

SUSTAINABLE PASTURE LAND USE MANAGEMENT
IN THE EASTERN STEPPE OF MONGOLIA

by

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A THESIS

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During the last decade, Mongolia has experienced a transition from a communist regime with a centrally planned economy to a democratic country with a free market economy. Due to this transition, many people lost their jobs and were forced to turn to raising livestock. The rapid change to a market economy, the privatization of livestock, and the huge increase in the number of livestock herdsman, led to the abandonment of traditional nomadic livestock grazing practices. Limited market opportunities, a lack of social services and the break down of water wells in remote pasture areas have resulted in increased concentrations of livestock grazing near soum and aimag centers and around open water sources. This has caused significant overgrazing problems and degradation of the ecological health of the grasslands in the Eastern Steppe of Mongolia.

Key words: Mongolia, economic transition, Eastern Steppe, nomadic livestock herdsman, pasture land, sustainable management

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CHAPTER I

INTRODUCTION

The decade of the 1990's has been a period of dramatic transition in Mongolia as the Mongolian people have chosen to move simultaneously to democracy and a market economy. Macroeconomic stabilization measures, privatization of state assets (excluding land), public sector reform and legal changes are being pursued to give the private sector a better chance of success in a competitive global economy. Enormous freedoms have emerged in modern Mongolia, which can be observed in the right to own property, the right to run a business, the development of an open media, freedom of speech and other forms of expression, and freedom of movement (1999 Annual Report).¹

The reforms in Mongolia, as in other transition countries, have not been easy. The rapid change to a market economy and privatization of livestock led to among many other things, a collapse of previous livestock grazing management practices. The dismantling of the Soviet-style livestock collectives was concurrent with the loss of important social services and economic opportunities in remote rural areas (Enkh-Amgalan A. 1997). These include the loss of medical services, the loss of government-subsidized dormitories for the children of nomadic herding families who need to live in villages to have access to public schools, the loss of communication services in remote areas, the reduction of transportation services, the reduction of food availability and distribution, the loss of jobs, and a reduction in economic opportunities.

¹ 1999 Annual Report was produced by the United Nations Country Office in Mongolia.

These changes have created hardships that have forced nomadic livestock herders to move closer to urban centers to be nearer to important social services and economic opportunities. The de-population of rural areas has led to the destruction of the social fabric of remote rural villages and communities. In the meantime, many families have moved out *soum*² and *aimag*³ urban centers to the nearby countryside, to raise livestock, as other jobs have become harder to find. Figure 1 shows the country's population growth trend and movement pattern. From 1990 to the present the previous pattern of urban growth has stopped, while the growth of rural areas has accelerated. According to the local government records in the Eastern Steppe the rural growth, however, has taken place almost entirely in livestock grazing areas near urban centers, for the reasons described above.

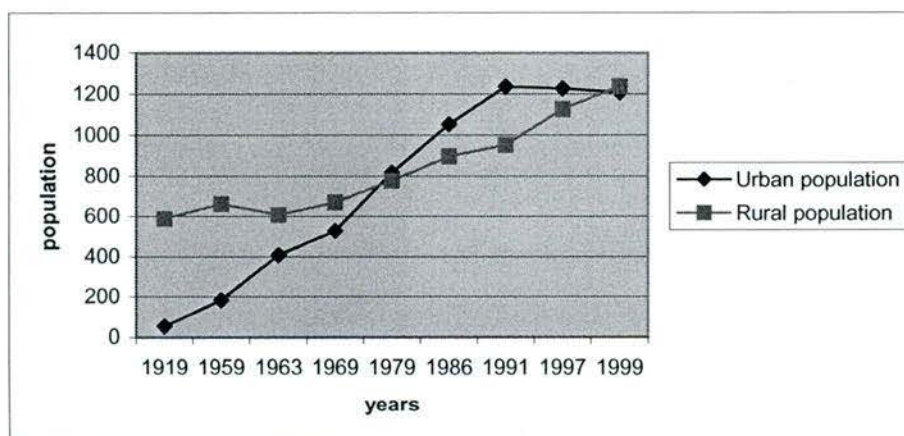
The recent movement and concentration of nomadic herdsmen and their animals near urban areas and water sources has caused major environmental problems including overgrazing and desertification. Research on utilization gradients near water sources, carried out by Buzzard and others (1999) at Buir Nuur in Dornod Aimag, determined that more heavily grazed areas had a lower species richness of grasses and forbs, while soil and erosion properties were similar. Typically, overgrazed areas near *soum* centers may have a poor forb and grass community with an average plant height of only 5-10 cm.

Traditionally, nomadic herdsmen often move their livestock in summer and autumn as these are the seasons with significant plant growth, and so the herds are moved to take advantage of better conditions. Movement was particularly frequent in autumn.

² *Soum* is an administrative and territorial unit. Currently there are 333 *soums* in Mongolia.

³ *Aimag* is the largest administrative and territorial unit. There are 21 *Aimags* in Mongolia.

FIGURE 1. Rural and Urban Population Growth Trend in Mongolia, thousand people



Source: *Euro-Asian Studies*, Jan 2000.

Today, herding is entirely private, with average livestock holdings between 100 and 200 animals per family. Local economic differentiation is large however, with some herders owning 1000 animals and other barely surviving on 30-50 animals. The amount of pasture land has decreased by 20 percent in the past 50 years, but livestock population has increased by 30 percent in the past 10 years alone.⁴ However, due to extremely cold harsh winters in recent years, many herding families have lost many animals. The number of livestock decreased due to these losses, by 14.3 percent in 2000. The most recent livestock census reports 25.9 million livestock animals in the beginning of 2002.⁵

In the last decade, the new Constitution and the Law on Land of Mongolia have been enacted to protect pastoral resources for communal use, however some herders have established “de facto” control of pastureland, water sources in pastures and saltlick areas. Conflicts between nomadic herders over pasture use are reported more frequently as

⁴ Mongolian National Environmental Action Plan. Final Draft June, 2000.

⁵ www.mol.mn (Daily news. 3 January, 2002)

traditional customs regulating pasture use have been lost and the Law on Land is not fully implemented (Moore B. 2000).

Mongolia has not yet experienced the high level of industrialization that occurred in the other areas of Asia, therefore it harbors some of the world's last unspoiled temperate grassland ecosystems. The Eastern Steppe of Mongolia is of great ecological importance because, unlike most other grasslands in Central Asia and the rest of the world, they have been relatively little modified by human activity or use (Shiirevdamba Ts. 1998). During the last decade, however, the cultural integrity and environmental health of the Eastern Steppe has been threatened by changes in livestock grazing practices as a result of Mongolia's transition to a free market economy.⁶

As result of the many lay-offs in state collectives and farms due to the transition to a free market, many people have become herdsmen. In the last 10 years the number of herdsmen has increased dramatically (Table 1). But new herdsmen usually have very limited experience in traditional livestock production methods. Their inexperience caused poor judgment in the selection of grazing areas and lack of adequate management for livestock protection, which led to increased livestock mortality in harsh winter weather, especially in recent years. Based on the Country Statistics of 1999, about 45 percent of the people in the Eastern Steppe are directly dependent on extensive livestock production with another 16 percent indirectly dependent on livestock production.

The nomadic lifestyle, based on livestock raising, has always been deeply reflected in Mongolia's culture, customs and tradition. This unique feature of the Mongolian culture has strengthened the Mongolian people's bonds with nature and the

⁶ The photos are taken in August 2001. (See appendix)

environment. It has also been stated by the President of Mongolia Mr. N. Bagabandi, because of its nomadic traditions, that “ Mongolian people have close association with the natural world and a deep reverence for the environment.”

