



*World Bank Technical Paper*

*Europe and Central Asia Environmentally and Socially Sustainable Development Series*

# KAZAKHSTAN

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*Rangelands in Transition*

*The Resource, the Users and Sustainable Use*



*Tjaart W. Schillhorn van Veen*

*Ilja I. Alimaev*

*Bulat Utkelov*



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## Acronyms and abbreviations

ALR	Agency for Land Resources
AUM	Animal unit month
AWR	Agency for Water Resources
BLM	Bureau of Land Management
DM	Dry matter
FHC	Committee for Forestry and Hunting
FSU	Former Soviet Union
GEF	Global Environment Fund
GP	<i>Gosudarstvennoe Predpriyatie</i> Government-or paratatal agency (such as railroads, factories, research stations)
JSC	Joint Stock Company
KK	<i>Kristianskoye Khozaistvo</i> – private family farm
Kolkhoz	Collective farm
LF	Large group farm (up to 50 families)
LLP	Limited Liability Partnerships
LPK	<i>Lichnoye Podsobnoye Khozaistvo</i> – small holder- subsistence farm
Leskhoz	State forest farm
LU	Livestock unit (cattle equivalent)
MREP	Ministry of Environmental Protection
MoA	Ministry of Agriculture
NEC/SD	National Environmental Center for Sustainable Development
PC	Producer Cooperatives
SGP	Small grant project
Sovkhoz	State farm
URA	User right association
WB	World Bank

## Currency Unit = tenge (Tg)

### Average exchange rate (Tg/US\$)

<b>1995</b>	63	<b>2000</b>	142
<b>1996</b>	67	<b>2001</b>	147
<b>1997</b>	75	<b>2002</b>	153
<b>1998</b>	78	<b>2003</b>	148
<b>1999</b>	115		

## Weights and measures

li	liter
g/li	gram per liter
h	hour
ha	hectare
kg	kilogram
m	meter
mln	million
mm	millimeter
mt	metric ton
pc	pieces

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## EXECUTIVE SUMMARY

### ***Background***

- i. Kazakhstan is the sixth largest country worldwide in terms of the size of its grasslands. Rangelands covered nearly 186 million ha (70% percent of all land resources of the Republic) and, historically, were a driving force in the country's economy as a source of fodder, food, fuel, medicinal plants, recreation areas, etc. These rangelands supported livestock as well as a large wildlife population that included large herds of the now threatened saiga antelope. Most of these lands are drylands with an average rainfall between 100 and 300 mm, and a wide temperature-range of over 30° C in summer and less than minus 25° C in winter. Some of these lands, such as the southern saxaul woodlands, and the Betpak Dala and Moyun Kum deserts in south central Kazakhstan contain unique landscapes and ecosystems. Kazakh rangelands also contribute to the global carbon balance by storing substantial amounts of carbon, an asset that may have commercial and economic value to the country and its landowners when carbon trading is developed.
- ii. An estimated 6 million people (40% of the population) depend directly or indirectly on these resources for their livelihood, and many live in poverty. The transition during the 1990s has seen a decline in many of agricultural services previously provided by the Government, while the population has been slow to adjust to the new economic conditions. Much of the rangeland has been abandoned because of lack of access, degradation, lack of water and lack of basic amenities for sustainable livelihoods (i.e. electricity, medical or educational facilities, shops, etc.). The abandoned or under utilized rangeland is estimated to be close to 100 million ha. Indeed, when compared to countries with similar grassland resources, Kazakhstan does not appear to fully realize the benefits that proper use of these resources offer, both economically and environmentally. As such, it has been deemed appropriate to review the issues, and suggest policies and actions that will assist the Government and the country in the sustainable use of this valuable resource.

### ***Past Policies and Current Issues***

- iii. In the 20<sup>th</sup> century the Kazakh rangelands have suffered from a variety of failed policies and their implementation, and the effects are still reverberating today. During the Soviet period, the rangelands deteriorated considerably due to a variety of questionable policies in land use. The first questionable policy was the ill-conceived ploughing up of fragile rangelands for short lasting agricultural production in the late 1950s (the *Virgin Lands* program). This was followed by a policy promoting of irrigated agriculture with unsustainable water use, excluding livestock from important winter grazing and leading to lowered water tables and land desiccation that pushed livestock out to less productive grasslands. Then in the 1970s the Soviet Government embarked upon a livestock development program that included the creation of large livestock farms, development of rangeland water resources and export of meat and wool. However, it was largely based on mining the grassland resources, and led to rangeland overgrazing and its deterioration. Ecologically risky land use for oil drilling, implementation of space programs and nuclear testing further destroyed valuable land. As a result of these policies and actions large tracts of land have become wasteland and desert, and it has been estimated that less than 50 percent of the original 186 million ha of rangeland are usable, and only one third (about 60-70 million ha) is currently used. Finally a poorly executed live-

stock ownership transfer and bankruptcy procedures during farm privatization in the mid 1990s, exacerbated by declining terms of trade for agricultural and livestock products, declining world market prices for wool and a breakdown of transportation and marketing systems, decimated the livestock inventory (an estimated \$ 2 billion loss in assets). The change from state-owned and centrally-planned collective farming to private farming and herding has left a large group of rural farm workers in poverty, often in remote areas without access to services, suppliers and markets.

- iv. The present Government and the public are aware of the detrimental effects of these policies, and are contemplating how to correct and reverse the trend. This is leading to three policy questions:
  - a. how to prevent further deterioration;
  - b. how to manage these lands (and the available water resources) in conditions of market economy;
  - c. whether and how to rehabilitate the damaged and destroyed pasture lands which are estimated to encompass 30-40% of all grazing land.
- v. The decline in livestock during the mid 1990s decreased the grazing pressure on some rangelands, and the deterioration of infrastructure (wells, powers, transport) reduced access to many remote areas. The transition also led to introduction of new herd ownership forms, reduced mobility and increased pressure on pasture around settlements. This pasture have severely deteriorated in the last decade. As such there is a perceived need to support remote rural communities that could play an important role in maintaining the land. The main policy questions are:
  - a. whether – and where – judicious investment in minimal infrastructure in remote areas is economically, socially or ecologically justified, and if so,
  - b. how to develop and prioritize -both geographically and technically -these interventions.
- vi. Previously, nearly all rangelands were communally owned and used. During the Soviet period the land was considered state owned and used by state and kolkhoz (collective farms); most of these farms no longer exist. After independence a number of laws and regulations have been enacted, mainly to regulate land use and ownership; all were targeted at arable land tenure but have also been applied locally to govern the use of range- and pasture land. Little attention was given to the peculiarities of rangeland management. This was inappropriate, as the fragile rangelands, with their multiple use and multiple users, require a specific approach. Consequently, the rangeland resources are currently used without proper regulation or oversight. The new Land Code (2003) allows private ownership of arable land as well as for much of the rangeland. Besides development of regulatory enactments aimed at introduction of the private land tenure and provision of lands to various users, the Government is facing the question of institutional oversight of the property both privately and state owned to assure its long-turn efficient use as from ecological and economic points of view. In compliance with the Land Law natural grasslands and that were previously used by population as grasslands and pastures cannot be privately used (article 26.3); approximately 17 million ha of such lands to be publicly as “commons” (and are becoming another example of the tragedy of “commons” use). After passage of the Land Law in 2003, the Government is now facing the following strategic issues:
  - a. determining models to be used in land tenure decisions (different models probably including pre-Soviet rangeland tenure and management systems);
  - b. how to assign land ownership or land use rights in an equitable fashion that will ensure economical and sustainable use;
  - c. the extent of land tenure and user rights, and whether non-agricultural benefits (including carbon rights) are to be included;
  - d. how to organize the State’s oversight role of land use, to assure sustainability of this national resource and maintain its potential; and
  - e. whether and how to decentralize the land management and monitoring functions, and increase the interest and responsibility of users.



## Vision

The overall vision is a sustainable and efficient land use that recognizes the vulnerability of this natural resource that, in view of its size and biodiversity, is of global importance. The land has the potential to provide income and sustainable livelihoods to users, including numerous rural settlers and herders. The land users are interested in maintaining the resource, but are currently lacking the skills and power to realize their potential and that of the land.

It is foreseen that most of the vulnerable lands will stay within the domain of the State, but that certain parts can be privately owned and/or leased for commercial use. Whatever the tenure system, there is a need for the State to monitor and assure sustainable use.

- vii. The role of the State will likely change from that of the sole manager of these lands to that of monitoring and regulation of these lands to assure that the use by (private) owners or leaseholders is sustainable and does not adversely affect the long term quality of the land and its flora and fauna, and still support the livelihoods of the traditional or new users. The driving force in management of these lands should be their sustainability. The driving force for the users should be the management of the various risks associated with the use of these vulnerable lands and their biodiversity, especially the risk of damage through overuse (including overgrazing). New opportunities for sustainable land use may arise with the emergence of an understanding of the value of these rangelands in terms of carbon sequestration and, ultimately, carbon trading.

## Recommendations

- viii. Rangeland law In view of the importance of this resource (see Vision box), that covers close to 70% of the country territory, serious consideration needs to be given to the development of a separate law or completion of the land code that will include rangeland provisions to guide the rangeland use whether for grazing, wildlife, or other single or multiple use forms. The provisions for rangelands need to recognize the dynamic and diverse primary productivity of these arid lands and consider the adoption of the locally most appropriate land tenure systems (long-turn leasing, ownership, exclusion, etc.) and include the following:
  - a. group management (by pastoral people) and mobility;
  - b. integrated use of rangelands, arable lands and forests;
  - c. new systems and opportunities for land quality monitoring and monitoring capacity, based on modern concepts of flexible land use and land use (grazing) planning.
- ix. Regulations may also guide the use and management of recently abandoned land, and whether to change the status and designation of the land currently in the State Land Reserve Fund. In the least these legal enactments could provide for transparent rules on allocation of such lands for shared tenure. Land leasing and/or ownership decisions need to take into account that:
  - a. the lease or land title includes access or ownership of the associated water resources;
  - b. essential (grazing) areas cannot be leased out or sold separately if it would seriously disturb the annual grazing cycle or threaten the mobility of transhumant herds or flocks as well as of migrating wildlife; and
  - c. protected land, whether national parks, cultural heritage sites, etc. should be excluded from long term leasing.
- x. Establishment of a rangeland management function Under conditions where long-term leasing or private ownership is accepted, there is an important role for the State to ensure sustainable use of the land and its natural resources. This oversight role would require:
  - a. the capacity to develop integrated master plans for defined ecosystems such as watersheds or desert areas;
  - b. the provision of guidelines and guidance for the development of rangeland use plans by land owners or lease holders;

- c. an entity that would carry out the State's oversight role; and
  - d. the capacity of local range managers to amicably resolve conflicts among various resource users.
- xi. At the national level this monitoring role may include the capacity to review and set policies that focus on the reduction and management of pastoral risks, on capacity building in early warning (environmental risk, fire risk, etc.) and monitoring systems, and on sustainable and socially accepted land use. Much of the land management could be decentralized, but this would include a need for:
- a. strengthening local (hakimate) local government capacity in land use planning and risk management – by integrating technical early warning information with information received from (traditional) land users;
  - b. strengthening local community capacity, backed by the State, to develop and monitor range use plans, and monitor leasing and appropriate land use.
- xii. In order to establish this range management and monitoring function, the Government may need to stratify the role of various institutions and ministries in land management, and consider separating the management role (now mainly associated with the Ministry of Agriculture and Land Resource Management Agency) and the monitoring and soil quality control role (probably given to the Ministry of Environment). It should also stratify the responsibilities of central, oblast, rayon and local governments. After distribution of functions some capital investment may be needed to re-equip monitoring agencies with modern tools (including diagnostic/ analytical equipment, GIS, transport, etc.) and skills (i.e. training).
- xiii. Priorities. In view of the changes in management as well as in the biology of the rangelands in the last decade, the Government may need to assess these developments in order to prioritize constraints and future interventions. In particular it is suggested to:
- a. improve diagnostics by surveys on, (i) the provision of water in the rangeland, (ii) the level of degradation, and (iii) the interaction between various resources users (livestock, wildlife, etc.;
  - b. invest in improving capacity in planning and implementation (especially at the local level)
  - c. decide on the appropriate institutions that are responsible for management and monitoring of the use of these lands, and where needed, upgrade their capacity.
- xiv. Regional development plans The development of the vast rangeland area needs a new approach that takes its peculiarities into account including, (a) low population density, (b) high transaction costs of supporting such population, and (c) the fragile land and lack of water. The responsibility for detailed planning and implementation of regional development plans can be transferred to the local or regional levels, with a greater focus on local initiative and feasibility assessments. If necessary, material resources should be provided for. These regional plans will take into account the different agricultural (mainly livestock raising) opportunities as well as non-agricultural opportunities such as wildlife production, viewing, and hunting, and other forms of tourism. Regional plans can be based on common interests or focus on cohesive natural settings such as a watershed. Experience has shown that a major hurdle to overcome is a shift in thinking in central government agencies to convince them that local communities can, and should, play a major role in deciding on the most appropriate initiatives and implementation. Separate plans may need to be drafted for specific resources such as the range wildlife population.
- xv. Infrastructure improvement As so much of the infrastructure (water supply, migration corridors, diagnostic tools, etc.) has been lost during the transition, a judicious effort should be made to assist communities in their rehabilitation. Such rehabilitation should only be accepted after development, review, and acceptance of comprehensive range- or watershed- plans, including economic analysis implementation and an agreement with communities that they will finance a large proportion of the costs.
- xvi. Risk reduction<sup>1</sup> The reduction in risks of overuse of the land and in the vulnerability of its users can be achieved through a number of interventions, in particular:

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<sup>1</sup> Examples of specific investments may be derived from Bank projects in Mongolia, Kyrgyz Republic and Egypt.

- a. land allocation and tenure (including water rights) that allows mobility (i.e. assuring herders access to an annual grazing cycle);
  - b. require land owners and users to develop rangeland management plans that are based on protecting the long term sustainability of the land rather than maximizing forage off-take; support for long term weather forecasting (especially drought and “dzud” prediction);
  - c. greater focus on quality fodder cultivation and preservation (which will take some grazing pressure of the rangelands);
  - d. encouragement of establishing multi-purpose herder organizations that are trained and able to reduce risk through improved pasture management;
  - e. improved rural services such as (seasonal) markets for livestock and fodder, provision of pinfolds, water supply, repair/maintenance of agricultural machinery, livestock breeding and veterinary services;
  - f. future introduction of other risk management tools such as risk insurance, pasture rotation, advisory services.
- xvii. Risk reduction includes maintaining some of the mixed-purpose land use systems, such as the mixed forestry-livestock use of selected saxaul forested rangelands by herders, and the seasonal use of floodplains and/or other winter- or summer- grazing areas by pastoralists. Resource access should be guaranteed through long-term leases, right-of-way (corridor) covenants, and access to water, preferably on a community basis. The community should be given the responsibility for maintaining the resource and essential infrastructure – such as wells, livestock holding pens, shearing sheds, fodder stores, etc.
- xviii. Human resources and skills development Unlike countries with similar grassland resources, Kazakhstan has no training program for range managers. Such skills are urgently needed at rayon and oblast haki-mate levels and in the private sector. Serious consideration should be given to develop programs and curricula in range management at the technical school and university level, to train rangeland managers in modern methods of range management, monitoring, and conflict management. This needs to back up by improved analytical and/or research capacity.
- xix. Financing This supervisory and advisory role of the State can partly be financed from the republican budget (as there are obvious public interests), and partly by re-investment of taxes and fees collected from users. Taxation or lease fees need to be flexible and should be related to the benefits reaped by users. The taxes and user fees could finance infrastructure improvements, but the State may provide judicious co-financing, especially where there are larger social benefits.

## 1. THE RESOURCES

### Rangeland Resources

#### *Grasslands*

1. With over 180 million ha of steppe and mountainous areas, Kazakhstan is the fifth largest country world wide in terms of pasture resources (after Australia, Russian Federation, China, United States and Canada)<sup>2</sup>, and it is first in the world in terms of rangeland per livestock unit. Covering such a wide area indicates a great diversity of resources from desert rangelands in the Kyzyl Kum to lush meadow pasture in the Altai (see table 1). Approximately 10% of these lands are cultivated and, traditionally, the Kazakh rural people rely heavily on animals for their livelihood. The human population in the rangelands and deserts of Kazakhstan is estimated at 4-5 million.
2. The rangelands<sup>3</sup> are mainly located in four major ecological zones (see annex figure 1):
  - i) The flat steppe zone, which forms a broad band along northern Kazakhstan and is characterized by grassy vegetation, especially feather grass (*Stipa* spp), fescues (*Festuca* spp.), and wild oats.
  - ii) The semi-desert, which forms a band through central Kazakhstan and is characterized by shrubby vegetation dominated by wormwood (*Artemisia* spp.).
  - iii) The desert zone that is mainly found in southern and western Kazakhstan. This zone contains sand deserts with the characteristic woody vegetation consisting of saxaul (*Haloxylon* spp.), sometimes mixed with tamarisk and *Artemisia* (see annex table 2)
  - iv) The southern pasture and desert areas that can be used throughout the year for grazing.

