995-2003	2000-2003
Meat Products (Kg/capita)	25.0	12.8	12.6	-50	-2
Urban	26	15	16	-39	7
Rural	24	12	12	-50	0
Dairy Products (Kg/capita)	171.2	87.4	88.6	-48	1
Urban	87	62	75	-14	21
Rural	204	101	96	-53	-5
Eggs Products (unit/capita)	67	51	49	-27	-3
Urban	49	44	57	16	30
Rural	65	54	60	-20	11

*Calculation in milk equivalents 1kg milk equivalents is equal 1.2 liter of milk
** calculated for 1995-2002.
Source: Derived from Household Budget Surveys for 2000 and 2003.

Households and majority of farmers consume about 40% produced milk and meat as mentioned in above the remaining production they realize to the market in raw or processing means. The Table 13 represents aggregation of livestock consumption and production in households and farmers.

Table 13. Disposition of livestock products produced by private farmers in % (2003).

	Cattle				sheep				Horses			
	Milk	Meat	hides		wool	meat	skins		milk	meat	hides	
Consumed	33	35	3		33	62	12		43	49	5	
Sold	53	65	97		67	38	88		38	51	95	
Processed	14	0	0		0	0	0		18	0	0	

Source: Basis farm survey 2003

About half of all products are sold through inter-market traders, and a somewhat lesser quantity is sold directly to final consumers. There are processed activities in the Households and private farms⁹ almost do not make except milk production.

There is also a challenge in estimating the real value of different products (i.e. the difference between the value received by the producer and retail price). There continues to be traditional inter-regional price variation, but many of the regional price differences have narrowed in the past few years. Important to note is the sharp effect that the existence of a local processor can have on inflating prices in a given region. The interregional price differences are closely linked with differences in processor demand in the various region of the country.

The table 14 presents the value chains for small and large dairy producers, respectively, with prices based on the summer season. The shows the distribution of revenues for one liter of raw milk as it passes through the chains. The calculation of taxation assumes the payment of 20% VAT and 4% sales tax, based on the final sales prices as discovered.

Table 14. Milk producers' value chains for selected processed dairy products

Chain	Price of each categories (Som /liter)		
	Small cheese plant	Large cheese plant	Large milk processor
Producer	4	4	4
Trader	2	2	2
Processor	3	5	10
Trader	3	-	-
Retailer	3	5	7
Taxes	3	5	7
Total	18	21	30

Source: Basis market survey, 2007

The first chain in Table 14 represents the sale of milk by a small producer to a local cheese plant through a local trader and the subsequent sale of cheese to the final consumer. The largest share of the price paid by final consumer is made by processing industries (processor) combining with service sectors of economy (trader, retailer) and taxes. The producer prices consist only 22% (4som), with the balance being fairly evenly divided among the other actors in the transaction chain. Total taxation on the chain is 3 Som, and this is actually paid at the last point of retail.

The second chain represents the sale of raw milk from small producers to a large processor a local trader and the further sale of the cheese to the local consumer. The value shared by the producer remains unchanged, whereas the processor's and retailer's margins are higher than in the forest chain because the chain is shorter and the final sales price is higher. Total taxation now amounts to 5 Som and is collected at two points- the processor¹⁰ and the retailer.

The third chain represents the sale of milk by producers to large processors through local traders for the production of pasteurized milk which is then sold to consumers. The largest return in the chain is made by the processor (10 Som), due to the relatively high net margin. The producer's share is sharply lower (only 20%) because of the high price for pasteurized milk in comparison with raw milk. Total taxes are 7 Som, or 24% of the total value of the chain.

For calculation in the following section of dairy value has been taken end of market price. The average price from table 11 is 23 Som.

Meat production

The marketing infrastructure for live animals in Kyrgyzstan is generally well developed. All major rural areas have live animal markets and they are well attended by traders, producers and exporters. This ensures that prices are competitive and transparent for sellers and there is little opportunity for buyers to act in a collusive manner. Most meat sales pass through the bazaar system. The table 15 presents the value chains for beef and mutton and composes the most common value chains for sales of meat and live animals expressed relative to kilogram of meat.