TABLE 1. Number of Herdsmen in Eastern Mongolia

Aimag	1990	1995	1996	1997	1998	1999	% increase 1990-1999
Dornod	4111	8600	8700	9374	8874	10445	250%
Sukhbaatar	5821	15264	15637	16566	16941	17121	290%
Khentii	6562	17627	16371	16819	16786	16304	250%

Source: Mongolian Statistical Yearbook –1999.

The main field research for this thesis was done in five selected soums of two Aimags in eastern Mongolia. In my field research I collected field data and information through extensive meetings with local communities, nomadic livestock herders, protected areas rangers, and government officials at the local and national levels. The field research was carried out through a five-week field study in August-September 2001. It investigated the following three interrelated topics:

1. Changes in the traditional nomadic livestock herding lifestyles and grazing practices in the Eastern Steppe grasslands of Mongolia that have occurred due to the country's recent transition to a free market economy.
2. Social impacts on remote rural villages and surrounding areas that resulted from the changes in the traditional nomadic livestock herding lifestyles and grazing practices.

3. Environmental impacts on the Eastern Grasslands of the Central Asian Steppes that have resulted from the changes in the traditional nomadic livestock herding lifestyles and grazing practices.

In today's globalized world, Mongolia is one of the only countries to retain its ancient nomadic culture and traditions. The country's extreme climate and geography as well as its landlocked condition greatly influence the Mongolian nomadic people's way of life. They have always lived close to their animals and the land (Adyasuren Ts. 1997). In Mongolia a settled life in the countryside has not been possible because herdsman have to move from one pasture to another to provide adequate pastures and forage for their animals. As mentioned earlier in this chapter, traditionally there are four seasonal moves, but now most nomads move only twice a year, between summer and winter encampments. Some of the livestock raising families have completely stopped moving their livestock to new areas, frequently due to limitations imposed by poverty (Batbuyan B. 2001).

This thesis intends to assess the extent of the recent changes in traditional nomadic herding lifestyle due to the transition to a free market economy and its social and environmental impacts in the Eastern Steppe of Mongolia. Due to the some limitations in field research this thesis may have a number of weaknesses. In particular, the field research had to be done during three weeks period spent in the countryside of the Eastern Steppe, so the data collected does not measure any changes that might take place over time. Also it was very hard to quantify the data collected on overgrazing and the health of grassland, therefore the field study relied on information from nomadic herders, and on some research results published by various scholars of this region.

In addition, field data and information collected through the various research projects carried out by the Mongolian Government and an United Nations Development Program/Global Environment Facility (UNDP/GEF) “Biodiversity Conservation and Sustainable Livelihood Options in the Grasslands of Eastern Mongolia” (hereafter refer to as the “Eastern Steppe Biodiversity Project”)⁷ project staff and it’s international consultants between 1998 and 2001, have been incorporated into this thesis.

The final chapters of this thesis are supported by the author’s library research, the information and knowledge gained through the courses attended, and individual study at the University of Oregon from September 1999 through March 2002.

⁷ “Biodiversity Conservation and Sustainable Livelihood Options in the Grasslands of Eastern Mongolia” is a seven-year project funded by UNDP/GEF and the Government of Mongolia.

CHAPTER II

COUNTRY BACKGROUND

Geography and Climate

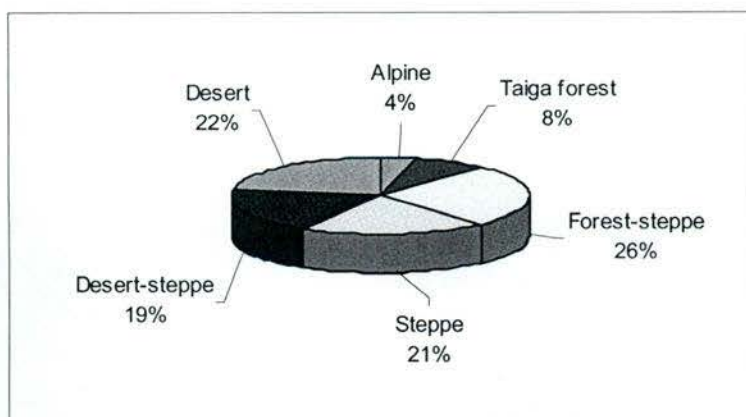
Mongolia is a land-locked country with an area of 1.564 million square kilometers (approximately 605 thousand sq. miles). The northern part of Mongolia lies on the southernmost fringe of the Siberian Taiga region. The southern part of Mongolia includes the northernmost portion of the Great Central Asian Desert. Mongolia is the seventh largest country in Asia and 19th largest in the world. It shares borders with the Russian Federation in the north and with the People's Republic of China in the east, south and west (Appendix D). The average elevation is 1,380 meters above sea level.

Mongolia has a diversity of ecosystems including alpine, high-mountain, taiga forest, mountain forest steppe, salt and freshwater lakes and riparian areas. It is famous for its huge expanse of temperate steppe grasslands and for its great desert, the Gobi. These semi-arid and arid areas comprise 60 percent of the country and are inhabited by about 25 percent of the country's population, the majority of them being nomadic herdsmen. Figure 2 shows these various vegetation zones in the country.

Mongolia is separated from the oceans by large distances and high mountain chains, and has an extreme continental climate with marked differences in seasonal and diurnal temperatures, and low rainfall. Mean rainfall ranges from 1.5 inches in the south to 15.3 inches in the north. Most rainfall occurs in summer, between June and August.

Mean monthly temperatures for the last thirty years range from -25.8°C (January) to 20.2°C (July).

FIGURE 2. Vegetation Zones in Mongolia



Source: Mongolia Biodiversity Conservation Action Plan, 1996.⁸

With its 2.65 million people, Mongolia is one of the most sparsely populated nations on earth. The Khalka Mongolians make up about 85 percent of the population. Five percent of the population are Kazakhs. The remaining 10 percent consists mostly of Russians and Chinese, whose families settled in Mongolia. Nearly half of the population lives in rural areas. About 34 percent of the people are directly dependent on extensive livestock production with another 26 percent indirectly dependent (Mongolian Statistical Yearbook 1999).

History

Mongolia is well known, as the land of the great Genghis Khan, who in the 13th century set up a vast empire comprised of many states and kingdoms. However not many know that the Mongolian plateau and surrounding areas were cradles of the Hungarians,

⁸ Mongolia Biodiversity Conservation Action Plan was developed with an assistance of UNDP/GEF Project on "Mongolia Biodiversity" in 1996.

the Turks, and of some peoples of Siberia. Some scientists believe that the ancestors of American Indians also came from this part of the world.⁹

The post-empire history of Mongolia is not well known. It is a history of a people struggling to preserve its identity, and struggling for survival when Mongolia's two neighbors Russia and China, were expanding their territories in the 16th-19th centuries. It is also a history of great power rivalries for spheres of influence and back door collusions. The 20th century saw Mongolia free itself from two centuries of Manchu rule, unsuccessfully struggle for independence, and then endure a brief ten-year period of Chinese occupation. This was followed by a national revolution in 1921, supported by the Soviets that led to the creation of the People's Republic of Mongolia. From 1924 to 1990, as part of the Soviet system, Mongolia saw the steady growth of its population (tripled in the last eight decades) and a cultural renaissance as Russian culture influenced Mongolia. The basis of a modern economy was laid, though it was heavily dependent on the Soviet Union.

The year 1990 was the turning point in Mongolia's modern history. With the Soviet Union engaged in its own problems, and eventual collapse, Mongolia was able to change its pro-soviet political orientation and opt for economic independence, political and economic reform and an independent foreign policy. These changes were generally supported by the people. Political reforms started in 1990. Two years later Mongolia adopted its new, democratic Constitution that guarantees the basic rights and freedoms for its citizens. Free enterprise has been embraced and the principle of equal justice for all is being pursued (1999 Annual Report).