These zones are intertwined with smaller eco-niche systems such as northern forest steppes, and eastern highland forests and foothills. There are also small eco-systems such as mountainous and sub-mountainous meadows and swamp eco-systems along rivers and lakes. The latter were an important link in the migrating of livestock and wildlife. Many pastures are multi-purpose lands but used as a rule to pasture livestock. About 40,000,000 hectares contain wooded pastures and saline lands.
3. Access to these areas is restricted by lack of water, rain or snowfall which allows only seasonal use. In some zones, such as the desert area, the use may be limited to a couple of weeks only. The annual volume of precipitation varies between 100 and 300 mm in the drylands (it may be higher in the mountains), with an inter-annual variation between 25 and 34%.
4. Kazakhstan's pasture resources deteriorated severely between 1960 and 1980 due to the conversion of pastureland to agricultural land and other use forms, and to overgrazing. This deterioration was further aggravated by the declining water table that specifically affected the winter grazing areas along rivers and around the Aral Sea. Substantial land resources have been desertified and/or covered with salt, and are unsuitable for grazing<sup>4</sup>.

<sup>2</sup> See White et al. 2002

<sup>3</sup> The term rangeland includes grasslands. However, perennials rather than annual grasses dominate in the rangeland vegetation especially in the semi desert.

<sup>4</sup> The World Bank-financed Syr Daria and Northern Aral Seas project is expected to address some of these problems.

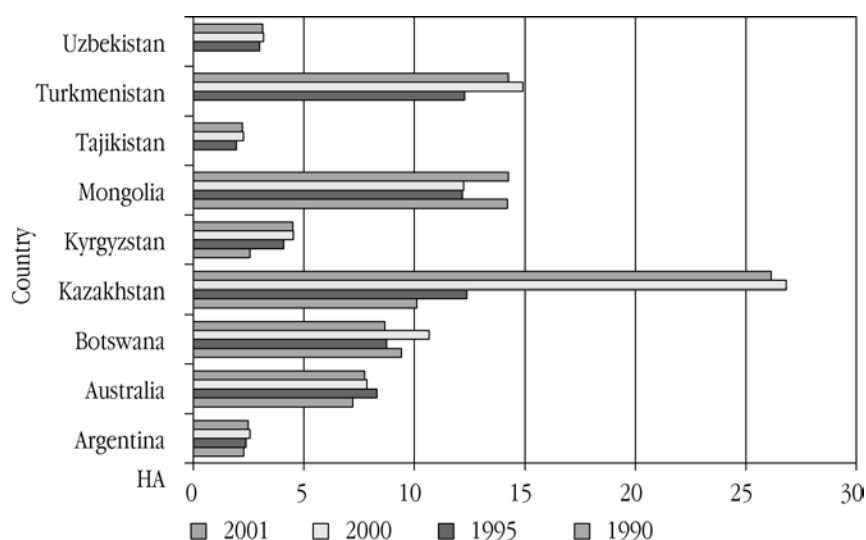
**Table 1. Main land types in Kazakhstan**

Ecological/regional zone		Land (ha × 1000) Percent	Currently usable grazing area <sup>(a)</sup> ha × 1000	Major perceived technical constraints <sup>(b)</sup>	Viable producers (%) <sup>(b)</sup>	
Steppe	Northern moist Steppe	15,670	20%	3,250	Mostly farmland and woods, farm-based intensive livestock Rainfall 200-400 mm	50%
	Steppe	20,590	30%	6,170	Lack of water, land conversion, distance to markets. Rainfall 200-300 mm	40%
	Dry Steppe	45,970	30%	13,790	Lack of water, land conversion, distance to markets	30%
	Eastern Steppe	4,780	30%	1,430	Lack of water, erosion	<5%
Semi desert		36,250	30%	12,080	Lack of water, access and mobility limits Rainfall <200 mm	<5%
Desert		103,930	50%	51,960	Lack of water, land conversion, distance to markets, limits to mobility	10%
Piedmont	Piedmont	3,700	15%	550	Lack of water, eroded	10%
	Dry Piedmont	16,290	10%	1,630	Lack of water, land conversion, distance to markets	10%
	Eastern Piedmont	5,020	10%	500	Lack of water, eroded	20%
Other	Mountain	8,060	35%	2,820	Limited seasonal access Rainfall 250-600 mm	10%
	River Flood Plain	390	10%	40	Limited seasonal access	50%
<b>Total</b>		<b>260,650</b>		<b>95,220</b>		

a. = after Babaev (1996) National Statistics; consultant estimates

b. = producers that are not hampered by excessive debts, or otherwise limited in their operation. After Bilesem (2001); National Statistics; consultant estimates, year 2001-2002

5. When compared to similar countries the overall Kazakh stocking rates do not appear excessive even in the late 1980s, but decreased drastically in the '90s (see figure 1 based on FAO data<sup>5</sup>). The decrease in stocking rate was largely due to the decline in livestock inventory especially of sheep and related to the

**Figure 1. Permanent pasture per Livestock Unit (FAO data)**

<sup>5</sup> Overall, the rainfall and consequently productivity of Kazakh rangelands is lower than in Argentina and Botswana.

ill-executed farm restructuring in the mid-90s (see Chapter 2). However, this assessment is based on aggregate data, and substantial areas previously used as grazing lands are no longer available or are severely degraded.<sup>6</sup>

6. Distant natural pastures have started to recover during the transition and now allow conventional semi-nomadic use, provided that water is available. Some eroded areas have recovered, and ephemeral, as well as root plants such as wormwood, summer cypress, winter vetch, and other semi shrubs have reappeared. This will likely help in the recovery of the soil of pastures in remote districts, allowing for a restricted grazing regime. Water availability is still a major limiting factor to grazing both in summer and in winter.

### ***Abandoned farm land***

7. A part of the land that was ploughed up during the “Virgin Lands” program between 1955 and 1975 is now abandoned, especially in Aktyubinsk, Kostanai and North-Kazakhstan Oblasts. According to the Land Resource Management Agency 12.8 million ha of previous wheat land was no longer used by 2000. Some land was recovered through overseeding with grasses and perennials such as wild rye for grazing, and feather grass and wheat-grass. It is estimated that under optimal steppe conditions it is possible to obtain 2.0–2.5 t/ha of green matter of wild rye, and 1.2–1.5 t/ha of grass hay. However, research from Kazak Fodder and Pasture Institute has shown that full recovery of these abandoned steppe lands would take 30 years.

#### **Box 1. Main causes of land degradation**

- Land reclamation: and diversion of large tracks of rangeland that were ploughed up for unsustainable wheat production;
- Land diversion: reallocation of crucial lands (floodplains, etc.) to irrigated agriculture, or wells and hunting reserves to absentee owners has made a much larger area unusable or un-accessible;
- Excessive ground water use: receding water tables were, and still are, a major threat to the rangelands and flood plains that flank the rivers;
- Use of trees shrubs as fuel wood: accelerated deforestation during the transition led to further desertification and sand dune formation;
- Overgrazing: although in general less a problem than during Soviet times, the overgrazing around human settlements has increased during the transition period;
- Salinity: excessive irrigation and dumping of drainage water on rangelands has led to the salinization of large tracts of land;
- Land diverted to nuclear testing and the space program: is contaminated with radiation and chemicals, but in some areas the plant canopy has improved.

Indirectly, rangeland degradation was also caused by changes in farm organization (favoring settlement of livestock over mobility) thereby concentrating animal on certain rangelands. In particular, the advanced date of the beginning of spring grazing (mandated in the FSU) has been considered detrimental to grassland sustainability.

### ***Desert land***

8. Kazakhstan has at least 8 distinct desert areas of which some are of worldwide importance in terms of biodiversity, examples are the southern saxaul woodlands, the Betpak Dala and Moyun Kum deserts in south central Kazakhstan that contain unique landscapes and ecosystems. Long distance migrating herds traverse the deserts between the southern winter grazing areas and the northern grasslands during spring and fall when residual water sources from snow melt or rainfall allow such passage. Deserts and areas with a rainfall between 100 and 200 mm are, overall, only suitable for short-term grazing. Some of the fringes, oases, “*choruts*” (small oases), and river floodplains are major refuges for wildlife and migrating birds.

<sup>6</sup> Kharin et al. (1999) consider that most of central and southern Kazakhstan rangelands are degraded, an assumption that is challenged by a more recent analysis by Robinson et al. (2000).

### ***Forest grazing land***

9. Some pastures, forests and national parks often contain substantial grazing lands. In some cases the grazing may not be conducive to forest re-growth or impact wildlife resources. In other cases the grazing may be beneficial as it prevents grass fires that subsequently lead to forest fires. Saxaul forests and bushes are traditionally grazed and were considered to be an integral part of traditional grazing systems. They are threatened by lower water tables, especially along the main rivers and Aral Sea, and by excessive (and illegal) harvesting of firewood.<sup>7</sup> Allocation of grazing rights to pastoralists may reduce the risk of grass and forest fire, and help control illegal cutting. This would require management agreements between the State Forestry Committee and the traditional range users.

### **Water Resources**

10. The lack of water appears to be a major limiting factor in rangeland use. With the region's erratic precipitation, land users and herders depend to a large extent on man-made structures, for example, such as wells, reservoirs, or piped-in water. Some desert areas (the Tau Kum, Kyzyl Kum, Ustyurt, Betpak Dala, Pribalkhashye/ Balkhash area and a large part of the Caspian lowlands) have no sources of natural water at all. As most of the previous water works are non-functional, large tracts of potentially grazable land is underutilized because of the lack of drinking water for livestock and wildlife.

#### **Box 2. Water rights**

Access to water is an integral part of rangeland use. Historically, the wells belonged to tribes and villages (*auls*); only newly constructed wells belonged to the people who built or bought them. Both the common property wells and the individually owned wells were randomly distributed, and herders watered livestock from the wells in different districts and auls. Traditionally, the owner of the well had priority rights, followed by individuals of the same tribe, and then the animals of other groups. In 1993, Kazakhstan passed a law on water rights and water management that declared that all water resources in Kazakhstan are the property of the State. The law establishes the Agency (Committee) for Water Resources (AWR) as the manager of water resources through oblast-level departments and subsequent links with local communities. The AWR is responsible for developing and implementing new water management-related regulations to manage fresh water resources sustainably and equitably. As part of AWR's work, local Water Users Associations are being established in selected areas of Kazakhstan.

The ownership/custody of livestock watering places and wells is linked to the land tenure and ownership. Wells in desert areas are allocated (by the local hakim after official or unofficial payment) to extended herder families that also have the grazing rights to the land (in Kyzyl Kum such areas may cover 1,000-20,000 ha). The herders can construct wells on their territory as long as it does not violate the purpose/ designation of the land (which is a pasture in this case). The well and its construction need to be in compliance with established environmental, sanitary, and other requirements.

### ***Surface Water***

11. In 1990<sup>8</sup>, only 15% of rangeland users relied on natural water bodies, i.e. river water that allows the use of about 21 million ha of rangeland, streams and springs that provide water to animals grazing 13.2 million ha, and lakes and reservoirs that allows the use of 2 million ha of pasture land. The network of rivers and streams ranges from 6-8 km rivers per 100 km<sup>2</sup> in the steppes of Kazakhstan, to 14–16 km in the zone of mountainous pastures. The network is more limited in the Caspian lowlands and semi-deserts of the Kara-Tau Mountains and Chu-Ili mountains, with respectively 2-4 km and 5 km per 100 km<sup>2</sup>. A total of 14,770 fresh-water lakes are mainly found in northern Kazakhstan, and their number decreases southward; 54% of all lakes and reservoirs are located in the steppes. The number of natural sources

<sup>7</sup> As of August 2002 the cutting of saxaul trees and wood is prohibited by law (except for sanitary cuts).

<sup>8</sup> Few data exist after 1990

for watering livestock increases in autumn and spring, as these are the periods of peak precipitation, and allow livestock herders to drive their livestock across the areas that are dry in summer (Betpak-Dala – or the pastures of Saryarka in spring, and to the pastures of Moyun Kum in autumn, etc.).

### ***Subsurface Water***

12. A total of 147 m. ha (or 80%) of rangeland depends on man-made facilities using subsurface water (see also annex figure 3). For example, the total pasture area in Kyzyl Orda with a man-made water supply facilities was 13.4 m ha or 95.5% of the grazing area. Water withdrawal from these aquifers has not been managed well and water levels have dropped. The water level in the Cretaceous aquifer between Kyzyl Orda and the eastern shore of the Aral Sea has dropped by 2-25 meters since 1960. This decrease has changed the grade line of self-flow between 5 and 60 km, thereby prohibiting the use of substantial areas of pasture. No new wells have been constructed during the last decade<sup>9</sup> and maintenance and repairs of existing wells has lagged. Currently only a limited number of intact tube wells -which are at least 10-12 years old – and a few self-flowing (artesian) boreholes wells are used.

**Table 2. Examples of animal drinking water works in two oblasts in 1990.**

	<b>Almaty</b>	<b>K. Orda</b>
Tube wells	3,464	3,566
Boreholes	920	1,667
Ponds	26	132
Ditches (km)	520	1,068
Pipelines (km)	1,876	n/a
Springs	486	104

### ***Water Supply System Operation and Maintenance***

13. During the Soviet period, shaft-well and especially pipe-well (borehole) repair costs almost equaled to construction costs of new wells. Often new wells were constructed rather than repairing dysfunctional wells, resulting in several wells being built at the same site place. Shallow shaft wells were regularly cleaned by a special State Agency using specialized equipment. As farms were no longer able to pay the Agency many wells fell into disrepair. Most of the boreholes do not function (partially due to disintegration of their construction and partially due to lack of electricity) and about half of shaft-wells are also out of service. Operation and repair of boreholes is more complicated requiring continuous maintenance of a pump or power drive, prevention of well/filter constipation, etc. Many boreholes do not function due to lack of power as most power transmission lines are broken or out of service.
14. Most of the water supply equipment is out of service or obsolete, but with the increasing interest in livestock production (and especially in relieving the pastures near settlement) a debate about water supply and management of water supply equipment seems eminent.

### **Other Resources**

15. *Fodder* Production of fodder is important to supplement grazing and alleviate the seasonal constraints in animal feeding. Hay collection from natural pasture has been an important component of livestock husbandry. However, it was often cut late as consequently of low quality. Most Kazakh livestock owners and range experts believe that the system of seasonal migration is an optimal husbandry system in the southern areas, whereas in the northern areas winterfeeding depends largely on stored fodder. Migra-

<sup>9</sup> Information received from the Kazakh Research Institute of Water Economy



tion, however, has declined in recent years. Some prosperous private farmers may indeed drive their livestock to remote pastures, but many others have abandoned this practice. Many private small holders cannot afford the seasonal migration due to the risk of theft, and/or lack of family labor and transport as their herds or flocks are not big enough to afford hired herdsmen and/or lease of transport. They keep their herds or flock in the vicinity of the village, within 8 km in winter, to 15 km in summer, from their settlement, and rely on additional hay (silage is a rare commodity, and the weather is conducive for hay preservation). Consequently, the preservation of fodder has become more important.

16. Planted fodder production (often legumes) is generally a part of normal crop rotation in arable production. It is sometimes also carried out by herders in low-lying areas, in floodplains, or in small plots next to wells or boreholes. This type of land use is not without risk as there may be a tendency to either expand such areas into fragile grasslands, or to overdraw water resources leading to a lower water table.
17. Herbal collection A large resource such as these grasslands and deserts provides a wealth of useful plants and other materials<sup>10</sup>. Most of these plants and goods are locally used and their sales are locally managed. Some products such as ephedra (*Ephedra equisetina*) and licorice (*Glycyrrhiza glabra*) were collected without reported biodiversity damage. Ephedra grows as a wild plant on the area of more than 300,000 hectares in mountain regions of southern Kazakhstan, whereas licorice grows mainly in floodplains. The annual collecting of ephedra and licorice was estimated to be respectively 700 tons (dry raw material) and 75,000 tons (mainly rootstock), of which a significant part is exported. The areas of natural occurring medicinal plants, including licorice and sweet root has decreased due to changes in the water tables. In addition, fairly large areas are covered with more controversial plants such as hemp and other narcotic plants. The area of wild hemp in the Chu valley was estimated in the mid 1990s to be no less than 100,000 hectares. Generally plant collection does not interfere with grazing or livestock migration, although the collection and controls over narcotics may force herders to avoid these particular areas.
18. Sequestered carbon The rangeland vegetation, which includes plants with substantial root systems, binds a considerable volume of carbon (dioxide). Carbon sequestration by grasslands varies by region, soil type, grazing patterns, vegetation type, and even grass species. Based on field studies in Shorthandy an average of 1.27 tons of carbon (C.) per ha can be stored annually in the Kazakh steppe (mainly during the period May to October; see USAID-CRSP, 2002). This store is dynamic and can easily be diminished by grass fires, by overgrazing, conversion to cropland, or urban development. However, in view of its size, the Kazakh rangelands are potentially a store of sequestered carbon of global importance.
19. Other resources Subterranean resources such as minerals are the property of the State and their extraction is State-managed with, so far, little compensation for the surface users. Aquifers are also considered public property.