The first and the third chains on the left represent the sale of live cattle by producers to inter-market and then on through the bazaars¹¹. The vast bulk of the value in this chain accrues to the producers (about 92%), while the shares of the inter-market traders and bazaars sellers are relatively small, reflecting the fact that they work on small margins but large volumes. Traders'

⁹ Households and private farms can be accounted as pastoralist

¹⁰ According to Kyrgyz Tax code (1996). The Kyrgyz republic has VAT system and patent system for large and small enterprises respectively

¹¹ The nature of intermarket is appeared because some producers can not buy their animals and they use mostly to middlemen who are present at all markets.

return are higher when they purchase live animals and then slaughter them, because they can achieve more weight gain by cutting out the meat than if they purchase carcasses. They also benefit from the revenue of the hide sale of the slaughtered animal.

Table 15: Value chains for selected live animals and meat products

Chain	Price of each categories (Som per kilogram)			
	Beef-bazaar	Beef-retail	Mutton-bazaar	Mutton – retail
Producer	120	120	130	130
Trader	25	25	30	30
Retail	-	15	-	24
Tax / bazaar tax	5	20	10	26
Total	150	180	170	210

Source: Basis market survey, 2007

The second and the fourth chains represent the sale of live animals as above mentioned, but with the meat being sold through retailers. Although producers sell at the same price, their share in the chain decreases, largely because the final consumer price is higher. Retailers are realizing attractive returns (Som 15-24 per kilogram sold), and the value of taxes amounts to Som 20-26.

Because of operating by NSC data which is expressed in total meat production, for calculation value of meat production in the following section is needed to calculate average price of meat. The average price of meat is approximately 178 Som

Wool and hides

Wool. There are two main products from sheep production-meat and wool- and the only poorly functioning supply chain appears to be in the wool sector. A large number of producers are excluded from the supply chain due to the lack of coverage of the traders and semi-processors that are involved in this business. However, the demand for wool (both coarse and fine) has only really re-emerged in the past three years (Table 16). It should be noted that there are two main types of sheep breeds in Kyrgyzstan- the traditional fat-tailed local breed (meat), and the merino cross which was prevalent during Soviet times. The sale of greasy wool from the fat-tailed breeders is not financially attractive to producers.

Hides and skins.

Where livestock producers are selling cattle on a carcass basis, they realize good returns from the sale of cattle hides. The sale of carcasses produces an attractive margin, but it is considered to be low given the risks associated with animal fatality rates, potential price volatility of both meat and feed. Processing of hides and skins (Table 13) is a major business, largely driven by export to China.

Table 16. Value chains for selected animals by-products (in som)

Chain	Price of each categories			
	Coarse wool (Som/kg)	Fine wool (Som/kg)	Sheep skin (Som per piece)	Cattle hides (Som per piece)
Producer	20	50	42	500
Trader	10	9	21	206
Processor	36	37	33	290
Tax / bazaar tax	4	4	4	4
Total	70	100	100	1000

Source: Basis market survey

There is considerable private individual enterprise involved all the way along the market chain. Overall, it appears that while the institutional and physical market infrastructure may be rudimentary, market chains for livestock products operate fairly efficiently. Certainly, market chains and distribution networks are continuing to develop.

Because of operating by data which is expressed in total wool and skin/hide productions, for calculation value of wool and skin/hide productions in the following section is needed to calculate average price of wool and remaining price for sheep skin and cattle in the same price. The average price of the wool approximately is 85 Som

For estimating of direct values from pastoralism including processing industry and service sectors of economy in the Kyrgyz republic is used calculation of livestock production in previous section and based on statistical data and survey report. The result of the estimations are shown on the following table

Table 14: Estimates Direct Values from pastoralism per capita¹² per annum (2007)¹³

	Proposed estimates (USD)
Dairy consumed	48
Dairy sold	96
Livestock consumed	15
Livestock sold	15
Hides consumed	-
Hides Sold	0.3
Skin consumed	-
Skin sold	0.5
Wool consumed	1.5
Wool sold	3.2
Total	179.5

Table 15: Estimates of total direct values from pastoralism

	Proposed estimates (USD)
Per capita per annum	179.5
National total per annum	915, 450, 000
Percentage of GDP ¹⁴	20.5%
Direct value per hectare ¹⁵	99.6

Indirect values of pastoralism

In this section, we consider indirect values of pastoralism which was indicated in the subsequent section. However, some of these values may overlap and other values may not be entirely attributable to pastoralism. The data presenting in this section illustrates other areas of activity that can be associated with pastoralism.