⁹ www.iaed.org/mongolia

Culture

Mongolian culture has many distinctive features that are closely connected with the nomadic people's lifestyle. From ancient times on, Mongolians have lived in the vast lands of Central Asia raising livestock. This nomadic lifestyle is reflected in the Mongolian people's everyday thinking and culture.

It is a common perception in Mongolia that one of the distinctive features of the nomadic culture is that people live in harmony with nature. Compared to settled peoples, the nomadic herders face nature more directly on an everyday basis. Through this, the herders are involved in a multifaceted relationship with nature. This is why the natural world is the theme of so many Mongolian epics, poems, songs and blessings. Tearing up flowers and grass, allowing filth into water, digging up land, killing female and newborn animals, and destroying forests are considered sins and are generally prohibited even today. Mongolians have a long history of raising and caring for livestock. Horses, cattle, sheep, goats and camels are praised as the "five treasures." Horses are considered the "emeralds" and are highly prized by Mongolian people. Thousands of teachings, sayings, proverbs, tales, epics, songs and dances have been created in praise of the "five treasures."

According to the "Secret History of the Mongols," a book written in about 1240, and other historic sources, shamanism was the state religion until the introduction of Buddhism. Shamanism reflects the deep Mongolian connection with Nature. For this reason the shamans performed rituals worshipping the mountains, water, sky and land.

Some of these traditions, mixed with the Mongolian lifestyle, oral literature, folklore and symbolism are still important components of Mongolian nomadic culture today.

Buddhism, introduced in Mongolia in the 16th century, played an enormous role in the development of Mongolian culture. The Mongolian people's perceptions, psychology, traditions, and world outlook were enriched by the Buddhist philosophy and world view.

Economy and Politics

For over six decades, from its independence in 1921 to the late 1980's, Mongolia remained in virtual isolation from the rest of the world. External trade and foreign relations were dominated by the Soviet Union. The country followed the Soviet model of a centrally planned command economy, with emphasis on the development of industry, mining, and energy. With Soviet economic assistance of equivalent to 30 percent of GDP, the economy grew at about 6 percent per year during the 1980's (The World Bank Report 1996).

Beginning with the collapse of the Soviet system's central planning economy in 1990, real GDP declined 22 percent between its peak in 1989 and its low point in 1993. Since 1994, Mongolia has been experiencing positive economic growth which has averaged about 3.5 percent per annum. It should be noted, however that GDP has not regained its pre-1990 levels. Reflecting the positive growth in Mongolia, per capita GDP has increased from US \$334 in 1994 to US \$453 in 1998, though this is still below the pre-1990 level of \$558 (1999 Annual Report).

Industrial production in the country has continued to decline in 1999 with growth taking place in the agriculture and informal sectors. Between 1990 and 1999 the share of industry in Mongolia's GDP fell from 35.6 percent to 19.9 percent while agriculture, primarily livestock production grew from 15.2 percent to 36.1 percent. The percentage share of agriculture has dropped in recent years due to the rising levels of trade, transport and services. These trends are summarized in Table 2.

Mongolia ranks among Asia's richest countries in terms of volume and variety of mineral resources. Although enormous potential exists in its mineral resources, such as gold, copper and coal, the economic viability of developing much of this natural wealth has not been demonstrated. The transport, financial, investment, and communication sectors are characterized by an inadequate infrastructure. Inadequate transportation infrastructure is a serious constraint on the development of the domestic market and a challenging obstacle to potential private investment programs.

Agriculture (primarily livestock raising) is the leading economic sector accounting for 36 percent of GDP in 1999. The agricultural sector has important connections to the nation's manufacturing sectors, providing the essential material inputs for many processing industries such as leather and shoe manufacture, wool processing, cashmere production, milk production and bread making. Thus, Mongolia's long term economic strength depends more on its agricultural sector than any other area of activity. It is through agricultural productivity that food is produced and important value added manufacturing activities are supplied with raw materials for their final products.

TABLE 2. Composition of GDP

Sector	1989	1990	1995	1996	1997	1998	1999*
GDP	100	100	100	100	100	100	100
Industry	32.7	35.6	32.4	20.6	24.1	24.1	19.9
Agriculture	15.5	15.2	36.7	36.6	33.5	32.5	36.1
Construction	6.1	5.0	2.7	3.8	3.4	3.5	2.3
Transport	10.4	10.2	3.4	4.7	5.2	5.3	8.7**
Communication	1.6	1.8	1.2	1.1	1.4	1.4	
Trade	19.0	19.4	12.3	18.3	18.5	18.9	20.6
Service	13.4	11.5	11.2	14.7	13.9	14.0	12.4
Others	1.3	1.2	0.1	-	-	-	-

Source: Human Development Report of Mongolia, 2000

* Data for 1999 is taken from the Statistical Yearbook of 1999.

** The sum includes communication as well.

A new constitution embracing democracy and the market economy system was adopted by the Parliament in 1992. The Constitution makes Mongolia a democratic parliamentary state with independent legislative, executive and judicial branches that guarantees citizens freedom of speech, religion, and other basic human rights, as well as the right to own property and engage in private business activity. The President and Parliament are elected directly by the people (Human Development Report 2000).

Development of Land Tenure

Historically, the first of two major developments in the relationship of Mongolian nomads to their lands took place, when Chinggis Khan granted fiefs to his political allies (ca. 1206-1227), giving them control over the pastures within their boundaries and the authority to extract labor and taxes from the serfs who dwelled there (Jagchid and Hyer 1979). This marked first time that groups of herders were associated with specific or fixed territories.

The second major development followed the successful introduction of Tibetan Buddhism into Mongolia in 1586. This was the establishment of an ecclesiastical social hierarchy that mirrored the quasi-feudal secular social order. Powerful lamas were granted their own territories and commanded labor and tribute from their ecclesiastic subjects or shabinar, who herded the monastery's flocks, a major source of church wealth. The church became a dominant political and economic force in Mongolia, with monasteries serving as hubs of trade and centers of political power, in addition to providing education and spiritual guidance (Miller 1959).

In 1691, the territories of the northern and western Mongols were occupied and ruled by the Manchu and became their colonial subjects. A Manchu colonial administrative structure was superimposed on the existing Mongol political and social organization, rigid territorial lines drawn and enforced around principalities, and a colonial legal code was issued. The Manchu divided the aimag of the three Khalkha khans into first 34, and later about 100 military-territorial units called khoshuun, which replaced

the former principalities, further dividing and circumscribing feudal territories (Batden 1968). Manchu rule lasted over 200 years, until 1911.

Legal codes promulgated in the seventeenth and early eighteenth centuries codified aspects of the customary law of the steppe, specifying which areas were open for use by monastery herds and which areas (sacred sites and the headquarters of secular princes) were forbidden. These codes articulated water rights (he who digs a well has first rights but is obliged to give water to the steeds of passing travelers), and codified the traditional “first come, first served” law of the steppe with regard to nomadic campsites (Fernandez-Gimenez, M. E. 1999).

Patterns of land use during the Manchu era varied among ecological zones. Regulation of seasonal movement controlled land use and access to resources. The timing of circulation among the seasonal pasture lands was signaled by the movement of the prince’s herds and camp (Maiskii 1921). However, the very poor herders seldom moved from winter pastures to summer pastures. Moving was very difficult for them, primarily due to the lack of transportation and, secondly, because of the extremely limited scale on which they raised cattle, their community did not require their moving, taking into consideration the fact that they did not consume much grass.