### ***Resource Depletion Risks***

20. *Climate related risks.* The main risk to the rangelands is further desertification, and substantial areas of land have been lost due to wind and water erosion and changed into bare land and sand dunes. The underlying causes are over-utilization and unsustainable use of rangelands in agricultural production, i.e. somewhat similar to the “dust bowl” period in the US and Canada in the early 1930s. An additional problem in the watersheds of the large rivers and Aral Sea is the salinization that limits re-vegetation and increases the risk of salty dust storms that affect weather and air quality over long distances.
21. The two major climate-related risks are drought and winter storms. Droughts are a common feature of the central Asian climate that may affect large parts of the country. Like in other parts of the world, these

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<sup>10</sup> See Kazakhstan: *Strategy and action plan on conservation and sustainable use of Biodiversity Conservation* (1999) pp 141-143.

drylands are fairly resilient with respect to climate, but are affected by long-term climate change and by other man-made risks. Hence, drought awareness and management are a priority Whereas fodder cultivation and preservation (supplemented by concentrate feed) was a major tool during the Soviet period, current livestock owners seem to revert more towards a mobility concept to avoid or escape dry regions during the drought periods.

**Table 3. Environmental risks in Kazakh rangelands**

Risk factor	Estimated area	Notes
Drought	All Kazakhstan	Severe drought in 1991
Ice storms ( <i>dzud</i> )	Regional/seasonal	Affects grazing animals
Fire	Varies by year and season	
Weed invasion	2.5-4.5 million ha	Including poisonous plants
Locusts	8 million ha (2000)	Abandoned farm lands provide breeding sites
Wind erosion	50 million ha	Sand dune formation threaten farm land and villages
Water erosion	6 million ha	
Salinization	3-4 million ha, including over 2 million in Aral Sea	Risks of salty dust storms in the rest of Kazakhstan and beyond
Radiation and military waste	11 million ha	Semipalatinsk testing grounds and others
Space program	4.8 million ha	Fuel and waste along flight path of space crafts

22. *Fire* All steppe vegetation and cereal crops quite often suffer from range and forest fires. The fires occurring in feather grass- and tipchak grass-steppe usually last for a long time and spread over large areas. The fuel load of dry plant material on such sites ranges from 0.22 up to 0.38 t/ha. The fires start due to the negligence of users, agricultural burnings, or dry thunderstorms. In many agricultural areas burning of straw also causes such fires; despite the fact that the latter (especially rice straw) can better be used as animal fodder.<sup>11</sup>
23. *Locust invasions* Major locust invasions occurred in 2000 when 8 million ha were said to be affected. Later outbreaks were smaller because of intensive spraying during 2000-2002. The research of the Kazakh Plant Protection Institute demonstrated that abandoned arable land was the chief breeding ground for the locusts (Italian locusts in particular) with up to 5 thousand locust eggs per m<sup>2</sup> in highly concentrated areas. In these cases land improvement, either by cultivation or by creating a good grass cover thereby depriving locusts of suitable breeding sites will in the long term be the major preventative action. Currently, the Ministry of Agriculture in cooperation with international and local institutions is developing a locust management and monitoring system to better manage and minimize the effect of locust invasions.
24. *Winter storms* Snows storms and late-winter ice storms (“*dzuds*”) are less predictable and can cause havoc among the grazing population. Ice storms when preceded by short thaw period can create a layer of ice over the earlier accumulated snow and prevent grazing animals’ access to standing hay in winter<sup>12</sup>. Whereas droughts may have an equal effect on arable- as well as livestock- farmers, the *dzuds* especially affect livestock and their owners (and wildlife).

<sup>11</sup> In China and other countries adding ammonia or urea enriches the nutritive value of such straw.

<sup>12</sup> Local animals, especially horses, are well adapted to pick up the fodder under snow. The ice crust formation formed during dzuds (caused by thaw and refreezing) may prevent such animals to feed in the open.

## 2. THE RESOURCE USERS

25. The Kazakh rangelands are an important part of the Central Asian rangeland system<sup>13</sup> and the largest grasslands of the world. Still, the system is neither a homogenous- nor a stable ecosystem. The use is often seasonal and either determined by mobility of its users or the ability to manage the adverse periods such as harsh winters or dry summers. The annual rainfall in Kazakhstan varies from between 100 mm in the drier areas to over 600 mm in the southern mountains. Most rainfall occurs in early summer and some areas barely get any snow in winter. This seasonal and geographical variation requires considerable agility of the users. It also requires an understanding by policy makers of the peculiarities of the use of this resource, and the risk of policy decisions, and/or incentives or disincentives that can lead to irreversible deterioration of these resources.

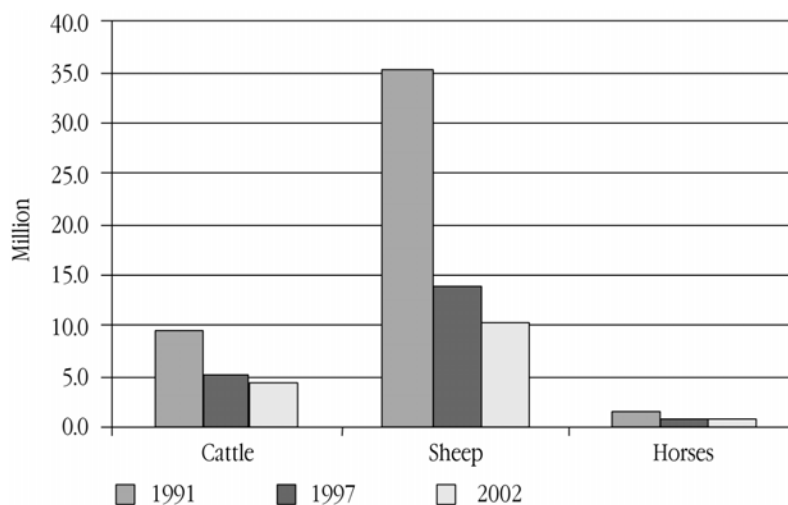
### Livestock Producers

26. Historically the main users of the steppe resources were livestock herders, who used to graze their livestock, hunt and fish, and grow small grain and fodder.

### *Livestock*

27. Kazakhstan's livestock inventory is estimated at 4.5 million cattle, 10.6 million sheep and goats, and 1 million horses and camels (2002 data). This number is lower than the inventory of over 5 m head of cattle, 18 m sheep and goats, and more than 5 m horses and camels recorded at the beginning of the 20<sup>th</sup> century, when a transhumant livestock system still existed.<sup>14</sup> It is also far lower than just before the

**Figure 2. Change in livestock inventory 1997 (Jan. data)**



<sup>13</sup> Various aspects of the system have been described elsewhere (Larin 1969, Babaev, 1996; Kirichenko, 1980).

<sup>14</sup> The data derive from the National Statistic Agency of the Republic of Kazakhstan.

break-up of the Soviet system in 1991 when the livestock inventory of Kazakhstan consisted of 9.7 m cattle, 35.6 m sheep and goats, and 1.8 m horses and camels, of which respectively 31, 18 and 31 per cent were privately owned. Following this break-up, the number of cattle, sheep and goats, horses and camels decreased by respectively 44, 60 and 38 percent between 1991 and 1997.

28. There are numerous reasons for the contraction, including the halting of import and subsidized delivery of feed, breakdown of the water supply system, the use of livestock in barter during the period of rapid inflation, the breakdown of transport between remote farms and markets and declining urban purchasing power. Moreover, many of the farms squandered their agricultural and other resources during the ill-conceived transformation of the state-owned farms to joint-stock companies (JSC), then producers' cooperatives (PC) and limited liability partnerships (LLP – which actually were the enterprises similar to the kolkhozes of the previous systems but with less supervision by the Government or, previously, the Party)<sup>15</sup>. Also, many collective and state farms in Kazakhstan were mixed farms and farm managers sold livestock in order to keep agriculture alive or to pay off their debts to State agencies during their transformation. Currently, private ownership predominates in the livestock sector (mainly household farms and other private farms) and is estimated at about 92%. These private herds are small and due to the lack of marketing opportunity, as well as lack of quality feed and fodder, are low yielding.

### Box 3. Land use systems in rural Kazakhstan

The most common land use systems that have developed during the 1990s include:

- a. *smallholder village system*: (LPK- Lichnoye Podsobnoye Khozaistvo). Most small holders that have few animals- i.e. less than 40 sheep equivalent- practice this system. The small holders are generally the former employees of sovkhoses and kolkhozes and keep their premises including a small plot of land and have an access to communal pastures. Livestock are turned out to pasture within walking distance of the village. Owners may also hire herders that take their animals out in summer (to mountain pastures) or winter (to distant pastures).
- b. *Private (extended) family and semi-settled system*: (KK – Krestianskoye Khozaistva) Livestock owners keep about 40 or more sheep and some cattle. They settle 10-60 km from the village near the fields and sheep barns of the former state/collective farms. Usually several families unite their livestock into one commonly managed herd with each owner contributing financially and providing the necessary labor to their joint livestock enterprise. The sheep barns are leased or purchased from the former state farms. This semi-settled pasturing system can be seen in the dry steppe, semi-deserts, foothills and low-mountain pastures but not in the area of sandy winter pastures. The livestock in the southern foothill region are often pastured in the adjacent mountainous meadows during the summer.
- c. *Group or corporate farms*: These are remnants of the previous State farm system that grazed their livestock in the different rangeland zones for at least two and sometimes four seasons. Previously such farms had large livestock holding (25,000 – 65,000 sheep, for example). Currently the majority of these farms that are restructured (and broken up) into joint stock companies (JSC), limited liability partnerships (LLP), and producers' co-operatives (PC)<sup>17</sup> that have fewer animals (1000 – 4000 sheep, for example). These small farms move their livestock through the pastures of lowland areas (dry steppe and semi-desert) during summer and winter. Some joint-stock companies and limited liability partnerships take their livestock to mountainous pastures. However, the best pastures located in the higher elevations cannot be reached at present due to bad roads and high expenses for migration.
- d. *Independent landowners or land owning companies*: These are generally urban landownership companies that accumulated large land holdings, which they either use for agriculture, recreation (mainly hunting), or sublease to herders or other land users.
- e. *Government enterprises (GP -Gosudarstvennoe Predpriyatie)*: These are farms owned by large government enterprises such as railroads and plants/factories. They include breeding farms, research institutes, etc.
- f. *State Land Reserve Fund*: These are lands that have been abandoned during the privatization process and mainly consist of pasture, estimated to be close to 100 million ha.

<sup>15</sup> The farm restructuring that started in 1992 focused on arable farming and did not take the livestock ownership and ownership changes into account, although selected scientists and representatives of the Association of Farmers provided suggestions about the transfer of livestock from state farms/ sovkhoses collective farms/ kolkhozes to their former employees. Farm managers preferred using the revenue of livestock sales (soon a fire sale) to pay off debt and/or acquire farm inputs for arable farming. Livestock assets with a value of over US\$ 1.5 billion disappeared between 1992 and 1998.

## ***Herders***

29. The total number of households depending on livestock has increased during the last decade to an estimated 1.6 million, but many of these may be owners against their will, who obtained stock and other assets during the break-up of the farms, and have few alternatives than trying to survive with their small flock or herd until social services improve. Population density in the Kazakh rangeland is between 0.7 and 3.6 persons per 1 km<sup>2</sup> living in villages with a population of 300-500 persons, or in seasonal settlements. The density of villages is low (1-4 per 500 km<sup>2</sup>) and their isolation was always the main concern of the rural population as observed by a social study by Spektor and Dvoskin in the late 1970s and early '80s (see table 4). Apart from these earlier concerns – that have been aggravated during the transition – rural household's additional concern was the inadequate feed availability for their newly acquired animals. Also, as compared to neighboring countries, Kazakh livestock production was fairly centralized with fewer farm workers that kept and gained experience in backyard production and relied on stored fodder during winter. The lack of organization of long distance grazing has resulted in over-grazing and a deterioration of pastures around inhabited areas, and a steep increase in poverty among the rural population.<sup>16</sup> More distant pastures have been abandoned and it is estimated that only 60 million ha of pastureland is actually used. Much of the rest is abandoned and included in the State Land Reserve Fund.

**Table 4. Constraints in rural settlements in the early eighties, as perceived by farm cadre.**

<b>Concern</b>	<b>Respondents</b>
Lack of transport of goods and people	88%
Cost of infrastructure	66%
Inadequate (social) services	58%
Poor rangeland use	50%
Poor management	36%

*Source:* Spektor & Dvoskin. 1988

30. However, many private farmers that were not burdened with high administrative overheads or old debts – like the limited liability partnerships and producer' co-operatives – have adapted to the new market conditions. They appear now to benefit from increasing demand and prices for meat products (associated with the increasing purchasing power of city-dwellers which is connected with the oil and gas boom in Kazakhstan). After 2000 a better collaboration between farmers has also started to emerge, including collective grazing. This cooperation is most common in small villages (*auls*) although farmers are cautious about the purpose of cooperative entities and especially about any (government) interference in their organizations. Indeed, livestock farming is the most common occupation of the over 100,000 private family farmers, whereas grain production is concentrated in the approximately 4,000 corporate farms.
31. **Poverty** Most rangeland users live in remote areas, but were previously provided with essential provision and services. Most of these services have disappeared during the transition, leaving many communities “stranded in a sea of grass.” Many of these rural settlements were abandoned. Government is now facing the difficult task of the deciding on the provision of services to rural communities (such as improvement of the transportation system, energy and water supply). It is currently contemplating abandoning far away poor rural communities and resettlement of population. This could open up land for extensive use by wildlife or herders, provided minimal provisions (such as water) are in place.

<sup>16</sup> Pilot projects such as the community effort in Zhangeldy directed by an NGO (*“Farmers of Kazakhstan”*) and supported by the Small Grants Program of the GEF try to learn and provide guidance in addressing this issue.

#### Box 4. Livestock farming in the US

About 69% of the 1.3 million farms in the US reported livestock inventory or sales in the 1997 census. The majority (over 90%) are small or intermediate family farms with sales less than \$250,000. Commercial farms (over \$250,000 in sales) accounted for 9% of all livestock farms but for 48% of total livestock sales. The USDA classified livestock farms as:

■ Farms with few livestock (less than 8 livestock units and less than \$5,000 in sales)	361,031 (27.5%)
■ Farms with specialty livestock (i.e. fish, bees, mink, deer etc.)	8,834 (0.7%)
■ Farms with pastured livestock	707,365 (53.8%)
■ Farms with confined livestock	237,821 (18.1%)

With respect to farms with pastured livestock (the major users of range land), the main two farm types were medium sized (70-210 cattle units) or small farms (i.e. 35-70 cattle units). Small farms control 74% of the land dedicated to beef cattle production. Such farms own less than 100 cattle (unit) on less than 1000 ha of land (of which about 60% is owned and 40% leased). Over half are owned and operated by retirees and part-time "rural lifestyle" farmers.

Source: USDA

32. The current rangeland tenure arrangements are vague and open to some abuse with large tracts of land being allocated to a limited number of persons or entities. Whereas at a certain level there may be some benefits to the large scale, this may have its limits, especially with respect to environmental and social sustainability. Such land ownership may impede the mobility of livestock and wildlife herds and as such, decrease efficient land use. There is also a risk (and possible emerging trend) of absentee land ownership by often urban wealthy land owners. In general, absentee land ownership bears a risk of insufficient attention to environmental sustainability and is often associated with poverty of those living on such lands.<sup>17</sup>

## Other Rangeland Users

### *Hunters and Herb collectors*

33. *Herb collecting* Generally herd collection does not interfere with grazing or livestock migration, although the collection and controls over narcotics may force herders to avoid these particular areas. The sale of collected herbs is regulated by law.
34. *Hunters and wildlife* Wildlife, especially saiga (protected by decree), deer and wild asses and their predators are other important rangeland users. The saiga population has declined drastically in the last decade. Locally other animals such as mountain goats and various large predators are an important part of the biodiversity, and generate income (whether legal or illegal) from hunting or viewing. Various animals are adapted to life in the desert fringe; wild boars and deer and wolves are found closer to the rivers and lakes, whereas to Argali sheep, lynx and bears are more commonly located in the mountainous areas. However, their populations appear to be dwindling due to overhunting and lack of oversight. The Kazakh rangelands with its lakes and *choruts* are also an important seasonal refuge for small mammals and birds. These seasonal water sources are important feeding and resting places for migratory birds in the annual fly-over between southern Siberia and the Middle East. Wildlife management is highly centralized in Kazakhstan, and using wildlife in revenue generation enterprises is not condoned.
35. Hunting has for centuries been an important part of rural life in Kazakhstan and even today traditional Kazakh hunters favor using trained raptors for hunting a variety of wildlife.