The "system" that constitutes pastoralism is majority recognized, but often not given much weight in policy decisions that affect individual pastoral resources. Management of pasture land has relationship with risk and needs well development strategy and management in both local and country level. The main of challenges that mobile pastoralists are faced: to access key resource pockets such as water access; veterinary services which becomes more actual in the country; Sufficient logging forages for winter season; to access cattle driving way for getting winter or summer pastures.

Measuring the value of different elements within a system is complicated by the fact that some of those elements are often integral to the entire system and is not divisible. The following things such as water resources, pasture resources, forages, natural second –helping (salt), agricultural crop and etc, illustrate some of the values associated with key resources on which pastoralists depend and could be considered as natural asset values associated with pastoralism. However, more work is needed to fully comprehend the opportunity cost associated with competing uses of these key resource patches¹⁶.

Inputs to tourism

Since 1998 the Kyrgyz republic has been starting to develop tourism sector. Now days we cannot estimate influence of tourism sector to pastoralism. But pastoralism plays one of the main roles in supporting this sector of economy through cultural, food environment services. Almost all tourists visit Issyk-kul region that has Issyk-Kul Lake and well developed infrastructure (See table 16). The Tourism disaggregating by the region and getting estimation value of pastureland to tourism in each region is unavailable

¹² According to NSC the total population of the country accounts 5.1 millions people

¹³ milk production and consumption are calculated using tables 6, 9 and 10 and other statistic data; livestock production (meat) and consumption are calculated using tables 6, 9 and 11 and other statistic data; Wool, skin and hides productions and consumptions are calculated using tables 6, 9 and 12 and other statistic data

¹⁴ Based on a GDP of 3 billion dollar, although clearly if these figures were added to GDP (and the rest of the subsistence economy were valued) Kyrgyzstan would be significantly higher than 3 billion.

¹⁵ The total area of pasture in the Kyrgyz republic is 9 188 000 hectares

¹⁶ Total economic valuation of Kenyan pastoralism, 2007

Table 16: Tourism sector indicators (2006)

Tourists	GDP	Government Annual revenue (USD)
219 442	3.6%	164 600 000

Interaction with agricultural sector (manure, traction, transport and logging forages)

These are another indirect values of agricultural and pastoralism that is not well captured in the official reports and literature. The livestock and agricultural sectors have mutually benefits. According to official report ("Agropress" 2004), the forages of the national pasture estimates about in 2167.8 thousand tons of forage unit¹⁷ but additional forages producing by agricultural (Alfa Alfa, maize, oats, processed sunflower, sugar beet and etc.) it is difficult to estimate (it occupies about more then 200 thousand hectare). Taking into account price of oats we can calculate potential value of pasture forages. The price of oats is 230 USD per ton and potential value of pasture forages is equal to 499 mln. USD.

The pastoralists in Kyrgyzstan use manure as heating in winter season and fertilization of arable land. It is also difficult to monetizing the value of manure. Other services to agriculture from livestock sector are traction and transport. These activities also has got nothing attention from official reports and other sources.

Inputs veterinary services to livestock

Veterinary Drugs. The past system of state distribution of veterinary drugs through the "Zoovetsnab" outlets has been replaced by private operators. The registration of veterinary drugs and vaccines, previously the responsibility of the State Veterinary Department (SVD) has recently been shifted to the Drugs Registration Unit of the Ministry of Health, but according to the new veterinary law SVD is to regain this responsibility. Accordingly, the SVD has initiated the preparation of the suitable laboratory, but the budgetary resources are insufficient to do this to the required standard.