After more than 200 years of Manchu rule, the Mongolian National Revolution ended internal Manchu rule occupation but not external control by China, which lasted from 1911 to 1921. In 1924, after ten years of Chinese control and three years of transition, the Mongolian People’s Republic was founded. By 1925 both the secular and ecclesiastic feudal systems had been abolished, and the nobility could no longer extract feudal taxes (Bawden 1968).

After the Mongolian People's Republic was established in 1924, traditional land tenure and land use practices started to change. All land eventually became property of the state and the country was divided into 21 Aimags. The khoshuun were abolished as administrative units, and 300 soum, were established as territorial/administrative units, ostensibly on the basis of scientific criteria (Cheney 1966). Soums were divided into bags, which are the smallest administrative and territorial unit.

Between 1929 and 1932, during a violent period in Mongolian history that came to be known as the "Left Deviation" (Socialist Change), livestock were confiscated from nobles and the church and redistributed to other herders. Absent the ecclesiastical feudal system, the control of pasture land by nobles and monasteries disappeared and other groups of herders took over those pastures. Regardless of their patterns of pasture use, each group of herders resolutely believed its own methods and pastures to be best, or at least better suited to its own needs (Simukov 1993).

In 1950's herding collectives gained momentum in Mongolia as the government learned to use taxation and social incentives to encourage participation. By 1958, 75 percent of all rural households in the nation had joined collectives, and by March of the next year 99.3 percent of rural households were collective members. Under the collectives, Mongolia's traditional social organization was disrupted and a new system was imposed. The basic unit of production became the suur, one or two households camped together and responsible for herding a specific kind of livestock. The basic nomadic strategy of rotating among seasonal pastures was preserved under the collectives however, the overall radius of movements was decreased, confining herders to smaller areas and limiting access to the broad range of ecological zones and diverse forage

resources traditionally used by many. Through a planned economy the state controlled total livestock population between 24 to 25 million. Private ownership of livestock was limited to about 50 to 70 animals per family depending on ecological zones.

The current land tenure system was legalized in the new Constitution adopted in 1992. In 1994 the “Law on Land” was enacted by the Parliament of Mongolia. The new law regulates the possession and use of land. According to the law “ Pasture shall be governed by the general schedule for winter, spring, autumn and summer settlements pursuant to the traditional system. Summer, autumn and reserve pastures shall be allocated to Bag and Khot ail and commonly used.” The Law also states that the “Aimag, capital city, soum, and duureg Governors may take measures for pasture protection such as release of pasture which has been overgrazed and whose carrying capacity has been exceeded, or limit the number of livestock”,¹⁰ but little is done to protect pasture so far.

The new Constitution of 1992 grants pasture land for communal use, however some nomadic herders have established “de facto” control over certain pastureland, such as water sources and saltlick areas. Conflicts between herders over pasture use are reported to occur more frequently as traditional customs regulating pasture use have broken down and the “Law on Land” is not fully implemented (Moore B. 2000).

¹⁰ The Ministry of Nature and the Environment published the English translation of the Mongolian Environmental Laws in 1996.

CHAPTER III

PRESENT CONDITIONS IN THE EASTERN STEPPE

The Eastern Steppe covers the two Aimags of Dornod and Sukhbaatar and parts of Khentii Aimag. It has total area of approximately 247,260 square kilometers. The Aimag centers are Choibalsan, Baruun-Urt and Undurkhaan, respectively (Appendix E). Eastern Mongolia's temperatures average is -24°C in January and 20°C in July. Humidity levels are very low. According to the national census of 2000, Eastern Mongolia has total population of about 222,500.¹¹ The majority of the people live in rural areas. Eastern Mongolia is home to a number of ethnic groups, including the Dariganga, Uzemchins, Barga and Khalkha.

Land in eastern Mongolia is predominantly used for raising livestock and for agricultural crops, mainly wheat. However, due to economic hardships and privatization of state farms, the crop production has decreased substantially in the last 10 years. This is particularly true in Dornod Aimag, where it has declined more than 50 percent, according to the Aimag statistics (1999).

Despite the vast arid grasslands, there are also meandering rivers and large wetland areas punctuated by beautiful lakes in eastern Mongolia that create favorable conditions for livestock. Eastern Mongolian's vast grassland is one of the largest remaining undisturbed temperate grassland ecosystems in the world and provides the

¹¹ Total population of eastern three Aimags.

most suitable grazing land resources for livestock, as well as habitat for the Mongolian gazelles.

Natural Conditions

With an annual precipitation of about 8.6 inches and very high inter-annual variability, the Eastern Steppe is dominated by grasses characteristic of the Dagurian and Dornod Mongolian plant communities. Generally, the scarcity of drinkable surface water is a strong constraint to permanent habitation in many parts of the Steppe, both for humans and animals (Project Document 1997).

The vegetation and soil structure of the Eastern Steppe are varied. These include wetlands in the north, which gradually change into rolling hills until reaching the vast flatlands of the plains in the south. The very eastern tip of the area, on the shores of Numreg River and adjacent to the Numreg Strictly Protected Area, is the second warmest location of Mongolia. Because of this and the availability of freshwater in the river and in Lake Buir, the Sumber area has attracted horticultural and cereal state farms in the past. But today in Sumber soum no major agricultural farms are in operation.

The Eastern Steppe is home to 25 species of mammals, with an abundance of rare and threatened species, including many endangered mammals and birds (Finch C. 1996). A number of important wildlife species in the Eastern Steppe are listed as rare, very rare or endangered in International and National Red Data Books. These include the great bustard (*Otis tarda*), several species of crane (*Grus* spp), mandarin duck (*Aix galericulata*), relict gull (*Larus relictus*), swan goose (*Cygnopsis cygnoides*), white-tailed sea-eagle (*Haliaeetus albicilla*) and the Eurasian otter (*Lutra lutra*). A number of

endemic species and subspecies are approaching extinction and can be found only in the Eastern Steppe. These include the alashanbeg elk (*Cervus elaphus alashanicus*), the rare Daurian hedgehog (*Erinacenus dauricus*), the Mongolian moose (*Alces alces cameloides*), the Asiatic grass frog (*Rana chensinensis*) and five species of reptiles.

The Eastern Steppe is dominated by over two million Mongolian gazelles (*Procapra gutturosa*), which undertake large-scale annual migrations across the steppe.¹² Today, the gazelles remain only in about 38 percent of their original habitat, mostly in the southern soums of both Dornod and Sukhbaatar aimags, because of human inhabitation and intensive agricultural farming that took place in the last six decades (Dulamtsuren D. 1994). In addition, their annual east-west migrations have been cut off by the Ulaanbaatar-Beijing railroad that has an impenetrable fence along side it. Part of reason having a fence, I believe is a traffic safety, because livestock are being pastured along the train road most of the seasons.

The Eastern Steppe has about 15 percent of the 150 endemic flora of Mongolia. Because of its position as a transition zone, one finds steppe plants from Kazakhstan growing beside Manchurian steppe flowers. Over 100 plant species are used for medicinal purpose (e.g., *Caragana spinosa*, *Glycyrrhiza uralensis*, *Sophora* spp, *Paeonia* spp). There are various important vegetation associations and one in particular, the *Stipa* + *Filifolium* + *Caragana microphylla* association, occurs in no other temperate grasslands. In addition, the below-ground biodiversity is considered to be greater than the above-ground biodiversity. Hence, the conservation of soil biodiversity is important, particularly due to species-community-ecosystem interactions and below and above

¹² Estimated population was reported by the Ministry of Nature and the Environment in 1997.

ground soil organism and plant interactions. Three distinct vegetation zones have been classified for the Eastern Steppe (Niamir-Fuller M. 1997):

- The Numreg system: a forest-steppe transition zone occurring in the eastern tip of the zone, this system expands into China;
- The Daguur Mongol system: a complex of forest-steppe transitional vegetation and *Stipa* + *Filifolium* + *Caragana* grass/shrub association, this system occurs north of Choibalsan and extends into Russia; and
- The Dornod Mongol System: a relatively homogenous system comprising bunchgrasses and rhizomatous grasses in vast open grasslands with hardly any woody vegetation. This system occupies the remaining 50-60 percent of the Eastern Steppe.