However, the increased hunting pressure over the last 100 years has resulted in the decimation of many populations of native wildlife. Argali sheep have become rare, as is the wild ass ("*kulan*"). The unique herds

<sup>17</sup> The current smallholder system fulfills an important role in poverty alleviation, as long as social services continue not to reach the rural poor. Still, over time many of the subsistence small holders will in part disappear, and the remaining producers grow into larger farming units.

were decimated in the mid 20th century in part due to hunting, and in part due to competition for grazing land with domestic sheep. Saiga populations also decreased by bad winters with record snowfall or *duzds* in the steppe. They were nearly extinct around 1920 but strict protection enforced by state and local governments allowed recovery to about 200,000 found on the drier plains, moving between grazing sites (Bekenov et al., 1998). However, currently they are again threatened by indiscriminate hunting, especially by the “new rich” who have access to all-terrain vehicles.

36. The possibility of commercial wildlife ranching is being explored; mainly using elk (*maral*) for meat and the harvesting of felt and horn for the Chinese market. Some hunting reserves exist but are mainly used by a closed group of privileged hunters or government officials. In other parts of the world, the economic returns of wildlife ranching are comparable to or better than cattle ranching. These economic returns are somewhat dependent on “niche” markets (i.e. interested hunters or wildlife viewers, and an upscale market for meat and by-products) which may in the short run are not expected to experience significant expansion in Kazakhstan (as export is limited by animal health issues and lack of quality control).

### ***Institutional Users***

37. The rangelands are also used by a fairly large number of institutional users, whether by the military, research farms and space institutes (especially Baikonour), or nuclear testing sites. The oil and gas industry also use large tracts of land, some of which may be compatible with grazing. There is a legacy of unsustainable use by many of these entities that has severely limited the use and/or access to a substantial part of the rangeland resources for grazing.

38. *Pipelines and roads* Pipelines, roads, railroads, canals and urban development have also taken part of the range and, in addition, may have curtailed the traditional mobility of the herders.<sup>18</sup> As already pointed out by Petrov (1979) these infrastructure projects should be implemented in such a way that it preserves the dynamic equilibrium of the ecosystem. Unfortunately that was not the case during the Soviet period and, with respect to the mining and oil industry, neither during the transition period.

39. *Testing grounds* Military and testing grounds such as Sary Shagan, Emba-5 (Aktyubinsk), Semipalatinsk and the Russian Kapustin Yar that stretched into West Kazakhstan, together took up more than 25 million ha of rangeland (UNECE, 2000). Many of these territories were declared out of bounds for grazing. For example, the Semipalatinsk nuclear testing grounds were depopulated in the 1940s and all people were resettled.<sup>19</sup> Recently, the fence along the perimeter of the testing area was opened and some people started to come back including livestock producers. Although many studies have been carried out on the radiation and health effects, the level of residual radiation in the grazing area has not been determined in detail apart from some surveys by the Kazakh Fodder Production and Pastures Research Institute. The Baikonour (in Central Kazakhstan) cosmodrome’s “flight pass” is claimed to have left a large strip of range resources contaminated with fuel (heptyl) and other chemical waste, as well as with the separable used parts of booster rockets.<sup>20</sup> Most herders prefer to avoid this region but real data are difficult to obtain.

40. *Forest land and national parks* The national “Forest Fund” includes over 10 million ha of pasture and rangelands. In order to generate revenue, the Forestry Committee does allow livestock herders to graze seasonal animals in selected forest reserves (leskhoz) and saxaul forests. Currently there appear to be

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<sup>18</sup> During the Soviet period, however, rail- and road transport were used to move livestock to distant grazing areas at subsidized costs.

<sup>19</sup> The Semipalatinsk nuclear testing range was officially closed by President Nazarbayev on 29 August 1991. A total of 456 nuclear tests were conducted at this site between 1949 and 1989

<sup>20</sup> Source: Presentation by Minister of Natural Resources and Environmental Protection in the Majlis on March 13, 2000.

few formal arrangements between forestry entities and stockbreeders about the (seasonal) use of these resources. These grazing arrangements and associated fees are generally orally agreed on a case-by-case basis between herders with managers of local forestry entities. National parks are strictly protected and the grazing on their territories is prohibited.

41. *International leased land.* During the Soviet period, part of the semi-desert and desert pastures of the state land reserve in south-eastern Kazakhstan, Zhambyl and part of Almaty oblasts (called *Kenesb-Anerkholi*) were leased for seasonal use to Kyrgyz herders to alleviate the shortage of winter pastures for adult livestock. After the republics became independent the arrangement gradually ceased.



### 3. RESOURCE ALLOCATION PAST AND PRESENT

42. It is estimated that between 1.6 and 1.8 million households (or about 5-6 million people) depend on livestock and rangeland for their livelihood (although not all live in the rangelands). The value of rangelands is difficult to determine, especially in the case of Kazakhstan where, due to its large size, the rangelands do not only have a local, but also a global value
43. The most common value considered is its use in grazing and fodder supply. Net primary production can be determined by evaluation based on satellite imagery, but then need to be matched with livestock and wildlife use. For example, stocking rates on summer pasture vary from 0.7 ha to 1.5 ha per animal for the 4-5 month grazing season or a fodder off-take of 500 kg/ha<sup>21</sup> but many of the *Artemisia* pastures may have lower yields and allow only stocking rates of one animal (LU) per 7-10 ha or more. The yield of pastures is generally lower in other seasons, and the digestibility and quality of the (mainly) standing hay is poor.<sup>22</sup> A very rough estimate (see table 5) is based on the assumption that about 100 million ha of grazing land is available in Kazakhstan.

**Table 5. Estimated annual value of rangeland resources.**

Land available	Sustainable off take per ha	Value per ton DM (US\$) <sup>23</sup>	Total estimated value/year
<b>Summer grazing*</b> (5 months) 75 million ha	500 -800 kg	US\$ 15	US\$ 600 million (approx.)
<b>Winter grazing*</b> (5 months) 20 million ha	100 kg	US\$ 30	US\$ 50 million
<b>Fall/winter grazing*</b> (2 months) 30 million ha	150 kg	US\$ 25	US\$ 100 million
<b>Herbal medicinal collection</b>			
Total estimated collection = 50,000 ton		US\$ 1,500 (average)	US\$ 75 million

\* = there may be some overlap in summer, fall and winter grazing area.

44. Assuming the availability of drinking water, these 100 million ha could at 9-10 ha/LU support 10 million LU, which is lower than the estimated 18.7 million LU that were grazing in 1990, but higher than the current livestock numbers estimated at 7.5 million LU (see figure 1). In other words, from a viewpoint of available grassland, there is opportunity for some herd expansion. The question to be addressed, and beyond the scope of this study, is whether such expansion is economically justified, i.e. is there a market for the products and services provided by such expanded production.<sup>24</sup>

<sup>21</sup> Assuming an intake of 5 kg/livestock unit/day there may be some overlap between seasonal grazing sources.

<sup>22</sup> This is especially the case for reed (*Phragmites*), which is a commonly used as animal fodder (providing an estimated 2.5 million MT dry matter equivalent) in floodplains and irrigation areas.

<sup>23</sup> Based on local prices in 2002, which are half or less of international prices. Meat prices on the other hand are at international level in 203. Total value of grazing matches fairly well with the output of the livestock sector estimated to be over US\$ 1 billion annually.

<sup>24</sup> In view of environmental concerns (waste management, methane reduction, overgrazing) Kazakhstan's first choice would be increasing the efficiency of the existing herds and flocks, rather than expansion.

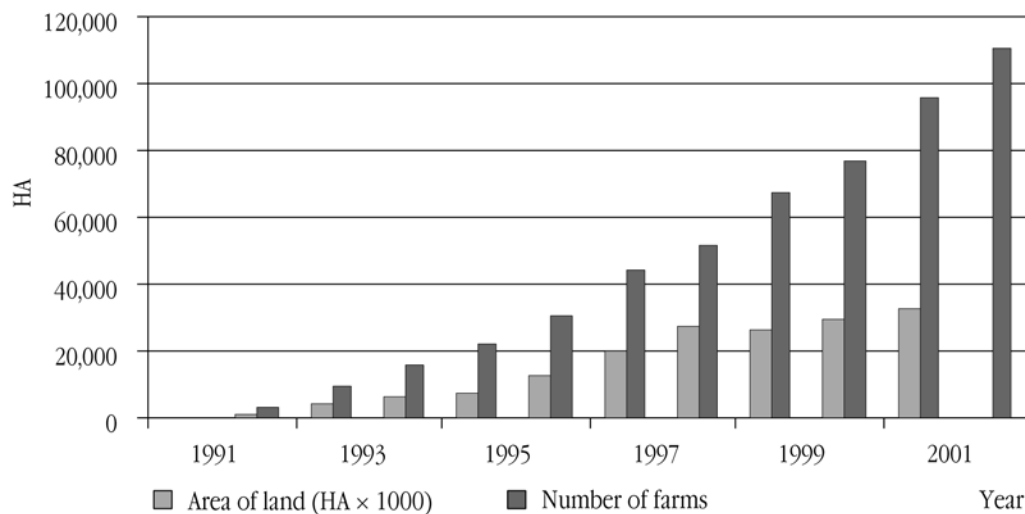
45. Other significant values include the collection of medicinal plants and in the future maybe carbon storage. Few data exist on either the legal or illegal trade in medicinal plants. Licorice<sup>25</sup> is probably collected from about 10,000 ha at 50-100 kg/DM/ha at \$2 per kg of dried roots. Estimates of the value of the carbon sink are highly speculative. Conservation of pasture carbon varies depending on region, soil, grazing, plants and grass. According to estimates, 1 hectare accumulates about 10-100 MT carbon. This reserve is dynamic and can sharply reduce as a result of grass burning, sod busting and urbanization. Further work is needed to determine the value, as well as the incentive system to encourage sequestration and prevent loss due to fires or poor land management.
46. The value in biodiversity is subjective but a differentiation can be made in global value (i.e. unique habitats and/or plants and animals) and local value. Many areas of Kazakh grasslands contain unique habitats, including the wetlands and lakes that are essential parts of the flyway of migrating birds from/to Siberia. Local values include the Kazakh people's appreciation for space, fresh air and their heritage as steppe dwellers. These values are not expressed in monetary terms.

### ***Rangeland Tenure***

47. During the Soviet period all land was State owned and maximal rather than optimal use was the paradigm. The land tenure of rangeland was based on the principle that:
  - a) all rangeland belongs to the State;
  - b) all subterranean resources belong to the State (including mineral rights and water resources).
 Even after independence no specific concept of rangeland tenure was developed. Although various land laws and decrees were passed, there is little evidence of extensive discussions on an optimal land use system based on local values and, possibly, market based systems. The use rights for both for urban and arable land were considered to apply to rangeland as well.
48. The first national law "On Farm" was passed in May 1990. This law granted the right to own land (allotments) of the so-called land reserve funds, which were established and managed by rayon executive committees (*rayispolkoms*). Areas of the allotments were established freely, depending on requests of applicants and the mood of the *rayispolkom* representatives. At present these issues are under jurisdiction of rayon hakimates (local administration at the rayon level). Various new laws and decrees were passed (see annex table 1), but none specifically addressed rangeland related issues, or debated the implication of laws that generally focus on arable land or other resources, rather than rangeland use and sustainability.
49. The Civil Code of 1994 recognized two types of property – private and state property. Farms belonging to research institutes were to remain as state-owned property. All other types of (former) collective farms were to be reformed into LLPs and PCs. In reality, however, only a few LLPs and producers' co-operatives corresponded to their names and most farm directors managed to maintain their position and prevent privatization. This delay was enhanced by the inertia of the majority of the rural population. The net result was a major loss in capital assets, poverty of population and an overall rural economic decline.
50. Despite these restrictions and the confusion imposed by various laws, a number of producers tried to overcome these obstacles and establish private farms (see Kazakhstan 2001). The numbers steadily increased and by 2001 over 100,000 farms had been established (see figure 3). The average size of these private farms is nearly 400 ha of which about 60 ha is arable land. This generalization is somewhat misleading, however, because farm systems and land holdings differ significantly in different parts of the country. The average size in southern Kazakhstan varies from about 30 ha (South Kazakhstan) to 1,868 ha (Mang-

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<sup>25</sup> Licorice is primarily marketed as a sugar substitute for most cocoa mixes. It also has large use in alcoholic beverages and other food items. The US market for example imports 34,000 ton of licorice root worldwide.

**Figure 3. Number and acreage of private farms.**

istau oblast). The area of farms in some other oblasts can be even larger. The area of arable land per farm depends on population density and climatic-geographic zones, and varies from 3 ha in the south and southeast to 3,500 ha in the central and southwestern oblasts of Kazakhstan. However, even such substantial landholdings may not always support a single or extended farm family (see also box 4).<sup>26</sup>

51. The Land Code of 2003 considers arable land as well as rangelands and grasslands as agricultural lands which can become a private property through purchase, and used on the basis of tenant rights or free of charge (refer to article 36.1). In compliance with the Land Law natural grasslands and pastures being the agricultural lands can be given in private ownership (articles 97.4 and 97.6). However, those lands previously used by population as grasslands and pastures cannot “... be given in shared ownership” (article 26.3). They will stay in domain of the State but local communities have a use right, free of charge. The new Code provides an opportunity to purchase lands not claimed by communities. The weak point in the land code is the arrangements for land use around settlements. This use is currently poorly controlled and, especially in the denser populated areas (such as Almaty oblast) the pasture has significantly decreased in the last decade (1993-2003). These lands total to 17 million ha and are currently considered “commons” and are unprotected from overgrazing. As such, some other action may be required to guide the use of such land and assure long-term sustainability.

#### **Box 5. Pre-Soviet and Soviet grazing land policies and their result in Kazakhstan**

Before Russian occupation a mobile (nomadic and semi-nomadic) livestock system supported the majority of the native population, and this nomadic history is still the pride of the Kazakh population. Annual migration routes varied from 200 to over 1000 km. Winters were spent in sandy deserts near the Caspian or Aral Sea and /or along the main rivers; summer grazing in the mountains or in the northern grasslands. Local community rights and common understanding of the “horde” managed access to land and water. These systems gradually changed during the last century. Settlement by mainly Russian settlers took away the most fertile rangeland to be used for arable agriculture and changed the life of native population significantly. About 3 million Russians had settled in the northern plains by the beginning of the First World War. At that time the Public Lands Treasury had confiscated over 32 million ha from the livestock communities and about 8% of the Kazakh population perished between 1892 and 1913.

<sup>26</sup> Still, a large proportion of the agricultural land (over 70%) is used by LLPs and PCs and the so-called large group farms (LF) of up to 50 families. Many of the managers were able to survive and avoid privatization because of their primary land tenure rights that allowed them to lease out land. They then leased out (in fact, sublease they themselves leased from the State) land they themselves leased from the State. Neither the first lessee nor the sub-lessee was really interested in sustainable use of land because they were neither owned or had secure tenure. This situation could change with application of the provisions of the new land legislation (Land Law 2003) where, officially, sub-leasing of State land is no longer allowed.

Under the New Economic Policies of the Bolsheviks some of these lands were returned to the native population. At its peak in the mid-1920s more than 45 m ha of fertile land were returned to the native population. However, this development was halted in the early 1930s and replaced with forced collectivization. Transhumant herding was discouraged and nearly stopped after 1930, when many herders either killed their animals, fled eastward to China and Mongolia, or succumbed.<sup>29</sup> Land was considered the property of the state and managed by the kolkhoz or sovkhos. Arable use had the priority, and large parts of fertile grazing lands were ploughed up, in particular during the Virgin Lands program in north and central Kazakhstan during the 1950s and 60s. This was followed by another ‘enlargement’ program of creating very large sheep breeding farms and construction of rangeland water works in the 1970s. By 1968 the number of sheep reached an unprecedented 34 million that was considered a “great success” and the leadership of the republic and country (USSR) advanced the slogan- “50 m heads of sheep for Kazakhstan”.