The SVD has always been responsible for the issue of import licenses for veterinary drugs and vaccines. Importers of veterinary drugs estimate the annual value of domestic demand to be in the range of US \$ 500,000 to US\$ 1,000,000¹⁸. However, there is only a limited number of officially recognized and licensed in veterinary drugs, and they face still competition from illegal importers, partly because little or no action is taken against the latter. The table 17 shows official estimated cost of material losses of the pastoralist from animal diseases. It is clear for making policy decision to develop veterinary services in the country for decreasing of material losses of the pastoralist.

Table 17 Livestock deaths in 2006

Species	Population ('000)	mortality	%	Estimated cost of material losses (USD)
Cattle	1074.8	1990	0.2%	785 526
Sheep and goats	3876.0	8820	0.23%	1, 044,473
Horses	345.1	384	0.11%	252,632
Pigs	77.8	579	0.74%	48,148
Total				2,127,779

Source: reproduced State Veterinary Department, 2006

Inputs of pastoralism to Public sector

According to Kyrgyz Law the pastures are property of the state. And pastures are managed by their leasing. But intensive and remote pastures (summer pasture) are often used without any formal agreement, though payments are often made on the spot to representatives of the rayon or oblast administration; this also tends to result in such payments not being recorded. The total amounts that are to be paid are very small. The aggregate of 7.7 millions soms (203 thousand USD) shown in table 18 represents merely 0.2% of total subnational budgetary revenues

Table 18: Registered Use of Pastures in the Kyrgyz Republic

	Total		Near village		Intensive		Remote	
	2003	2004	2003	2004	2003	2004	2003	2004
Share of pastures leased	7%	11%	4%	14%	10%	14%	7%	6%
Rent fees collected (millions som)	4.8	7.7	n.a	n.a	n.a	n.a	n.a	n.a

Source: Gosregister

Other interaction pastoralism with different sectors of economy

No reports have been found of efforts to measure linkages between pastoralism and other sectors of economy. The value other products (agricultural products) that the Kyrgyz republic produces can be estimate as enabling resource that offers livelihood diversity for pastoralists. (See table 19)

¹⁷ Forage unit are used for calculation forage crops 1 kg of forage unit = 1 kg of oats, 1kg of forage unit = 2 kg of hay

¹⁸ According to data of the State Veterinary Department

Table 19: The main Kyrgyz national crop products

	Volume of products ('000 tons)
Wheat	1013.7
Maize	398.5
Cotton	105.9
Tobacco	8.7
Sugar beat	812.2
Oil-bearing crops	77.7
potato	1308.2
vegetables	678.0
forages	-

Indirect values, Unmeasured

Environmental services

Around 90% of forests of the Kyrgyz republic are located at an altitude of 700 to 3600 m above sea level. In accordance with forest code of the Kyrgyz republic, all the forests of the country are considered to be especially valuable natural recourses, exercising the environmental, ecological, sanitary, curative, and other protective functions.

As of January 1, 2003, the forest fund of the Kyrgyz republic amounts to 3321,5 thousand hectares, including the forest-covered area of 864,9 thousand hectares, or 4.32% of the total area of the country. The forest fund area managed by the State agency for Environment protection and Forestry (SAEPF) under the Government of the Kyrgyz republic amounts to 3275.7 thousand hectares, including the forest-covered area of 834.7 thousand hectares.

Despite the fact that the Kyrgyz republic is referred to the forest-poor territories, the Kyrgyz forests have their own unique features and play a great ecological role in the global processes or regulation of the environment status and prevention of the negative changes of climate. Growing on the mountain slopes, these forests contribute to prevention of mudslides, impede the formation of landslides and avalanches in the mountains, and regulate the water discharge in rivers making it more even during the year. Therefore, it is hardly possible to overestimate the significance of the Kyrgyz forests both for Kyrgyzstan and for the whole of Central Asia, where the agricultural is based on the irrigation.

The forestry sector of the Kyrgyz republic is not a deciding branch in the national economy of the country. Its contribution to the national economy is inessential. The gross output of the hunting and forestry branches taken together amounts to 97.6 million soms, or 0.09% of the country.