Over the last decade the Government of Mongolia has given a high priority to conservation and has established a number of new protected areas in the Eastern Steppe. Currently there are nine protected areas with an area of 2.3 million hectare of land (Table 3). Another 12 areas are proposed to create protected areas (Appendix F).

Despite its unspoiled condition and global biodiversity importance there is some record of decreasing pasture yields in the Eastern Steppe. In his report on grazing and range management, Buzzard (1999) concluded that the many of the ranges of the Eastern Steppe are on the borderline between the “healthy” and “at risk” categories. This means some areas require external inputs for recovery, and that the lack of rangeland conservation practices is a cause for concern. Generally, rangeland ecosystem shifts between different ecological states over time in response to natural or human-induced factors. Such changes can be sudden or they may occur gradually.

TABLE 3. Protected Areas in Eastern Mongolia

Name	Classification	Area, ha	Establishment
Mongol Dagurian	Strictly Protected	103,000	1992
Mongol Dornod	Strictly Protected	570,400	1992
Numreg	Strictly Protected	311,200	1992
Lkachinvandad	Nature Reserve	58,800	1965/1995
Ugtum Uul	Nature Reserve	46,200	1993
Jaran Togoo	Nature Reserve	800,000	1997
Ganga Nuur	Historical Monument	28,800	1993
Yakhi Nuur	Nature Reserve	n/a	1998
Toson Khulstai	Nature Reserve	n/a	1998

Source: National Report on Biological Diversity- 1998¹³

Socio-Economic Conditions

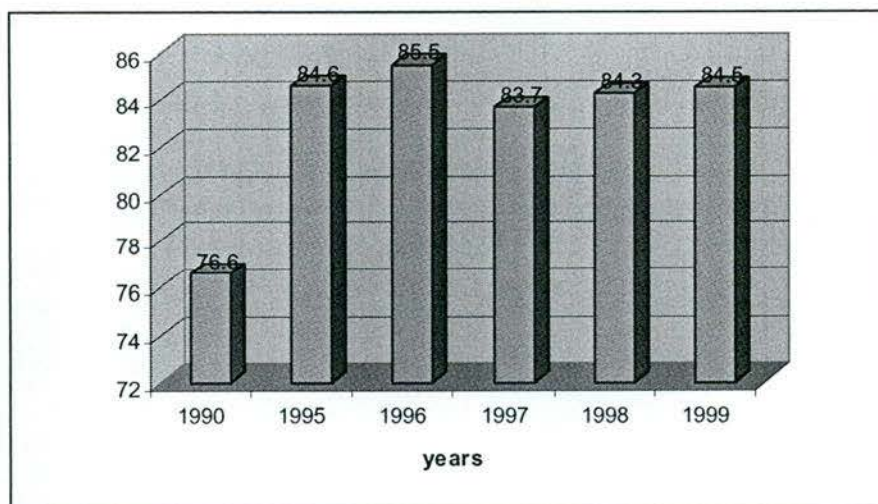
The more arid and remote Eastern Steppe is far less inhabited than the Central and Western Steppes of Mongolia. The Eastern Steppe retains much of its pristine character, primarily because of the mobile and dispersed traditional livestock production system that was in use.

Between 1960 and 1990, the human population of the Eastern Steppe almost doubled, but since 1990 the population growth rate has decreased considerably, as many people have lost their jobs from collectives and state farms and have moved to the major

¹³ This was a First National Report on Biological Diversity of Mongolia and submitted to the Convention on Biological Diversity in 1998.

urban centers in the central part of the country. Figure 3 below illustrates the population change in Dornod Aimag in the last decade.

FIGURE 3. Population Change in Dornod Aimag, thousand people



Source: Dornod Aimag Governor's Office 2001.

The population density has decreased from west to east in the Eastern Steppe. Dornod and Sukhbaatar Aimags both have some of the lowest population densities in the country. For example, Dornod Aimag has 0.42 people per square kilometers, compared to the highest of 2.5 people per square kilometers. More than half of the people living in the Eastern Steppe are nomadic livestock herding families. The percentage of people living in urban areas is lower than the national average.

According to the country average, the middle class herdsmen household has about 200 head of livestock. The minimum herd required for survival is now much higher than in the collective era, because now nomadic households rely less on other sources of income such as salaries and subsidies. Questionnaires administrated in the Eastern Steppe to a small sample of households in Dornod and interviews with soum governors, show that on average 20 percent of households are below the poverty line

(Niamir-Fuller M. 1997). Generally, unemployment and poverty are higher in eastern Mongolia than in the central part of the country, due to a lack of market opportunity and remoteness.

During the collective era the livestock production in the country was fairly constant with national livestock populations ranging between 24-25 million. This was regulated by the manipulation of domestic consumption and export levels. The official export of live animals to Russia stopped after 1990, because of the breakdown of inter-governmental agreements.

Livestock population in the Eastern Steppe did not follow the country's increasing population trend. Between 1991 and 1994 livestock population in the three Aimags has decreased by 18 percent, most of it in Dornod Aimag. One explanation is that the Eastern Steppe has increasingly become the region providing livestock for domestic consumption for the major cities of the country. Another factor was that local cross-border unofficial export, especially into Russia, has increased.

However, the number of livestock in the Eastern Steppe has steadily increased after 1994, reflecting the population growth of the country. Table 4 shows livestock population growth between 1995 and 1999 in eastern three Aimags.

The major contributor to this growth was dramatic increase in the goat population, as the price of cashmere nearly tripled. However, camel populations fell by one third between 1989 and 1995. In 1993, the government established a partial ban on the slaughter of camels in order to save the country's herds. Camels are widely used in the Eastern Steppe as a major form of transportation by traditional nomads, who use them to pull their carts when they move from place to place.

TABLE 4. Livestock Population in Eastern Mongolia, thousand head

Aimag	1995	1996	1997	1998	1999
Dornod	591.4	594.2	657.2	735.7	811.8
Sukhbaatar	1015.6	1040.9	1133.1	1288.2	1450.6
Khentii	1100.9	1150.5	1254.0	1388.7	1462.3
TOTAL	2707.9	2785.6	3044.3	3412.6	3724.7

Source: Mongolian Statistical Yearbook, 1999.

In general, domestic consumption of meat has increased since 1990, as production of other food commodities, such as vegetables and grains have decreased. Today most vegetables and grains come from the Chinese market through local cross-border trade. There are two official cross-border points between eastern Mongolia and China, where local people can trade animal products for food and clothes. An official border gate to Russian is in Chuluun Khoroot soum of Dornod aimag.

In the livestock animal census of 2000, the total livestock population in eastern Mongolia was estimated at 3.86 million. Some researchers have suggested that the Eastern Steppe pastures have a carrying capacity for an additional 10 million livestock per year.¹⁴ But it is obvious that a considerable amount of areas in the Eastern Steppe is not available for livestock grazing due lack of water resources and other factors. Exact data is not available.

In the past several years, the social and economic support structures in rural areas have gradually become inoperative, because local governments have lacked the financial

¹⁴ Daily News issue #63 of March, 2001.

capacity to maintain them, and also due to a rapid privatization without a concrete policy. This has led many nomadic herders, along with their livestock, to settle near and around functional service centers. At the same time, the local government has very little capacity to use land use planning and enforcement of regulations to combat land degradation.