The lack of sustainability in rangeland use soon became evident. In the late sixties the Kazakh SSR Ministry of Agriculture reported that 450 out of the 697 specialized sheep kolkhozes and sovkhos did not produce forage or feed. The increased livestock numbers and mismanagement in these farms led to continuous, rather than the traditional rotational, grazing on the same pastures. Gradually nutritive herbs and grasses disappeared and were replaced by unpalatable weeds, or by overall disappearance of grass cover and subsequent increase in wind erosion and increasing sand dune formation especially in some farms in Aktyubinsk, Kyzyl Orda and Zhambyl oblasts. By the late 1980s, large areas of Central Asia had turned into virtual deserts (of which an estimated 63.3 m ha are in Kazakhstan; see Kharin and Kiriltseva, 1988).

In the early 1990s when State support dried up, the livestock production in these arid areas became unprofitable and the transition-related change in market conditions only accelerated this trend. When the State required settlement of farm debts during the farm privatization the farms lacked the liquidity and tried to settle debt by barter, sheep became the main “currency” in many areas. In some cases this led to abandonment of farming and herding, and the people started to migrate from the arid areas. The collective farms and branches of state farms established (late) in 1960s and 70s were abandoned first.

### ***Institutions***

52. Government is still facing the question of institutional oversight of land property both privately and state owned to assure its long-term efficient use as from ecological and economic points of view. Rangeland allocation was traditionally managed by the Ministry of Agriculture, through its agro-industrial complex with very large land allocations to sovkhos and kolzhos. Although these farms were advised on, and supposed to adhere to, a management plan that ensured sustainability, the plans were always implemented pursuing both economic and production interests. At present, the regulation of land allocation and management is under the jurisdiction of the Land Resource Management Agency, local representative bodies (*maslikbat*) and local government bodies (*bakimate*).

**Table 6. Possible land tenure arrangements for (grazing) rangeland in Central Asia**

<b>Type of resource</b>	<b>Tenure options</b>
Winter spring shelters, corrals and homestead wells	Private individual/family freehold
Land surrounding winter quarters	Freehold or lease hold (at present this is communally used)
Arable fields	Private individual/family freehold or lease hold
Hay fields	Freehold or lease hold
Shearing sheds	Private or group lease hold or freehold
Winter-spring pastures	Individual/family, group lease hold or community land
Summer-fall pasture	Group or public lease hold
Intermediate wells	Individual/family or group public lease hold lease
Large wells	Group public lease hold
State grazing reserves	Public ownership with group leases

53. Local representative and executive bodies are responsible for the development and approval of regional programs for the sustainable land use, soil fertility improvement, land resource protection together with the implementation of other environmental protection activities. The Land Resource Management Agency is supposed to manage issues concerning the land management, land tenure and other use

forms and determination of price of land plots<sup>27</sup>. It is also responsible for preparation of the state land cadastre and monitoring of the land use including the unused lands and used with the legislation violation. According the Land Code the right for provision of rangelands and other plots of land for the private ownership and land tenure is given to the rayon executive bodies (hakimate).

54. Advisory services to the Land Management Agencies (whether central or in the habitats) are to be provided by research institutions such as the Water Industry Institute (Taraz City), the former Institute of Fodder and Pasture, the Ministry of Agriculture and its scientific and production centers such as the Production Center of Livestock Breeding and Animal Health (Almaty), and the Institute of Botany and Photo-introduction of the Academy of Science. An important role is to be played by increasing number of NGOs that are becoming involved in rangeland issues. These NGO provide stronger input on social and economic issues, which are generally not covered by the, very technical, research institutes.
55. Unfortunately there is a lack of skills in range management, in particular among middle level cadre. This is especially a problems at raion and oblast level where important range management decisions are now taken by inexperienced lay staff, that have little on no experiences and. Consequently range management decisions are rarely based on reliable local experience gained since independence.
56. A joint effort of land owners/users, NGO's, oblast and rayon hakimates, maslikhats, Ministries of Agriculture and Environmental Protection and their regional divisions should provide the necessary quality management the range and grazing. It will require the introduction of some changes such as (i) upgrading staff and equipment in all these agencies, and (ii) clear delineation of their roles, recognizing the difference between regular land management, tax/revenue collection, and monitoring for sustainable use. Indeed in a large country such as Kazakhstan serious consideration needs to be given to a system that is largely managed locally with greater emphasis on a participatory role of the land users (and land user associations), and administered by local (rayon or oblast) hakimates and land agencies.

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<sup>27</sup> In all most countries the land price and lease rates are determined by market forces (a notable exception is the western US where rangeland lease fees are set by the Federal Government). As the Kazakh land market is not yet functioning, the Government choose, at least for the time being, to have the lease rates and price set by the State.

## 4. POLICY CONSIDERATIONS FOR SUSTAINABLE LAND USE

57. Each country/region has to develop its own land tenure system,<sup>28</sup> often based on a mix of traditional common use and formally regulated use, translated into acceptable regulations on ownership, tenure, and use. The specific objectives of land management may vary but the overall objective of sustainable use is generally accepted. Such sustainable use is often guided by:

- economic efficiency;
- social equity;
- environmental stability.

Worldwide the focus is increasingly on people rather than on land only, and policies include the provision of sustainable livelihoods to the people on these fragile lands. Such a focus was part of the pre-Soviet customary rangeland tenure, and it may be opportune to review these customary systems and decide whether they may be considered among the options for land tenure and management of rural rangelands that are currently abandoned.

### *Rangeland Use Policies*

58. The Soviet system that replaced the traditional pre-1900 Kazakh systems was largely based on static “carrying capacity” determinations. Rangeland management in the rest of the world is based on broader systems that take the variability and dynamics of grassland production into account (see Scoones, 1994, Kerven et al, 1996, Ho, 2001). Unfortunately this issue is currently not addressed in land tenure debates in Kazakhstan that appear to be dominated by problems and opportunities of private land ownership. The grazing capacity of the semi-arid and arid areas of Kazakhstan was variable throughout history, depending mainly on weather and access to rangelands. Various grazing regimes have tried to optimize the natural productivity, taking the limitations brought on by low and variable precipitation and cold weather into consideration. Hence, the importance of flexibility (i.e. mobility) in livestock systems when considered future grazing systems, landsuse and land tenure policy..
59. Modern rangeland policies focus less on the carrying capacity, and more on mobility, climatic variability, and risk management. The new land managers have to balance intensification and (extensive) mobility and assure long-term sustainability. However, it will take time to determine the point of equilibrium as the resource is still trying to recover from past misuse, and as the users are making efforts aimed at their well-being improvement using natural resources. In addition, in some areas the system is used by (often urban) opportunists that try to make quick profits by depleting existing resources (for example the saiga antelope) or by trying to speculate and obtain custody of large tracks of land (for example flood plains or winter grazing lands that are crucial links in the annual grazing cycle). On the other hand, the initiatives and actions of new land users – irrespective of the legality of such use – may provide valuable lessons about land use and land tenure in Kazakhstan.

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<sup>28</sup> Humphrey and Sneath, 1999 narrate the differences in the post Soviet transition of nomadic people in Mongolia, Russia (Tuva and Chita) and North Western China and the effects on the landscape.

### Box 6. Rangeland tenure in other parts of the world

Worldwide, various models of grazing land tenure exist. Most countries recognize private pastureland ownership, even in areas where such lands are vulnerable (Argentina, Canada, US, Australia). However, they reserve the right of the State to maintain custody of land of which the use may be of benefit to the population as a whole. These lands (and waters) are basically those where ownership is considered to be in the interest of the State, whether as a user (land allocated to defense department, to roads, research etc.) or as a protector (for example of fragile lands).

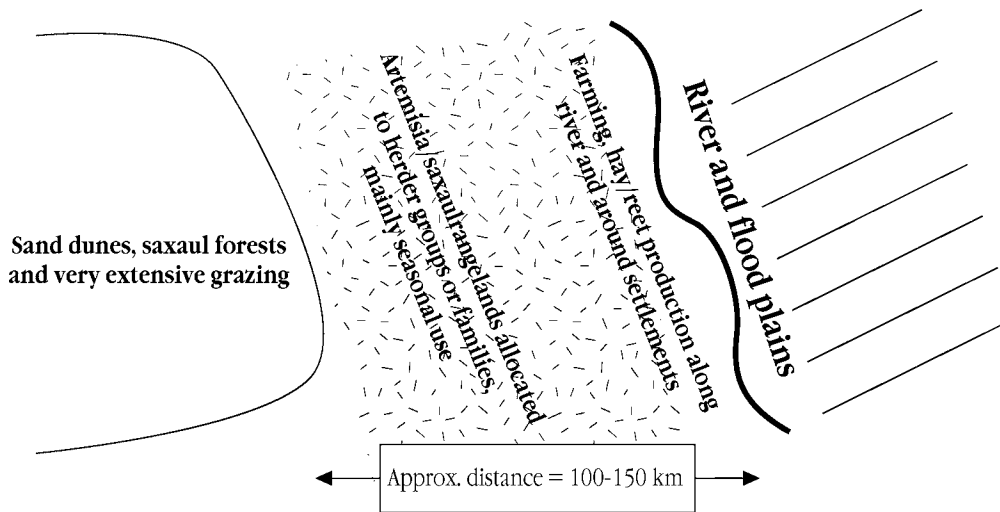
Interpretation of the “common interest” varies widely. For example, in Australia many rangelands are individually owned, in the western US mainly publicly (central/federal, state) and in the eastern US mainly privately, in northern Scandinavia by a mix of state and family companies and in Switzerland by the state or village councils. Most of these arrangements are based on traditional arrangements and common law, and in some countries (Australia, US, Canada) tribal communities own or have right to substantial parts of forests and rangelands. Most of these arrangements are still debated (whether in public debate or in courts) and there does not appear to be a common model. The general consensus, however, is that the traditional users should have a major voice in the management.

60. The broader political issues today include:
  - a) the type of land tenure that ensures optimal use of the rangeland resources;
  - b) the type of land use to be considered for the very remote pasture in areas far from markets, and whether to include per-Soviet land use systems and land tenure;
  - c) how to balance the interests of all users and prevent land grabbing that would restrict access to “essential” lands that are crucial in determining the land use and/or access to a wider area (floodplain, watering sites, corridors, winter grazing, etc.);
  - d) the extent of land use rights (and/or private ownership) and whether or not it should include rights to other resources (such as carbon rights);
  - e) how to prevent further deterioration and set priorities for rehabilitation;
  - f) the role of the State in either managing or monitoring the use of these lands.
61. *Rangeland code* In view of the importance of the resource that covers close to 70% of the country, the first action is to complement the land code with a rangeland law (or legal enactment) that will guide the use of rangelands for grazing, protect wildlife and be the manual for other single or multiple use forms. Preferably this law should be very brief; accepting that most of the management of the resource is to be guided by legal regulation. The main reason for a simple law, and leaving the detail to regulations, is to provide the Government and land users the necessary flexibility to explore new land use and management forms during the transition period, and not be restricted by untested laws.

### ***Mobility versus Settled Management Systems***

62. Any debate or regulation on rangeland use needs to recognize the dynamic and diverse primary productivity of these arid lands, and, hence, the locally most appropriate land tenure systems (leasing, ownership, exclusion, etc.). In some areas this may lead to (European style) summer grazing or winter housing, in some others to continuous grazing – often associated with distant migration (transhumance). Such migration can be vertical in the mountainous regions or horizontal in the steppe and semi desert. Typical examples of vertical migration can be found in southeastern Kazakhstan and neighboring Kyrgyz Republic (Schillhorn van Veen, 1995) and western China (Sneath, 1999). Horizontal migration was the main type of husbandry in Kazakhstan until the 1960s when creation of large livestock farms prohibited migration of herds and flocks. Recently, the possibility of a compromise hybrid of some mobility combined with land specific tenure arrangements has been proposed by research institutes and NGOs. An example of proposed leasing of land in the south-central part of the country is provided in figure 4 (Zhambakin, 1995; Alimaev, 1998) The leasing arrangement is designed in such a way (with long stretches of land and/or corridors) to facilitate annual migration (the establishment of corridors is another option). These stretches are more or less at an angle to the river and allow annual migrations from river floodplains (where animals may be grazing or housed in winter) to spring, summer and fall pasture further away in the desert area.

Figure 4. Simplified proposed landuse along parts of the Syr Darya river.



63. As such the laws and regulation guiding the land use need to be broad and flexible and take into account that specific separate regulations may be needed for each of the diverse areas of the country. Such regulations do not need to be managed centrally, but could be oblast based. They could include recognition of:
- possible group or community ownership/tenure of grazing lands, and decision making by the pastoral people;
  - land use patterns that integrate the use of rangeland, crops land, and forests, and encourage interaction among various users of this fragile resource (including interaction between livestock and wildlife, livestock and forests);
  - new systems of land quality monitoring and monitoring capacity, based on modern concepts of flexible land use; and possibly a decentralized supervisory role at the rayon or oblast level in assuring sustainable use.

To avoid confusion and opportunistic land grabbing, the Government may seek a temporary moratorium on leasing rangeland to urban outsiders that are mainly using the land for land speculation, until the law and some regulations on tenure are determined.

#### Box 7. Land tenure considerations

- Considerations with respect to land leasing and/or ownership decisions:
- land use is based on a land use or grazing management plan;
  - the lease or land title will include access to the associated water resources;
  - certain essential (grazing) areas cannot be leased out or sold separately if it would disturb the annual grazing cycle or threaten the mobility of transhumant herds or flocks as well as wildlife;
  - protected land, whether national parks, cultural heritage sites, etc. will be excluded from land term leasing, but some parts may be used in emergencies;
  - land taxation or lease fees need to be flexible depending on the benefit reaped by the user;
  - under conditions where long-term leasing or private ownership is accepted, the role of the State (whether local or central) is to assure sustainable use of the land and its natural resources. This oversight role would require,
    - providing guidelines and guidance for the development of rangeland use plans by land owners or lease holders,
    - a capacity to develop integrated master (land use) plans for defined ecosystems such as a watersheds or desert areas,
    - an entity that would carry out the State's oversight role, and
    - the capacity of local range managers to amicably resolve conflicts among various resource users.

64. There is a tendency to focus on large commercial producers and neglect or dismiss the small holder. At least in the short term this may be unwise, as:



- a) livestock production is often the only means of survival of the rural small holders, and neglect may increase poverty and/or greater demand on social services;
- b) small producers may develop niche production systems that may help to innovate the sector;
- c) existing large farms are often non-viable and either depend on state subsidies or on exploitation of the workforce.

Still, small holders need economically justified alternatives to their current practices of grazing, animal husbandry and production.

65. *Ownership of resources below the land surface and sequestered carbon.* In Kazakhstan, the State is deemed to be the owner of subterranean resources including the rights to minerals and deeper water resources. These “deeper” resources are generally not influenced by the type of land use, and there may be some justification that they remain within the realm of the State. The situation is different, however, for sequestered carbon, which is influenced by land use as well as by land protection (to prevent fires, etc.). As such the land user, rather than the State, plays an important role in carbon sequestration. In case of proper rangeland management he/she should be a beneficiary as for the carbon trading. It may be speculative to express the value of sequestered carbon in monetary terms, and further work is needed to determine this value as well as the incentive system to encourage sequestration and prevent loss due to fires or poor land management. Further debates about carbon sequestration and trading should acknowledge the interest of the land users and, as incentive to optimal land use, should consider directing most of the benefits of future carbon trading to them. This work requires more policy dialogue on ownership issues. In most European countries the land owner rights include the topsoil (to a distance of – for example – 200 cm); in the US the land owner has all rights including deeper resources such as oil and minerals. The Kazakh system today is closer to the European model but may need to specify in particular, whether to include the right to topsoil (and bound CO<sub>2</sub>) in order to design an equitable system of distribution of carbon credits.

#### **Box 8. Rangeland management in the United States**

Although most farmlands are privately owned, the Federal Government owns over 250 million ha of land, the majority of which is managed by four federal agencies – the Forest Service, the Bureau of Land Management (BLM), the National Park Service, and the Fish and Wildlife Service. Most of these lands are nearly uninhabited vast range and forests in the western United States. The Forest Service or BLM manage around 70 %; of which approx. 100 million ha of this is classified as rangeland.

The administration of these lands, especially the role of the BLM, is guided by a variety of laws and regulations. Most land is leased to private owners and the determination of proper lease fees is a continuous point of contention between leaseholders, the Government, and various citizen groups that challenge the Government on the following issues:

- (i) *pricing mechanism*: it is argued that the lease fees should at least recover the cost of the BLM in pasture management and improvement. These fees ranged between \$1.50 and \$2.00 per animal unit month (AUM= 1 cow or 5 sheep) in recent years, and are based on historical gross beef cattle production values and on short term interest rates (of Treasury bills). However, the current revenue covers only half of the program's administrative costs.
- (ii) *range condition*: it is argued that rather than mainly focusing on the value of the range for grazing, a broader range of benefits and services should be considered (see parameters).
- (iii) *public participation*: rather than mainly dealing with livestock producers (for example advisory commissions elected by range users) it is argued the BLM should pay more attention to multiple use form and consult with local authorities, environmentalists, recreation interests, etc.
- (iv) *socio-economics*: it is argued that livestock production is an American tradition, and the only use form that allows rural communities to survive. Without subsidized grazing many ranchers may have to sell their ranches.