Table 20 Annual Potential Economic benefits of selected Environment services in Kyrgyzstan

	unit	Volume	Value mln.(\$)	benefits Local/global
Fuelwood	'000 m ³	36	0.4	Local
Grazing/fodder	'000 ha	9188	5.5	Local
Wildlife	-	-	-	-
Timber	'000 m ³	40	6.0	Local
Medicine herbs	Metric ton	-	-	Local
Honey/hives	Metric ton	1157	3.4	Local
water	Km ³	47	371*	global
fishery	Metric ton	745	1.9	local/global
Forage	In Forage unit and thousand tons	2167.8	499	Local
Salt	Metric ton	36500	4.8	Local
Carbon absorption	Metric ton	890.000	3.6	global
Other & hunting			2.6	local
Total			898.2	

* according to government agreement the state cost of 1m³ of water is equal 0.03 som

The table 20 shows environmental services (or activity) which needs to be consider in pastoralism activity because these activities can be estimated and have vital value. Mainly all these services have close tradeoff between conservation and use of the land. For instance now days the pastoralists face with problems of using pasture near the forests or within forests and using the land of the State Forest Fund for animal driving because of harmful affect on forest resources and policy decision maker needs develop sustainable interaction between pastoralism and other environmental services.

Conclusion

Continuing a long Kyrgyz tradition, the livestock is one of the strongest components of rural economy. The sector contributes substantially to the national economy by providing high value food, income, employment and foreign exchange. There are also significant indirect benefits which include reduced risks to human health, more sustainable use of arable land and pastures, access to lucrative markets and possibility to add value to livestock products. The processing and marketing of livestock products are also attractive to women.

During the USSR era Kyrgyzstan pastures sustained decades of overstocking and increasing signs of degradation. The disintegration of the USSR precipitated a corresponding collapse of the Kyrgyz rural economy and resulted in a dramatic decline in livestock due to the large scale slaughter or bartering of livestock in order for rural populations to survive the initial crisis period. At this period low numbers of livestock and the collapse of the support systems previously in place, resulted in traditional transhumance practices ceasing. However fifteen years later the numbers of livestock in Kyrgyzstan are beginning to gradually recover. Though efforts have been made during these intervening years to replace Soviet era institution and management systems, they have had mixed results and limited practical impact on the ground. Therefore some values need to work out for livestock valuation. Other values remain contentious, particularly the value of services that are ascribed to pastoralism, and requires a lot more research to understand the role that livestock inputs to environmental and economic of country.

Some conceptual and methodological issues have resolved, including the most appropriate way to present the measurable values of assets, income and inputs. However, it is already possible to present rough estimate of direct values of pastoralism to Kyrgyz's economy and to use this report data to compare with other published estimates of potential costs, or economic value, or alternative land use options

A number of points are clear from this report, despite the some of the points were omitted in some areas:

- Pastoralism could be even one of the main contributors to domestic trade and export earnings, given the high value of the subsistence economy.
- Pastoralism is predominantly meet and dairy production system, so a policy focus on wool and fine wool production need to repair previous position
- Data from livestock and pastoralism sector remains poor and government unable to make appropriate policy decisions in an information vacuum.
- Pastoralism should get more deep attention by investment and governmental support – it is making its significant returns of inputs to the State and could become a much greater contributor with greater investment.
- Nobody pays attention to the indirect values of pastoralism, but pastoralists have major role to provide in service provision to a wide national and international beneficiary.
- The number of animals can reach a freshhold of available pasture capacity in near the future. And government should regulate this issue in present time.

This report reviews the key issues that must be addressed to programs and policies needed for understanding pastoralism values. The main issues that need to be tackled to achieve sustainable rangeland management are animal productivity, disease control, farmer know-how, improved interaction with other environmental services, marketing and agro processing. Implementation successfully, these items in programs and policies with value estimation that gives crucial conception to facilitate sustainable continued growth of pastoralism and further the sector's contribution to economic growth and poverty reduction.

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