Potential Threats to Pasture Land

As was mentioned earlier, land was nationalized during the Collective Era. The state owned the land and allocated user rights to collectives and state farms. Collectives were run according to traditional communal regimes. Members of the collective had equal rights to all pasture land resources within collective's territory. The collective made all decisions concerning pasture land use planning, zoning and rotation within its jurisdiction.

Traditionally, during the collective era, grazing patterns were kept flexible and mobility was encouraged. This was a clear recognition of the ecological and economic necessity of mobility of livestock in arid lands.

However, the traditional regulations and post-collective adaptations for land tenure security and allocation may not be able to cope now with the new system of privatization and rural-urban movement, especially near soum and aimag centers. The situation creates new threats to pasture land in the Eastern Steppe.

A major threat to the Eastern Steppe is the excessive use of pasture land year round in the same areas. It was determined by Buzzard and others (1999) that the uncontrolled, season-long grazing that is common around soum and aimag centers has simplified plant composition and eroded soils within an area of 5-10 kilometer radius,

and similarly along riparian corridors and in the proximity of open water sources.

Similar observations have been made in several recent research reports, such as a report by Ariungerel D. (2000).

The lack of infrastructure in remote pasture areas contributes largest portion in to the overgrazing problem near aimag and soum centers. Today livestock production is the only source of income for most nomadic livestock herding families. In order to sell their products most herdsman families prefer to live close to markets, that are located in soum and aimag centers. Another income source is pensions paid by the local government. But the nomadic herdsman, who receive pensions, have to go to soum and aimag centers every month to collect those pensions.

Another identified potential threat to grazing land is the current livestock herd composition and productivity in the Eastern Steppe. During the last 10 years, the goat population has increased 2.1 times Dornod Aimag, 1.7 times in Sukhbaatar Aimag and 1.6 times in Khentii Aimag. Some scientists conclude that when sheep and goat ratios get close to 1:1, it indicates violation of traditional nomadic herd composition (Yadamdorj P. 2001). Generally, goats are fast moving animals with a larger impact on grazing land compared to sheep, therefore more nomadic herdsman prefer to have minimal number of goats in their herd. In addition, some herdsman in Sergelen soum of Dornod aimag have indicated that regardless of cashmere price, goats are less profitable animals than sheep, in terms on market demand with cash change. However, Goto (1970) concluded that sheep have a habit of eating up all the grasses without leaving anything and so those in the rear can hardly find any grass to eat.

Since the 1980's, the effect of global warming has become increasingly evident in Mongolia. During the last 60 years, according to the National Meteorological Report (1997), the climate in the Eastern Steppe became drier and warmer. The average annual temperature has increased by 0.7°C in the region. Meantime, it has also been recorded that the average summer temperature for June and July has decreased, which in the long run may affect the duration of vegetation growing season. If such climate change occurs it may have some negative implications to the vast grasslands ecosystem and living conditions of nomadic herdsmen in eastern Mongolia. However, there is very limited information available on climate change and its consequences in the Eastern Steppe.

CHAPTER IV

RESEARCH METHODOLOGY

Goals

Mongolia's recent adoption of a free market economy has affected the traditional nomadic livestock herding lifestyle and grazing practices in Mongolia. The field research done for this thesis, assessed the extent of changes and evaluated the social and environmental impacts in the Eastern Steppe of Mongolia. The Eastern Steppe is the most important grazing land for livestock production in the country. Therefore, there is a great need for adequate study and information, in order to manage sustainably for the future.

The field research in the Eastern Steppe of Mongolia summer 2001 involved collecting field data and information through extensive meetings with local communities, nomadic livestock herders, protected areas rangers, and government officials at the local and national levels in Mongolia. There was a wide range of collaboration with the Eastern Steppe Biodiversity Project staff both in Ulaanbaatar and Choibalsan. The author of this thesis has been involved in this project for a number of years prior to coming to study at the University of Oregon. His past experience and relationship with the project have provided favorable opportunities for this field research.

The field research relied on information gained from local nomads and attempts to identify their beliefs about the major causes of overgrazing problems. The general

procedure used in this field research was to visit local herdsman families and invite them for discussions and interviews.

Another aspect of the field study was to identify, evaluate and document the condition of the most critically overgrazed areas in the study area. Therefore, this field research has focused on the following three interrelated topics:

1. Changes in the traditional nomadic livestock herding lifestyle and grazing practices in the Eastern Steppe grasslands of Mongolia that have occurred due to the country's recent transition to a free market economy.
2. Social impacts on remote rural villages and surrounding areas that have resulted from the changes in the traditional nomadic livestock herding lifestyles and grazing practices.
3. Environmental impacts on the Eastern Grasslands of the Central Asian Steppes that have resulted from the changes in the nomadic livestock herding lifestyle and grazing practices.

Subjects

The main subject population for this field research included nomadic livestock herding families in the Eastern Steppe, particularly Sergelen, Sumber and Matad soums of Dornod Aimag and Dariganga and Erdenetsagaan soums of Sukhbaatar Aimag. Additional information and data were gathered through the meetings with national and local government officials, scientists, the Eastern Steppe Biodiversity Project staff, and Eastern Mongolian protected areas rangers.

This field study attempts to evaluate problems that are closely associated with nomadic herding family's daily lives. Most of the individuals who participated in the meetings and interviews were quite confident that they would benefit from the outcome of this research study. The subjects generally felt free in their discussions with the interviewer. The nomads who were interviewed had never been formally interviewed previously, or with formal protection of their rights, and signing of consent forms.

Instruments

A main instrument for the field research was short interviews with local nomadic herdsmen. Another instrument was the informal meetings with local and national and government officials. Ten questions for the interviews was provided prior to each interview, so candidates could have a choice whether or not to participate.¹⁵ This provided participants with a comfortable feeling before he or she answered the questions. Participants could also refuse to participate at any time, at no cost. In order to protect the subjects right consent forms were used and signed in each interview.¹⁶ All necessary documents such as consent form and questionnaire were provided in their native language with a full explanation.

Based on approval from the Human Subject Compliance Office at the University Oregon, interviews and meetings with nomadic herdsmen were videotaped and audio recorded. All individuals were literate with at least three-year formal education and able to read and understand the questions that were asked.

¹⁵ A list of interview questions is Appendix A.

¹⁶ Consent form is Appendix B.

Hypothesis

The migration of nomads to pasture lands near urban centers may create overgrazing and related environmental problems surrounding those areas, and leave the more remote rural areas with social problems resulting from de-population caused by the departure of many inhabitants. In addition, there is a great concentration of livestock around water sources due to lack of maintenance or even to the dismantling of water wells in remote pasture areas. This may cause competition for wildlife habitat with animals such as Mongolian gazelle. There are many small lakes and streams in the Eastern Steppe, but few have drinkable water, due to salinity or eutrophication from animal wastes.

Steppe fire and rodent encroachment are generally regarded by nomadic herdsman as natural disasters, with a huge negative impacts on the environment. However, recent studies suggest some beneficial results from steppe fires and the presence of rodents. There is a need to better present these ecological concepts to traditional herdsman. It is an important goal for this research study to bring changes in the understanding of local nomadic herdsman about fire ecology and rodents habitat preference.

In the long run, less seasonal movement of nomadic livestock herders may result in the dismantling of traditional herding practices that have been with Mongolians for thousands of years. This would be a cultural tragedy, because the Mongolian traditional nomadic lifestyle is a symbol of the country's identity, internally and throughout the world.