#### ***State Role in Management and Monitoring***

66. Previously all land was within the domain of the State and used by the State and collective farms. Currently many of these farms no longer exist. Some land is still used and taken up by new farmers and organizations; much has been abandoned and is part of the State Land Reserve Fund. Kazakhstan has adopted the principle of private land use for agricultural land. Apart from the pending decision on land

allocation to different users, the Government is facing the question of institutional oversight over the use of these lands to assure its sustainability. The primary policy issues facing the Government are:

- How to assign land ownership or land use rights in an equitable fashion that will ensure economical and sustainable use.
  - How to organize and stratify the State oversight role over land use to assure sustainability and protect this national resource.
  - How to manage or allocate the land (mainly pasture land) currently in the State Land Reserve.
67. Since independence a number of laws and regulations have been enacted mainly to regulate land use and ownership. Most of these laws and regulations were targeted at arable land. More or less by default, these regulations have locally also been applied to govern the use of range- and pasture land. This was inappropriate, as the fragile rangelands – with their multiple use and multiple users – require a specific approach. Consequently, the rangeland resources are currently used without proper regulation or oversight.
68. The first priority would be the development of management plan in a process that includes all stakeholders. Such a process is relatively new in the FSU where decisions were generally made by a centralized power. Since independence a number of non-governmental organizations have emerged, some with good understanding of social and environmental issues in civil society. Rural communities and herder associations are slower in recognizing the need for civil initiatives and need further encouragement to participate in a debate about sustainable land use.
69. There is little recent precedent on sustainable rangeland use in a Soviet country that is moving towards a market economy. Further debate and demonstration may be needed to determine the most appropriate base for the supervisory role of Government, and whether or not the supervisory role should be separated from the “land owner role”.<sup>29</sup> Few satisfactory examples exist although experiences in the Kyrgyz Republic may provide useful lessons. Western countries (Canada, US, Australia) are also still struggling with this issue. Kazakhstan has, probably rightfully, chosen to decentralize land management decisions. As such, the now emerging herder communities should have an important voice in the decision making and, in large countries like Kazakhstan, it may indeed be more appropriate to allocate the monitoring role to the oblast or rayon level to allow greater involvement and interaction with local users.
70. Issues in this debate include resolving:
- a) the inadequate monitoring program and lack of data on the condition of land resources;
  - b) the lack of community support for protected areas and alternative livelihood options;
  - c) insufficient public awareness (especially among urban rich population) about sustainable resource use;
  - d) the lack of revenue capture mechanisms to enable stakeholders to re-invest revenues in land management.
71. Resource management may improve by developing management plans and by enabling local stakeholders (from beekeepers to oil drillers) to establish user rights agreements (URAs) among themselves and with landowners and government agencies where appropriate. This will be done through consultations among local users, Land Resource Management Agency, MoA and MEP.

### ***Revenue Collection and Use***

72. The new land code of 2003 allows ownership and leaseholding of rangelands and other agricultural lands. The land laws identify different land types i.e. irrigated arable land, rained arable land, hayfields and rangeland. The Government, in decree 890, has developed criteria and conditions for the sale of

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<sup>29</sup> For example in Turkey the rangelands are “Treasury” lands and in the western US most rangelands are managed (including quality control) by the Bureau of Land Management (Ministry of Interior, see box 7).

such lands. Criteria include soil quality, regions and use pattern. The prices of rangeland are generally around 5-10 % of arable land prices. For example the prices purchase of State owned rangeland in Akmola, for 2003, are listed at 9,200 tg/ha (compared to 71,900 tg/ha for irrigated chernozem land (see table 7 and annex table 5). The State has fairly liberal payment schedules in which the new owners can pay for their land over a 10-year period (but can not sell such land until fully paid). Prices for primary sale of rangelands are not fixed yet and will be 4000 and 10,000 tg/ha, and landowners are also allowed to pay for land over a period of 10 years. Land-owners are expected to pay a land tax to be collected by the rayon. As for the leasing the Government continue using the previously fixed fees. Leasing rates for Government land are linked to the calculated land taxes (determined in the tax laws).

73. Various mechanisms of land revenue recovery are used worldwide. The most common are land taxes (in the case of land ownership), lease fees (in the case of short and long term leases), and grazing fees. In most cases the fee structures vary locally, depending on market conditions and needs. Generally they are, or should be, linked to the perceived benefit to the user. For example, determination of a grazing fee for 120 days should be linked to the cost of feeding, and to market conditions (see box 7). Taxes and long-term leases can be set per hectare, as the user has a long-term interest in maintaining the resource. Fees for grazing are generally set per animal and for a defined period, to avoid overutilization of the resource. Fees and taxes can, to some extent, also be tools to influence land use. For example high fees for “near village” pasture and lower fees for distant pastures may be an incentive for herders to move to the latter.
74. In most countries the taxes and fees are collected by local authorities and to a large extent also used locally, in part to finance general services, in part to finance the upkeep, improvement and monitoring of the range resources. Since land may well be the main asset in many rural communities in Kazakhstan, they are likely to be the perceived main source of revenue for local authorities. However, these lands are also a national asset (and heritage), which may justify some types of State support (rather than just taxation) for sustainable land users.

**Table 7. Average target prices for farm land in 2003 (1000 tg/ha).**

<b>Oblast</b>	<b>Average land price</b>	<b>Arable land rain-fed</b>	<b>Arable land irrigated</b>	<b>Meadow</b>	<b>Rangeland</b>
Akmola	20.4	28.7	56.5	10.7	6.6
Aqtobe	5.8	21.9	54.8	7.1	3.9
Almaty	19.8	25.2	122.9	12.0	3.3
Atyrau	2.4	n/a	35.1	3.7	2.1
East-Kazakhstan	10.8	22.3	42.2	10.2	6.7
Zambyl	11.3	23.5	72.8	10.5	3.2
West-Kazakhstan	7.1	18.0	52.7	9.5	4.8
Karaganda	5.5	18.7	49.1	5.9	3.9
Kyzyl-orda	12.3	n/a	126.1	5.6	2.0
Kostanai	25.1	36.5	59.2	11.5	6.5
Mangistau	1.5	n/a	33.3	1.5	1.5
Pavlodar	12.9	23.3	45.3	19.1	5.0
North-Kazakhstan	40.9	50.6	67.7	13.0	11.0
South-Kazakhstan	80.0	24.9	226.4	9.5	3.4
<b>National average</b>	<b>14.0</b>	<b>31.1</b>	<b>98.7</b>	<b>9.8</b>	<b>4.4</b>

## 5. INVESTMENTS AND OTHER ACTIVITIES FOR SUSTAINABLE LANDUSE

75. During the Soviet time the rangelands deteriorated considerably due to a variety of questionable policies in land use, including the ploughing up of fragile rangelands for short-lasting agricultural production, unsustainable water use leading to lowered water tables, land desiccation, and the use of ecologically risky oil drilling, space launches and nuclear testing. The Government and the public are fully aware of the detrimental effects of these policies and are now contemplating how best to correct and reverse the trend. This is now leading to policy and technical questions on how to prevent further deteriorative use, and whether and how to rehabilitate the damaged and destroyed pasture lands which are estimated to encompass 30% of all grazing land.
76. The common paradigm is the “rational usage of the natural pastures,” a concept that dates back to the Soviet times, but was thwarted by other policies and actions that strived to maximize livestock production, an objective that was more frequently measured by livestock numbers than by efficient production. As such, the new guiding principles for development and investment in the resources should be:
- i) environmental sustainability,
  - ii) economic justification,
  - iii) benefits to the poor, and where possible
  - iv) integrated use forms.

These objectives may be achieved through a number of investments that include rehabilitation and repair with priority given to environmentally fragile areas. Possible actions include selective rehabilitation of rangeland water supply, (i.e. where economically justified and not leading to overuse of other related resources), regional development, risk reduction, and other measures that can significantly increase the productivity of pastures, improve plant coverage, and protect from further degradation. Such improvement should be of benefit to the users who will have to play a major role in improving land use, in order to improve the quality of autumn, winter, or spring pastures. Implementation, however, would require considerable improvement of skills and support systems.

### ***Land Rehabilitation***

77. From a technical viewpoint considerable experience has been acquired in the later years of the Soviet Union in the rehabilitation of agricultural land. This experience indicates the technical feasibility, although over a long period (i.e., decades) to reach environmental sustainability. The experience has not yet taken the economic sustainability into account but that question is currently being considered. Most of these interventions can be done by the private sector, such as individual farmers, farmer groups or cooperatives, including:
- development of pastures through overseeding and resting;
  - restriction on permanent pasture use, through better oversight and fencing;
  - encouraging hay production and introducing better fodder preservation and storage techniques;
  - exclusion of grazing on steep sloping land (through fencing or reforestation);
  - increasing shed feeding, reconstruction and repair of sheds used during winter season in certain northern and suburban areas;
  - extending the period of use of summer pastures by better management.

Government can encourage such initiatives through awareness campaigns, training, co-financing and other incentives but farmers, environment and market conditions should be the main determinants of the production system.

78. Incentive systems for farmers and herders who would like to participate in schemes that aim to rehabilitate land and improve land use systems can be initiated by national, oblast, rayon authorities. However, some overall guidance and monitoring (to gather data and share experience gained) may be required. Some of these principles are expected to be tested in the World Bank supported Dryland Development Project (Karaganda).

### ***Regional Development***

79. Given the size and diversity of Kazakhstan it is difficult to design interventions that can cover the whole country, and development of the vast rangeland area needs a new approach that takes its peculiar features and characteristics into consideration including, (i) low population, (ii) high transaction costs of supporting such population, and (iii) fragile land and lack of water; but also linkages to other areas either as the source of surface water, or winter grazing, for example. In most of these areas the agricultural (mainly livestock raising) opportunities are combined with, albeit limited, non-agricultural opportunities such as wildlife raising, viewing, hunting and other tourism. Development would require proper land use plans and some infrastructure such as the development of recreational and tourism facilities, vigilant management, -and, at least in the short run, protection of the wildlife and biodiversity.

### ***Water Supply***

80. As much of the access to remote rangelands depend of water availability a debate has started on whether, and how, to re-establish rangeland water resources. This debate may need to be framed in a wider context of sustainable rangeland use to prevent the mistakes of the past over use of pasture resources. The four major topics in the debate are:
- a) Social – i.e. how to organize water provision and water rights in more intensively used areas. Choices include public management (i.e. operated by municipalities), private ownership (which is unlikely under current law) or group management (i.e. rangeland water user associations).
  - b) Environmental – i.e. how to ensure that access to water does need lead to overuse of the associated pastures, and how to assure that access to water will not damage water ways or wetlands, etc.
  - c) Financial/economic – i.e. assess how the creation of water resources or structures is indeed economically viable, and ensure that the users who benefit from this resource will pay their full share of the costs (both the operating cost and amortization).
  - d) Technical – i.e. determine the kind of structures that are technically feasible and cost effective. Should old structures be repaired (and if so by whom), or are new structures to be constructed that are more sustainable (that are not dependent on a rural electricity grid, for example).

In most countries such range water supply equipment is privately owned and managed, although some state support may be provided when communal access is expected. Such communal use is managed by user-associations that will charge members (and non-member users) a fee, which is generally based on the benefits obtained. This can be a fee based on a per animal basis, and is based on the full cost of operating and maintaining the water resource. Even if privately owned, the state may levy a small fee for the underground water used if the latter is considered a societal asset.

81. As such it is recommended to commission a survey of available water sources, decide which are to be maintained, repaired or renewed, and draft (i) a priority list and (ii) a long term management plan that is based on management and financing by the users. Financing some pilot rehabilitation programs (as for example done in the Kyrgyz Republic) may help to draw relevant lessons. Government, and donors, may then develop an investment plan that includes support for the development of water user associations, and improved skills in water use and range management planning.

### ***Carbon Sequestration***

82. Competition for grazing land may also be influenced by its future value as a carbon sink. Field measurements by Kazakh and US specialists of carbon fluxes over the past three years indicate that Central Asian rangelands have the potential to act as atmospheric carbon sinks, and that the capacity of rangelands to sequester CO<sub>2</sub> could be increased with better rangeland management practices (see USAID-CRSP, 2002). Some of this work is included in the World Bank supported Dryland Management Project that started in 2003.
83. Current research is only considering the technical aspects of CO<sub>2</sub>. However, before mainstreaming these findings, there are a number of other issues for consideration by rangeland managers. These include, control of fire and other hazards (such as rodents) that may release or decrease sequestered carbon and, most importantly, decisions on land tenure and benefit distribution, i.e. who will be the ultimate beneficiary of proper rangeland management and carbon accumulation. This work requires more policy dialogue on ownership issues (of land and of bound CO<sub>2</sub>) in order to design an equitable system of distribution of carbon credits.<sup>30</sup> Such a development would also require considerable improvement in skills, an area that should have the highest priority among Government programs.

### ***Risk Reduction***

84. The reduction in risks of land overuse, and in the vulnerability of its users can be achieved through a number of interventions<sup>31</sup>, in particular:
  - a. land allocation and tenure (including water rights) that allows mobility (i.e. assuring herders access for their annual grazing cycle);
  - b. require land owners and users to develop rangeland management plans that are based on protecting the long term sustainability of the land, rather the maximizing forage production;
  - c. support for long term climate and weather forecasting (especially drought and “dzud” prediction);<sup>35</sup>
  - d. greater focus on quality fodder cultivation and preservation (which will take some grazing pressure off the rangelands);
  - e. encouraging the establishment of multi-purpose herder organizations that are trained and able to reduce risk through improved pasture management;
  - f. improved rural services such seasonal markets for livestock and fodder, repair/maintenance services (for water supply equipment, farms) and livestock breeding and veterinary services;
  - g. future introduction of other risk management tools such as risk insurance, pasture rotation and advisory services (for appropriate species or breed selection, herd management, etc).
85. Risk reduction includes maintaining some of the mixed-purpose land use systems, such the mixed forestry-livestock use of selected saxaul forested rangelands for forestry and livestock breeding, and the seasonal use of floodplains and/or other grazing methods during winter and summer seasons by pastoralists. Resource access should be guaranteed through long-term leases and preferably on a community basis. The community should be given the responsibility for maintaining the (forest) resource.

### ***Rangeland Management Functions***

86. In order to fulfill its oversight and supervision role over such an important natural resource, it is appropriate to establish a specific agency that will oversee the activities in this vast territory and provide guidance on long-term pastoral risk management. This role would include:

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<sup>30</sup> Currently Kazakhstan has not signed the Kyoto Protocol that tentatively guides international carbon trading.

<sup>31</sup> Examples of specific investments may be derived from World Bank supported projects in Mongolia (livestock development and insurance against weather related events), Kyrgyz Republic (investment in creation sheep herder cooperatives and in pasture monitoring and allocation).

<sup>32</sup> Such forecasting allows herders to make early decisions on stock inventory, such as stock reduction when severe winters or dry summers are forecast.

- a. a national capacity in early forecasting and monitoring;
- b. a national capacity to review and set policies that focus on the reduction and management of pastoral risks;
- c. local (hakimate) government capacity to plan for risk, by integrating technical early forecasts with information received from (traditional) land users;
- d. local (hakimate) government capacity, backed by national capacity, to deliver risk response and risk recovery in a timely, equitable, and cost-effective manner
- e. local (hakimate) responsibility to strengthen participation of interested parties and civil society in rangeland planning.

Especially in the northern and southern steppe oblasts, this function can be organized in combination with forestry management, as forestry is relatively less important in this area and where it is important (saxaul forests) there is a clear linkage with range management.

This supervisory and advisory role of the State can be partly financed by the general budget (as there are obvious public goods aspects) and partly by re-investment of taxes and fees collected from the users. This may require some capital investment to equip the organization with tools to carry out such a function (including diagnostic/ analytical equipment, transport etc.), which could in part be derived from consolidating functions now carried out by other institutions.

87. It is difficult to predict the long-term consequences, as there are considerable biological and physical differences between regions and types of pastures. The response of each type of pasture to the new management system may be different. Local history of misuse of pastures (see Zhambakin, 1995; Asanov and Alimaev, 2001) is an indication of a need for respect for the land and the difficulty in predicting the consequences of interventions. As such, innovation will require pilot demonstrations with careful monitoring of the individual or aggregate impact of a new grazing system on the grasslands, related resources and surrounding communities. Livestock herders generally tend to adopt a strategy of adaptation to changing economic and pasture conditions. More prosperous and commercially inclined people will increase their livestock numbers. The focus on numbers, rather than productivity, is a Soviet legacy that can have a detrimental effect on pasture resources.
88. *Investment in public support systems.* The State (whether central or local) should encourage investment in sustainable rangeland use, in particular by improving access and facilities such as water supply and shelter for migrating flocks and wildlife, allocation of fodder areas, etc. If possible such investments should be made with local community input. Where such investments are of common interest or can reduce rural poverty the State may consider co-financing private initiatives. The role of the State would be improvement of information services and other investments of a public goods nature. A major issue is where to put support and how. Most rangeland users live in remote areas and the transaction costs of reaching them may be high. This can be overcome by providing them with greater responsibility (and regular inspections), by the use of new telecommunication equipment and by combining activities (i.e. shearing combined with breed recording and animal health interventions; wool collection with delivery of farm inputs etc.).

### ***Skills Development***

89. Private farmers and herders need investments and technical advice (i.e. agricultural extension) on livestock farming and protection of their proprietary rights. Current skills and rangeland management are limited to a highly specialized level in academia and research institutions. Unlike countries with similar grassland resources Kazakhstan has no specific training program for range managers. Such skills are urgently needed; for example to advise rayon and oblast hakimate leaders as well as in private sector. Serious consideration should be given to developing programs and curricula in range management at the technical school and university levels to train rangeland managers in modern methods of rangeland management, monitoring, and conflict management.

***Potential Non-Grazing Use***

90. As there are more opportunities for land use besides grazing, policies and rules should be in place to assure the non-agricultural use of rangelands. For example, to improve the sustainable utilization of wild medicinal resources, Heilongjiang province in China set up a provincial station for management of wild medicinal plants with 106 management stations and 35 reserves and adopted a collection process based on sequential collection (i.e. collectors are allowed to use certain fields one at a time). In the Yikezhao Region of Inner Mongolia the province administration has erected an enclosure for the protection of licorice that covers an area of 80,000 ha. The licorice area in these regions of China increased from 360,000 ha in the 1970s to 470,000 ha in the 1990s. Direct State involvement may be unwise as this is mainly a private sector activity, but Government should verify that its policies are aimed at improving the system, especially the quality of the final product, and on also ensure that the collection does not lead to depletion of the resource. Unfortunately the Central Asian licorice resources that are estimated to produce over 50,000 tons of raw licorice per year are threatened by desiccation and development of irrigation.



## 6. QUALITY CONTROL AND MONITORING

91. Monitoring or systematic inspection of pastures is currently not conducted in the republic. The geo-botanical inventory assessment, a regular event during the Soviet period, was more or less halted due to lack of funds, re-organization, and a greater interest by the agency involved in land management issues related to mining and oil drilling. The technical center for land resource management of the Kazakh Scientific and Production Center for Land Resources and Land Management delivers the data geo-botanical studies only upon request from users. Geo-botanical inspections of pastures in the Atyrau region, for example, were performed in connection with surveys and allocation of territories for oil extraction. In addition, specific research institutes or other entities may carry out targeted studies, either by mandate or when commissioned by central or oblast governments. For example the Kazakh Grain Research Institute – for the sequestration of CO<sub>2</sub>, the Kazakh Astrakhan Research Institute – for recovery of pastures through agricultural techniques, the Kazakh Fodder Production and Pasture Research Institute – for use of pastures and meadow, the Institute of Botany and Phytointroduction – for ecological condition and natural land recovery, and the Ecology Institute – for recovery and use of pastures of Aral Sea area, etc. Under future conditions with private land ownership and the right for rent tenure the organization of a pasture inspection service should become one of priorities among other activities.

**Table 8. Potential indicators of rangeland condition**

Indicator class	Condition parameters
Soils	Soil fertility, soil depth, waterholding capacity, soil loss, carbon storage
Vegetation	Botanical diversity, vegetation cover, vegetation productivity, root systems, carbon sequestration
Wildlife	Diversity, reproductive rate, management system, fishing, hunting and watching pressure, protection of rangeland dependent species
Livestock	Livestock density, reproductive rate, yield, management systems
Fragmentation/ ecosystems	Size, condition and dispersion of rangelands
Services	Tourism services provided, fire frequency and management, herb collection, forecasting of

Based on NRC, 1994; Flather and Sieg, 2000.

92. The Soviet system focused on the carrying capacity of the vegetation. This concept is now somewhat outdated and a more comprehensive set of parameters may be required, such as biological/environmental indicators, and indicators that consider economic potential, i.e. the benefits the land provides, such as wildlife habitat, tourism, medicinal plants, etc. (see table 8.).
93. Further thought should be given to a decentralized approach which might provide a number of benefits such as:
- a) a more rapid response time to needs and services;
  - b) greater involvement, and acceptance, by local communities.

This assumes a democratic decision process and adherence to the paradigm of long-term sustainability. The latter is based on sound mutually-agreed (between users and state) criteria that are verifiable at the national level.

94. In view of its large rangeland resources, there is surprisingly little expertise in rangeland management in Kazakhstan, especially at the local level. This is a legacy of the Soviet system that concentrated on the

botanical aspects, but less on management and dynamic use. Range management, as such, is not a specialization in Kazakhstan, an omission that may need to be reconsidered in the near future.

### ***Risk Management***

95. Traditionally the main risk management tool was mobility and migration. This is still a valid tool, and should be part of any discussion of land tenure whether focused on private ownership or long and short term leasing. As most risks are weather or climate related, good climate or weather forecasting is an essential tool which can be used by herders and farmers in order to protect themselves from financial losses associated with calamities such as drought and “dzud”. Establishment of the insurance system against calamities, such as drought and ice storms, should be considered in a country as large as Kazakhstan, where the risk of such events varies by region (thereby spreading the risk for the insurer). Discussion about such an insurance project are being held in Mongolia.

### ***Conflict Resolution***

96. The variety of land users, with different interests competing for the land can raise the risk of conflict. Although market forces can often be used to guide the resource allocation, there are exceptions, including cases where private use may lead to over-exploitation or risky behavior, or when there are traditional users whose livelihood depends on the resource but are crowded out by short-term commercial interests. During the 1990s, for example, there were few conflicts over land use as land was abundant and livestock numbers seriously declined. More recently, however, the value of land has been recognized. There appears to be some “land grabbing” where (often rich) owners assume ownership over large tracts of rangeland (sometimes over 10,000 ha) without intending to farm or graze it themselves, but rather use hired herders or lease the land to third parties.

#### **Box 9. Access to services**

Apart from access to land and water, optimal resource use also requires that the land holder has access to a number of services and resources including:

- Access to information/knowledge (through radio, television, internet, extension agents, etc.), and supported by functional applied research in rangeland management and resource use;
- Access to financial services (including banks, money transfer, micro-credit, insurance and agricultural credits, etc.);
- Access to animal health services (including state supported epidemiological services and epizootic diseases control, as well as private clinical services);
- Access to breeding services;
- Access to markets.

Note that access does not implicate free services. Most of these services are to be paid for, although in view of the high transaction costs the State may consider providing some assistance.

97. The legal system and laws are often not functioning optimally, and local conflict resolution is more appropriate. Local authorities or elders that are able to line up the different interests and amicably resolve conflicts often make such decisions. However, this would require training both of range managers, as well as those involved in resolving conflicts.

## 7. CONCLUSIONS AND RECOMMENDATIONS

98. The conclusions are based on the following paradigms:
- a) Kazakhstan's rangelands are an important national and global resource;
  - b) the change from State-owned and centrally planned collective farming to private farming and herding requires a major change in approach to rangeland and farm management;
  - c) a national debate about land management has more or less come to consensus (in 2002) that arable lands might be held privately while more vulnerable rangelands and forests should be state-owned but can be leased.
99. The driving force in management of these lands should be their sustainability. The driving force for the users should be the optimal use and management of the various risks that are associated with the use of these lands, especially the risk of damage to its future potential and biodiversity through overuse (including overgrazing). The driving force of the State is to encourage sustainable use and risk management by users, and address wider threats of environmental contamination and lowering water tables.
100. Irrespective of the final choices in tenure, the role of the State will likely change from that of manager of the rangelands, to that of assuring that their use by (private) owners or leaseholders is sustainable and does not adversely affect the long term quality of the land, or its flora and fauna, while supporting the livelihood of traditional users.

### Policy

101. Hence, the State should soon develop policies that ensure sustainable use of the resource. In this effort it should take into account the interests of a variety of parties including herders, other local users, local communities, national interest groups, and the global community. These policies should, among others, address the following issues:
- a) access: open access or access limited to certain users;
  - b) tenure: private ownership or leasing, or community ownership or leasing; somewhat depending on the societal value of the land and taking regional differences into account;
  - c) lease fees: their collection and distribution. Policies should focus on the system of determining the fee structure and the collection systems (the actual amount – which is now often set by law- may be better left open as it should be changed depending on conditions);
  - d) users: how to assure a rural livelihood under varying conditions; are there to be maximum and minimum limitations on the land to be leased (depending on the use form); multiple use forms and/or users;
  - e) conflict avoidance: and conflict resolution among and between users, as well as between users and the State;
  - f) state management of the rangelands: role of central state, oblast, rayon and community administrations; assurances of quality control by independent monitoring agencies as well as communities;
  - g) capacity: capacity of the rangeland to meet the needs of users under varying seasonal and climatic conditions, assuring flexibility (mobility) in its use;

- h) skills of rangeland users and rangeland managers: training of range managers; improvement of education and information distribution system among land users;
  - i) infrastructure development of: (roads, water sources, markets, etc.) but in such a way that it will not infringe upon sustainable use;
  - j) managing environmental risks: reduce environmental risks and develop a management program for heavily contaminated areas (such as the Baikounour and Semipalatinsk chemical and nuclear contaminated sites, and the more recent environmental risks associated with mining and oil drilling).
102. In view of the importance of a resource that covers close to 70% of the country, serious consideration should be given to complementing the land code with a rangeland law (or regulation) that will guide the use of rangelands, whether for grazing, wildlife, (saxaul) forestry, or other single or multiple use forms. This rangeland law should recognize the dynamic and diverse primary productivity of these arid lands. It should determine the locally most appropriate land tenure systems (leasing, ownership, exclusion, etc.) taking into account local conditions and include provisions for group or community ownership/tenure of grazing lands and decision-making by the pastoral people. Experience may need to come from pilot investments and dialogue with stakeholders.
103. Under conditions where long-term leasing or private ownership is accepted, there is an important role for the State to ensure sustainable use of the land and its natural resources. This oversight role would require:
- a) providing guidelines and guidance for the development of rangeland use plans by land owners or lease holders;
  - b) a capacity to develop integrated master plans for defined ecosystems, such as a watersheds or desert areas;
  - c) an entity that would carry out the State's oversight role, and in particular:
    - review and endorse rangeland use plans,
    - access and contribute to rangeland management information systems,
    - initially support technological innovation in rangeland monitoring and sustainable rangeland use;
  - d) the capacity of local range managers to amicably resolve conflicts among various resource users.
- Further debate and pilots may be needed to determine the most appropriate base for such an oversight role for Government.

## Investments

104. In order to fulfill its oversight role over such an important natural resource, it is deemed appropriate to establish a specific agency that manages the oversight over the vast territory and provides guidance in long-term pastoral risk management. This would include
- a) a local and regional (rayon, oblast) capacity in technical aspects of rangeland monitoring and communication with users and integrating technical early warning information with information received from (traditional) land users
  - b) a national capacity to review and set policies that focus on the risks reduction and management associated with the rangeland;
  - c) local government capacity backed by national capacity in development of plans for rangeland management and development.
- In the future some institutional capacity in monitoring carbon sequestration and (local) trading may be added.
105. It is also necessary to improve the capacity in diagnostics and quality monitoring. In the short term this would require:

- a) a water resource study and feasibility for improving water resources (including community ownership and/or management) in the grazing areas;
- b) a sound survey of degraded land and a management plan for improvement and/or rehabilitation, GIS base mapping, and possible development of a rangeland cadastre;
- c) further institution building in rangeland management and planning;
- d) possible special cadastre registration of rangeland;
- e) further work on measurement of sequestered carbon.

In the short term, the State could also invest in pilot demonstrations in sustainable rangeland use, as so little is known about optimal use and management systems under current and future Kazakh conditions. The investment should include creation of monitoring skills and tools at oblast and rayon levels.

106. Most of these lands are likely to be extensively used, and may need further rehabilitation and or improvement to allow sustainable offtake. This rehabilitation could include:

- a) limited investment in access roads and livestock holding areas (during migration or marketing);
- b) limited co-financing of users' initiatives to re-establish water resources;
- c) development of a service network (animal health services, advisory services, services for purchase of production resources and marketing services, etc.). Such service networks should largely be self-financed, but may need some state support where they provide for public goods (such as epidemic disease control, advice on sustainable grassland use, fire protection, etc.);
- d) rehabilitation of abandoned arable lands into grasslands, as well as pasture improvement where applicable.

107. Finally Kazakhstan needs urgently to invest in skills improvement in range management preferably through targeted academic and vocational education programs.

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## 9. ANNEX TABLES

**ANNEX TABLE 1. Recent legislation of the Republic of Kazakhstan relating to forest and rangelands**

<b>Law or Decree</b>	<b>Effective date</b>	<b>Brief description of the main rules for pastures, cultivation or pasturing</b>	<b>The Agency executing the law</b>
Law "About the peculiar features of the privatization of the property of state-owned agricultural enterprises"	01.02.1992	Regulates the process of privatization of the property of state-owned agricultural enterprises (state farms/ sovkhoses). The property can be privatized in the following ways: <ul style="list-style-type: none"> <li>• Redemption;</li> <li>• Sale by bidding or auction;</li> <li>• Free transfer of the property to the members of labor collectives.</li> </ul>	<ul style="list-style-type: none"> <li>• Government</li> <li>• Private Property Committee</li> <li>• Ministry of Agriculture</li> <li>• Academy of Agricultural Sciences</li> <li>• Local executive agencies</li> </ul>
Decree "About approval of the allotment (land share) right transference procedure during privatization of state-owned agricultural enterprises"	10.06.1994	The regulation was developed in accordance with the President's decree "About transfer of the part of the property of state farms/ sovkhoses to the directors' private property" of 09.03.1994. The decree allows members of sovkhoses to sell, transfer or concede their right of property (land shares) for use in farm production to other members of the sovkhos subject to the conditions of bilateral agreements. Such an agreement should be established in the form of Contract, which, henceforth, will be a foundation for the land authorities to issue the State Land Certificate.	<ul style="list-style-type: none"> <li>• Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>• Ministry of Agriculture</li> </ul>
Civil Code of the Republic of Kazakhstan	01.03.1995	The Code regulates common civil relations and the personal business relations of citizens, corporate bodies, state, and administrative and territorial units.	<ul style="list-style-type: none"> <li>• Government</li> <li>• Ministry of Justice</li> </ul>
Decree "About approval of the norms of granting of allotments to citizens and corporate bodies"	08.04.1996	The decree determines the norms for granting of free allotments for farm production for the following bodies: <ul style="list-style-type: none"> <li>• Farms;</li> <li>• Legal bodies;</li> <li>• For private subsidiary farms.</li> </ul>	<ul style="list-style-type: none"> <li>• Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>• Ministry of Agriculture</li> </ul>
Decree "About approval of the charges for the land sold to private owners or granted by the state for land tenure"	08.05.1996	The decree sets the lease rates for land. These rates are currently based on land valuation (with certain adjustment coefficients. The Land Committees of the Oblast hakimates assess the land for taxation, leasing, etc. based on norms and rates (per hectare of pastures) which have been established for each oblast.	<ul style="list-style-type: none"> <li>• Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>• Ministry of Agriculture</li> </ul>
Decree "About approval of the procedure for pledging of land plots and right of land tenure to secure mortgage credits"	06.06.1996	The decree regulates tenure rights of farmers and legal entities and the process of mortgaging land (plots)	<ul style="list-style-type: none"> <li>• Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>• Ministry of Agriculture</li> </ul>



<b>Law or Decree</b>	<b>Effective date</b>	<b>Brief description of the main rules for pastures, cultivation or pasturing</b>	<b>The Agency executing the law</b>
Decree "About the procedure for establishment and distribution of the special land resources"	30.10.1996	The decree determines the procedure for establishment of the Special Fund of Land Resources in the districts for further redistribution of the land between agricultural producers. This relates to the citizens who have no right for a share of land (those who did not work in sovkhozes/ state farm and kolkhozes/ collective farms).	<ul style="list-style-type: none"> <li>Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>Ministry of Agriculture</li> </ul>
Decree "About approval of the procedure for purchase and sale of the state-owned land plots or the right of permanent land tenure"	10.12.1996	The decree regulates the relations connected to purchase and sale of the right of permanent land use and allotments, which are not built-up with buildings, facilities and other estate property.	<ul style="list-style-type: none"> <li>Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>Ministry of Agriculture</li> </ul>
Law "On Farming"	01.04.1998	Regulates legal, organizational and economical framework for establishment and operation of farms. Land is granted for permanent and temporary free use with the right to transmit it as legitimate. The right of land use can be sold, mortgaged with a bank, leased or transferred.	<ul style="list-style-type: none"> <li>Ministry of Agriculture</li> <li>Local executive agencies – hakimates (of oblasts, districts and villages)</li> </ul>
Law "On agricultural partnerships and their associations (unions)"	01.01.2001	The law regulates the creation of marketing cooperatives for the joint procurement and sale of material resources, for processing, storage of products and other services.	<ul style="list-style-type: none"> <li>Ministry of Justice</li> <li>Ministry of Agriculture</li> <li>Local executive agencies – hakimates of oblasts and districts</li> </ul>
Land law	01.01. 2001	Agricultural land use is granted as follows: 1) for (agricultural) land use – to natural persons and Kazakh corporations for commercial agriculture; protective forestation; research, experimental and training purposes; subsidiary farming, market gardening and livestock production; 2) as private property – to the citizens of the Republic of Kazakhstan for development of personal subsidiary farming, market gardening and country/ dacha construction – to foreign citizens and persons without citizenship status – for temporary use based on a lease agreement for a period of up to 10 years.	<ul style="list-style-type: none"> <li>Local executive agencies – hakimates of oblasts and districts, and their land committees</li> <li>Ministry of Agriculture</li> </ul>
Land law	July 2003	Law will allow to purchase and sell the agricultural land. It will carry some restrictions such as the ban on the land sale to private companies up to 2007 and the restriction concerning the size of the land tenure (5% of any agricultural land in the administrative rayon). The privatization of rangelands is prohibited.	<ul style="list-style-type: none"> <li>The law is under consideration.</li> </ul>
Decree 890	Sept. 2003	Sets the prices for sale of Government land to private owners and entities as well as leasing rates for land to be leased from the government or governmental users.	