Research Limitations

This field study has some limitations. These include the time constraints of the duration of actual fieldwork. The three-week of field research in the Eastern Steppe did not allow adequate time to identify all social and environmental causes for overgrazing, particularly in the quantitative measures. Therefore, most of the data based on oral information gathered through the meetings and interviews. In addition, not all of the nomads interviewed gave full answers to all of the questions asked. In particular, the nomads generally did not provide answers to the question about their personal income and also the livestock numbers currently in the area, where they live. Finally, there is very limited scientific information available for the eastern steppe grasslands management, especially during the last ten years of transition to a free market economy.

CHAPTER V

RESEARCH RESULTS

The field research for this Master's thesis on "Sustainable Pasture Land Use Management in the Eastern Steppe of Mongolia" consists of two main parts. The first part involves the personal interviews with traditional nomadic livestock herdsman, and the meetings and discussions with family members of livestock herdsman. These interviews and meetings took place in Sergelen, Sumber and Matad soums of Dornod Aimag and in Erdenetsagaan and Dariganga soums of Sukhbaatar Aimag.¹⁷ The second part involves the meetings with scientists and local and national government officials, both in the national capital city of Ulaanbaatar and in eastern Mongolia, with staff members of the Eastern Steppe Biodiversity Project, and with Protected Area Rangers.

While the meetings and interviews with the nomadic herdsman were the most important part of this section of the thesis, the meetings with scientists, local government officials and the Biodiversity Project staff were very important resources that helped me to understand the local concerns and to learn about past research carried out in the Eastern Steppe.

¹⁷ The Eastern Steppe Biodiversity Project has produced various maps. Some of these maps have been used in this thesis.

Interviews and Meetings with Nomadic Herdsmen

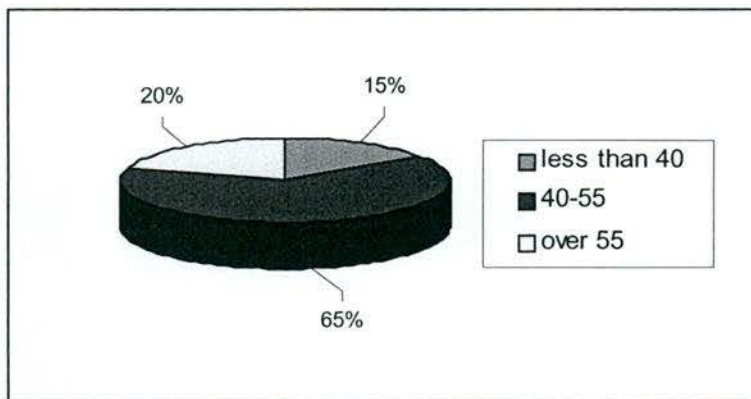
A main criteria for the selection of traditional nomadic herdsmen for these interviews and meetings was their current location in Sergelen, Sumber and Matad soums of Dornod Aimag and in Erdentsagaan and Dariganga soums of Sukhbaatar Aimag. Each traditional livestock herdsman was asked ten (10) specific questions concerning current pasture conditions and livestock management practices, and the effects on these caused by recent changes of transition to a free market economy in the selected areas.

I interviewed 20 nomadic livestock herdsmen in various locations in the Eastern Steppe for this field research. Of those herdsmen, 15 percent were less than 40 years old, 65 percent were between 40 and 55 years old, and 20 percent were over 55 years old (Figure 4). Of those herdsmen, 85 percent were male and 15 percent were female. Only 10 percent (or 2 nomads) were recipients of retirement pension money from the local government. An estimated 25 percent of traditional nomads interviewed were new livestock herders who were forced to take up nomadic livestock herding lifestyles following the privatization of livestock and the dismantling of the state collectives and farms. Most of the new herdsmen were located in Sumber soum, because that area had many people who worked in the state agricultural farming collectives under the previous socialist system. When those state collectives were dismantled, many of those who lost their jobs were forced to become nomadic livestock herdsmen for their survival.

In addition, another 30 people who are members of nomadic livestock herding families were involved in discussions and meetings. The questions discussed in these meetings covered a wide range of topics, in order to assure that I received a great deal of

supplementary information that helped me better understand the current grazing practices. The following are the research results based on the ten questions that were asked of the nomadic herdsmen.

FIGURE 4. Age Grouping of Nomads Interviewed



Source: Field research note.

QUESTION 1: “How many kilometers is it from the place you are currently staying to the closest urban settlement?”

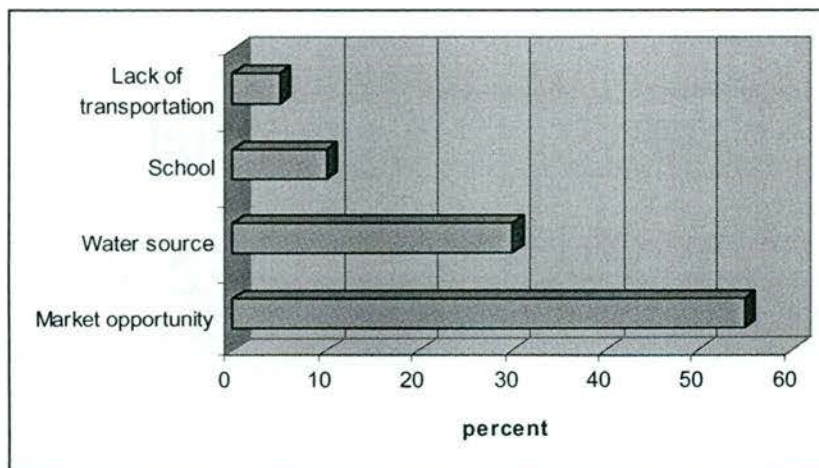
Eighty percent of nomads who were interviewed were located within 15 kilometers or less from the nearest soum centers. The nomads who were located the closest to soum centers were mostly found in Sergelen soum in Dornod Aimag and in Dariganga soum in Sukhbaatar Aimag. Particularly, nomads along the Galiin Gol river in Sergelen soum are the closest to the soum center. Most of them were found between 4 and 10 kilometers from the soum center. Fifty five percent of these herdsmen said that the major reason to live so close to soum centers was to have better opportunities to buy and sell at soum center markets. Thirty percent said they were in that location because there were better water sources for their animals. It is common for soum centers to be located on or near the best water sources in their areas. This is the case for Sergelen

soum in Dornod Aimag and Erdenetsagaan and Dariganga soums in Sukhbaatar Aimag. Another 10 percent of these nomads answered that they liked to be near the soum centers so that their children were able to go school. This is a newly important factor because under the previous socialist system the state provided free dormitories for school age children of nomad families, in the soum centers. Following the transition to the free market, most of the school dormitories for nomad's children in soum centers ceased to exist, and those that remain are quite small and very expensive for the average nomad families. The remaining 5 percent of these nomads answered that they did not have adequate transportation or resources to move further away from their soum centers (Figure 5).

Two nomadic families in Sumber soum, who answered that their current locations are not close to soum centers, pointed out that they were located within a few hundred meters from Buir Nuur, which is only available water source for their livestock. The same answers were received in the area of Ganga Lake in Dariganga soum. But these livestock herdsman also said that they stayed around these major open water sources for 2 to 4 seasons. One herdsman, who lives 300 meters from the Buir Nuur, said that his family had not moved away from that area at all for the last six years, due to a lack of transportation or resources to move elsewhere.

For those who were located near open water sources but further away from soum centers or other urban areas, the question about how far to the nearest urban center was not appropriate to answer. Nonetheless, their location close to water sources, and comments about reduced mobility, helped to indicate potential overgrazing threats.