**ANNEX TABLE 2. Desert rangelands of Kazakhstan**

<b>Region</b>	<b>Type</b>	<b>Rainfall</b>	<b>Vegetation and use</b>
Ustyurt region between Managyshtak and the Aral Sea	Stony plateaus, solonchaks and sands dune. Brown soils, with salt lakes and takyrs.	Very low rainfall; less than 100 mm	Mainly semi-shrub vegetation. Not suited for livestock due to the lack of water, but home to the still sizeable Ustyurt saiga herd.
Northern Kyzyl Kum	Sand desert cut by alluvial plains near the main rivers.	100-200mm	Various shrubs and ephemeres on sand and sandy loams soils allow seasonal grazing.
Syr Darya delta	Desert sand and takyrs, and clay flats near rivers	About 100 mm	Shrubs, wormwood and ephemeres sustain seasonal animal grazing in desert; livestock depend largely on delta fodder and reeds in fall and winter.
Northern Caspian Sea region	Flay or slightly holly plains with dunes and ridge sands.	140-180 mm	Shrubs, sandy wormwood, vetch and grasses. Used for seasonal grazing.
North of Aral Sea region	Brown, solonchak and desert soils	130-200 mm	Grass, bushes and saxaul. Part used for agriculture, mainly for extensive grazing.
Betpak –Dala desert	Between lower course of Chui and Sary-su rivers and west shore of Balkash lake.	100-150 mm	Gray brown soils and sparse vegetation. Home area of one of the left over Kazakh saiga herds.
Moyun Kum sands	North of Kara-tau range and the Chui river. Sand desert with gray brown soils.	170-300 mm of rainfall	Saxaul, wormwood and saltworth. Important pasture region with 150-160 vegetation days.
Balkash desert	Gray-brown desert soils	Low rainfall area (100-150 mm)	Saxaul, wormwood desert and tugai forests in the river valleys

*Source:* Babaev, 1996 and team observations.

**ANNEX TABLE 3. List of institutes that are active in rangeland and pasture research**

<b>Name of the institute</b>	<b>Location and department</b>	<b>Principal directions of the research</b>
Kazakh Research Institute of Fodder and Pastures	Almaty	<ul style="list-style-type: none"> <li>• fodder production</li> <li>• pastures</li> </ul>
Kazakhstan Research Institute for Sheep-breeding	Almaty oblast	Sheep breeding and selection
Kazakhstan National Agricultural University	Almaty	Arable agriculture
Kazakhstan Research Institute of Astrakhan Breeding	Shymkent	<ul style="list-style-type: none"> <li>• breeding/wool/karakul</li> <li>• pastures</li> </ul>
South Kazakhstan Agricultural Research Institute	Shymkent	Arable agriculture
Kazakhstan (A.I. Barayev) Research Institute of Grain	Shortandy (Akmola oblast)	<ul style="list-style-type: none"> <li>• arable agriculture</li> <li>• plant breeding</li> <li>• pastures (partial)</li> <li>• CO<sub>2</sub> measurement</li> </ul>
State Production Center for Land Resources and Land Allocation (ELR)	Astana, Land resources management agency	<ul style="list-style-type: none"> <li>• managing land resources</li> <li>• land arrangement</li> </ul>
Kazgiprozem (State Center for Land Resources Monitoring)	Almaty, Land Resources Management Department	<ul style="list-style-type: none"> <li>• soil- and geobotanic surveying</li> <li>• pasture monitoring</li> </ul>
Kazakhstan Research Institute of Forestry and Arable Agriculture	Shuchinsk	<ul style="list-style-type: none"> <li>• planting forest</li> <li>• agricultural forest reclamation</li> </ul>
Kazakhstan Scientific Research Institute of Water Economy	Taraz	<ul style="list-style-type: none"> <li>• field irrigation</li> <li>• pasture water supply</li> </ul>
Institute of Oriental Research	Almaty	Socio-economic research of livestock farming
Kazakhstan Scientific Research Institute of Veterinary Science	Almaty	Animal disease research
Institute of Environmental Research and Sustainable Development	Almaty	<ul style="list-style-type: none"> <li>• GIS of rangeland and CO<sub>2</sub> measurement</li> <li>• Recovery and use of pastures of Aral region, conservation of biological diversity</li> </ul>
“Farmers of Kazakhstan”	NGO	Pilot livestock production
Botany and Plant Introduction Institute		Conservation of biological diversity

**ANNEX TABLE 4. Summary of water availability in Kazakh rangelands**

<b>Region</b>	<b>Water supply</b>
Caspian plain/lowlands	The Eastern Caspian coast.. Flow rate: 0.2 - 0.8 m <sup>3</sup> /h.
The Naryn sandy areas:	Depth to groundwater: up to 10 m, to groundwater or and aquifer at 100 – 300 m. Salt or brackish pressurized water which is still suitable to water livestock.
Urolo-Embinskoye tablelands.	Depth to groundwater: 6–20 m, flow rate varies from 0.2–0.8 m <sup>3</sup> /h. Mineralized water (2.0 g/li). There is a fresh water aquifer at a depth of 50–100 m with a flow rate up to 30 li/second.
Mangyshlak mountainous districts	(Ak-Tau, Kara-Tau). Depth to groundwater: 3–6 m, sometimes 15–20 m; flow rate – up to 0.4 m <sup>3</sup> /h. Brackish water. The ground water level at the Caspian Sea coast is 2 – 4 m; flow rate – 0.3–0.7 m <sup>3</sup> /h; mostly salt water which is unsuitable for animal use.
Utyurt Plateau.	Depth of wells: 10–20 m; flow rate: 0.4–0.5 m <sup>3</sup> /h. Fresh water in sandy massifs at the depth of 2–4 m; flow rate: 0.2–0.4 m <sup>3</sup> /h.
Mugodjar mountains.	Depth to groundwater: 10 m and more; flow rate 0.2 – 0.5 m <sup>3</sup> /h. The water has a high hardness.
Turgay Plain.	The deep artesian water of Chilic and Chokhus aquifers is located at a depth of 50 to 300 m. The sand/ water of Big and Small Garsuny is located at a depth of 3–4 m; flow rate – 0.4–0.6 m <sup>3</sup> /h. but salt. The water of Turgai River basin is located at a depth of 2.5–10 m; flow rate: 0.1–0.3 m <sup>3</sup> /h. Up to 30 per cent of all wells yield salt water. The Aral Kara Kum desert has fresh water at a depth of 1–3 m. Depth to the groundwater between the sandy massifs is up to 20 m. The water is salty.
Syr-Darya basin.	The Aral district (between Kyzyl-Orda and the Aral Sea): depth to groundwater: 5–20 m; flow rate is up to 0.3 m <sup>3</sup> /h. Wells with water at 25 m and flow rate of 0.3–0.5 m <sup>3</sup> /h in the eastern part of Kyzyl Kum. The floodplains (up to 25 km wide) of Syr-Darya River have water a 4–10 m deep with a flow rate of 0.5–1.0 m <sup>3</sup> /h. The depth to groundwater increases when moving away from the river. The water of northeastern part of Kyzyl Kum is concentrated in the aquifers at the depth of 80–100 m and deeper.
Northern Plains	(along Tobol, Ishim and Irtysh rivers). Fresh water at 3-10 m; flow rate: up to 0.7 m <sup>3</sup> /h.
The Low Hills area of Kazakhstan.	Groundwater at 1–10 m in the areas of Sary-Su and Zhana-Arka. Flow rate varies from 0.3 to 4.0 m <sup>3</sup> /h. The water is fresh. The groundwater of the Tengiz-Kurgaldjin basin is located at about 10 m., the water is highly mineralized. Flow rate: up to 0.8 m <sup>3</sup> /h.
Betpak-Dala Plateau.	Mainly, fissure/ fracture water at the depth of up to 10 m. Flow rate – up to 1 m <sup>3</sup> /h. Few wells and springs. As livestock was driven to the summer and winter pastures (Sary-Arka and Moinkum respectively), spring and autumn precipitation were depended on.
Moyun Kum.	The groundwater is at the depth of 10–20 m with the flow rate of 0.25–0.50 m <sup>3</sup> /h in the North and Southeast, and 0.1–0.25 m <sup>3</sup> /h in the South and Southwest. There are about 100 self-flowing pipe wells with the flow of up to 1.0 m <sup>3</sup> /h in the area of the lower reaches of Chui River.
Balkhash sandy areas.	The low-mineralized water is located at the depth of up to 25 m. Flow rate is 0.5 – 0.7 m <sup>3</sup> /h. There are a number of artesian wells with the flow rate of 0.5–3.0 m <sup>3</sup> /h.
Balkhash – Alakul Basin.	The groundwater of the sand massifs are located at the depth of 1.5–3.0 m; the flow rate is up to 0.1 m <sup>3</sup> /h. The depth of the wells is 2–3 m on the riverside of the rivers of Ili and Karatal and up to 10 m on the plain. The flow rate is small – 0.1–0.3 m <sup>3</sup> /h. the water is fresh.
Chui–Talas Basin (between Chui and Talas rivers).	The Chui artesian basin has a lot of self-flowing pipe wells with the flow rate of up to 20 li/second. The groundwater of the borders/ edges of the basin is located at the depth of 1–3 m. The water is fresh.
Kopa-Ili Basin.	There is an abundance of artesian, often pressurized, water with the flow rate of up to 40 li/second in the talus area. The groundwater is located at the depth of up to 15 m.

**ANNEX TABLE 5. Leasing rates (tenge/ha) for land used by natural persons and private legal entities for use in farming/agricultural production**

Oblasts	Type of agricultural land	Types and subtypes of soil												
		Chernozem/ black earth		Liver-colored/ livery	Chestnut-colored	Light-chestnut	Brownish	Light-brownish	Grey-brown (for rice)	Sands	Light-chestnut chernozem	Chernozems (cotton zone)	Mountainous chestnut black earth	Sub-alpine and Alpine
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Almaty	Not irrigated tillage											24.5		29.2
	Irrigated tillage								40.2	170.8		119.6		
	Hayfields										11.4		14.0	11.4
	Pastures							2.6		2.1	6.2		8.8	8.1
Kyzyl Orda	Irrigated tillage							43.1	60.0	187.7		110.0		
	Hayfields							5.5			10.5			
	Pastures						1.9	2.0		1.8	4.7			

**ANNEX TABLE 6. Livestock watering facilities and grazing provided in the Kazakh rangelands in 1990**

Oblast	Tube wells		Pipe wells/boreholes		Ponds		Channels		Pipelines	
	Number	ha × 1000 covered	Number	ha × 1000 covered	Number	ha × 1000 covered	Number	ha × 1000 covered	Number	ha × 1000 covered
Aqtobe	7,646	9,151.8	2,229	4,733.9	559	1,192	–	–	–	–
Almaty	1,260	1,922.6	398	612	2	4.8	113	67.4	1066.9	510.9
East Kazakhstan	340	147.8	1055	1,483.3	7	4.8	24.8	6.1	–	–
Guriev	1,444	1,677.2	398	1,423.6	46	212.7	2,071.6	1347.2	305	206
Jambul	3,477	2,939	1,871	3,007.9	152	166.8	186.1	68.5	326	194.6
Jezkazgan	2,023	4,075.4	2,895	8,473.4	491	1,266.7	0	–0	0	0
Karagandy	740	839.9	1,448	3,782.9	597	1,107.5	0	–0	0	4
Kyzyl Orda	3,566	525.6	1,667	7,299	132	255.1	106.9	156.7	0	0
Kokshetau	426	403.6	1,924	1191.2	810	658.6	0	–0	0	4.1
Kostanay	813	276	1,913	1,436	1,535	1,613.3	0	–0	0	11.3
Mangyshlak	2,350	2,351.6	1,053	4,226.6	43	271.3	0	–0	259.6	184.9
Pavlodar	730	1,070.4	3,496	4,972.4	151	179.5	0	0	70.8	26.1
North Kazakhstan	4	6	247	90.1	567	289.7	0	0	0	49.3
Semipalatinsk	1,952	1151	6,972	7,266.1	128	43.8	52.4	72.5	28.5	102.2
Talkdy–Kurgan	2,204	2,924.8	522	1,070.8	24	25.2	137.9	52.8	809.1	551.2
Turgai	1,256	934.6	352	399.8	1,252	287.3	0	0	0	0
Ural	4,731	2,139.1	1,071	1,185.5	867	1,145.9	1,752.4	1206.6	617.4	302.5
Akmola	318	169	781	1225	229.7	–	0	0	0	0
Chimkent	2,826	4,153	1,240	3,096.3	–	–	91	55.1	15	112.1
<b>38,106</b>	<b>41,588.8</b>	<b>31,532</b>	<b>56,975.8</b>	<b>7592.7</b>	<b>8,725</b>	<b>4,536.1</b>	<b>3,032.9</b>	<b>2,431.4</b>	<b>1,748.3</b>	

Source: Ministry of Melioration and Water Industry

**ANNEX TABLE 7. Livestock watering facilities in the Kazakh rangelands in 1990**

Oblast*	Springs		Lakes		Rivers		Filling stations	
	Number ha. × 1000	Area covered	Number ha. × 1000	Area covered	Number ha. × 1000	Area covered	Number ha. × 1000	Area covered
Aqtobe	310	390.9	37	109.3	0	3,170.7	–	–
Almaty	122	208.9	0	0	0	2307		
East Kazakhstan	1349	1334.9	13	119.6	316	856.7	3	1.8
Guriev	0	0	12	27.6	0	479.3	33	80.3
Jambul	444	400.8	5	8.9	0	804.8	0	0
Jezkazgan	5,033	945.4	5	167.3	0	2,254.4	145	353
Karagandy	138	263.7	43	58.9	0	539.7	29	54.3
Kyzyl Orda	104	181.3	11	27	0	249.9	0	0
Kokshetau	39	23.3	261	232.9	50	231.1	0	0
Kostanay	68	60.2	821	672.8	0	407.8	0	0
Mangyshlak	77	174.8	0	0	0	0	11	15
Pavlodar	33	79.5	33	57.7	0	66.5	3	1.7
North Kazakhstan	0	0	0	0	0	421.6	223	129.5
Semipalatinsk	2,201	1,775.5	25	30.2	0	2,417.2	23	23
Taldy-Kurgan	364	436.2	0	0	507	1,977.3	11	27.5
Turgai	84	117.1	34	98.5	271	1,512.5	0	0
Uralsk	2	1.3	0	0	271	1,628.3	0	0
Akmola	0	103.5	0	366.5	0	563.6	0	0
Chimkent	200	221	0	0	83	1,096.5	2	3
	<b>10,568</b>	<b>6,724.6</b>	<b>1,300</b>	<b>1,977.2</b>	<b>1,498</b>	<b>20,984.9</b>	<b>483</b>	<b>689.1</b>

\* = the old names and geography of the oblasts have been used in this table.



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