FIGURE 5. Reasons for Livestock Concentration



Source: Field research notes

One herder answered that one of the reasons for the concentration of nomadic herdsman families around Ganga Lake in Dariganga soum, is the presence of Mongolian tourists from Ulaanbaatar, the national capitol city, and from neighboring aimags, particularly Dornogobi Aimag. The nomadic herdsman families live nearby so that they will have a better opportunity to sell milk, yogurt and goat to these tourists and travelers. According to him, goats are generally considered the best animal to use for the open fire picnics of the tourists and travelers. While we were conducting research in the region around Ganga Nuur, we met a group of 10 tourists traveling from Dornogobi Aimag.

QUESTION 2: “What is your family size? What is your family income per month?

What are the major income sources?”

Family size varied greatly. Twenty percent of the nomads interviewed had more than 7 people in the family, 50 percent of nomads had between 5-7 people in the family,

25 percent had between 3-4 people, and 5 percent had less than 3 people in the families. Because one of the purposes of the research was to analyze the relationship between the number of livestock per family and the number of people who must be supported by that livestock, this question was clarified. The nomads were asked to indicate how many members of their family actually lived with them. For example, a family with 8 children would report that their family has only 2 children if just two are still living with them and the other 6 children are now adults who are married and live elsewhere.

In the past it was very common to have more than 5 children; however the average family size in Mongolia has recently decreased. In 1999, the total fertility rate in Mongolia was 2.5 children. We noticed that some young families preferred to have fewer children than was common in the past. In particular, a young female herder with three children who was interviewed, stated that the economic difficulties that come with having more children because of recent economic hardship, and said that it is not currently easy to support larger families. Another middle age man in Sumber soum, who has six children, expressed a different view about having larger families. He said in traditional livestock herding practices children provide enormous help, especially with herding smaller livestock animals such as goats and sheep, in the warmest seasons. He said he enjoys his large family and is able to get a great deal of help from his children.

My research and related observations indicated that the number of people in the family and rate of poverty have some direct relation, because income is extremely limited due to the lack of markets and economic opportunities, and because family consumption is greater for larger families. Two families with more than 6 children in Sumber soum had incomes substantially lower than the poverty line. But this might not be always the

case. According to the Bag Governor in Khalkh Gol, Sumber soum has more poverty, and about 25 percent of its nomadic herders families live on income below the poverty line. He explained that this was the result of poor market opportunities and the remoteness of that region. Sumber soum is the most eastern soum in the country and about 330 kilometers from Dornod Aimag center.

The question about family income per month was never answered by any of the nomadic herders who were interviewed. Part of the reason for this is the difficulty of measuring the income, because their lives and livestock marketing often less involved with cash than with trading. Herders often trade their livestock products for food commodities (flour, rice, sugar) and clothes.

All the herders who were interviewed answered that livestock products are their only income source. In addition, one herder in Ganga Nuur of Dariganga soum said that people in that region sometimes rent their horses to Mongolian tourists and travelers as a supplementary income source. Several herders did mention the high price paid for cashmere in the last two years, which was a great income source. However, one herder in Sergelen soum had a completely different view on the cashmere's goat population. He said that even though cashmere has a high price, still goats are not as productive or marketable as sheep. Sheep can be sold any time of the year, either in trade for food and clothes or for cash, but the cashmere goats make money only once a year in spring through the sale of their cashmere. He also referred to the goat's low susceptibility to cold and harsh weather in the winter.

Finally, the cash economy itself is limited in remote rural areas. During the transition to a market economy, for example, the resources in rural banks was very

minimal. Even today, local banks are frequently very limited operations. According to one nomadic herder in Sergelen soum, in the last few years, the local soum bank only pays pensions to elderly people once a month, and even this is often delayed because of cash shortages.

QUESTION 3: "How many people in your family are currently employed at a job outside of the family's livestock herding?"

Among the nomads interviewed, not one person including the family members, reported having a job outside of their family livestock herding. There were two main reasons given for this. First, there are very few jobs available in most of the rural areas of the Eastern steppe. Due to the privatization of state collectives and farms, many people lost their jobs and were forced to become herders for their family's survival. In the past, state collectives and farms provided many people with a variety of jobs of different types. Almost no jobs were created to replace the jobs that were lost in the transition from a socialist economy to a market economy. There are no government programs to support or effectively address these problems. Second, those who lost jobs were more likely to have had very limited skills and education, and therefore it was hard for them to find other jobs in other areas. Although literacy is very high in Mongolia, there is currently very little opportunity for training in new jobs for most people. In addition, these people almost universally lack the capital required to start any other business of their own.

The problems caused by job losses were reported especially frequently in the Buir Lake area and the Khalkh Gol area of Sumber soum. This area used to have large agricultural farms and in addition many people were employed in the fisheries industries.

Most of the people who lost their jobs grew up in the Mongolian countryside, where almost everyone learns the skills required to raise and care for livestock animals, either from their parents or from their extended family members. Under these conditions it is difficult for these people to learn the skills required to get other jobs, so they turn to livestock herding. Those who have lost jobs have chosen to herd animals because that is considered an easy job for countryside people to perform. However, in general, successful traditional nomadic livestock production does require certain skill and knowledge. An old nomadic herder in Sergelen soum talked about the significance of traditional knowledge in livestock herding. He mentioned that some of the new herdsmen have lost more livestock in snow blizzards last winter than more experienced herdsmen. According to him, a lack of experience in winter camping area selection, and inadequate attention to fattening their animals prior to winter, were the major factors in the larger livestock losses experienced by new herdsmen. He said that, for example, every family in his soum lost some animals, but that the number of animals lost varied greatly from family to family depending on their experience and skill.

As was mentioned earlier, 25 percent of the herders who were interviewed were new livestock herders who began herding after 1990. For instance, two herders in Sumber soum worked as tractor operators for a state farm for 13 and 20 years, respectively. Another young herder in Dariganga soum said that he was a truck driver for a state collective, and he received his truck as a part of his share in the privatization of state assets. Unfortunately, his truck is now very old and very hard to maintain. In addition, he said that gas is always in short supply and is generally more expensive in the countryside than in the central part of the country.

QUESTION 4: “How many head of livestock do you have?”

Twenty five percent of nomads reported that they have more than 500 head of animals. The survey found that 60 percent have between 200 and 500 livestock animals and 15 percent have less than 200 animals.

According to the studies done by the Eastern Steppe Biodiversity Project, livestock herders can be divided by the size of their herds into the categories of very poor, poor, middle and rich (Table 5). Generally, very poor and poor herder families can not increase their livestock, because they must use, trade or sell all of their livestock just to buy or trade for food and clothes. They cannot easily afford to raise and keep livestock for the purpose of increasing the size of the herd because their needs are greater than the reproductive rate of their livestock.

Maisky (1959) suggested that a Mongol family of five at the beginning of the 20th century needed 14 horses, 3 camels, 13 cows and 90 sheep and goats (for a total of 120 livestock) to survive. Because of changes in the economy, today their needs are greater. The Mongolian government concludes that an estimated 200 livestock are necessary for a nomadic herding family of 5 people, and that a larger number of animals are needed for larger families.

Most of the nomads interviewed said that those herders who previously worked for the socialist state collectives received most of the livestock that were distributed as a result of the privatization of those state collectives. However, one herder in Dariganga soum said that her family did not receive any animals, in spite of her work at the Children Summer Camp owned by the local state collective. Her family received a few animals from their parents who were nomads, and today they have about 60 animals, mostly

cows. In her interview she concluded that 60 animals is not enough to feed her family of five.

TABLE 5. Livestock Herdsmen Household Level by Herd Size

Household level	Herd size
Very poor	< 30
Poor	>30 and <100
Middle	>100 and < 500
Rich	> 500

Source: Eastern Steppe Biodiversity Project 2000.

However, it is hard to make any conclusion about the average number of livestock that can support an average nomadic family, because the area where this research was conducted contains pastures in critical condition. Families with a larger number of livestock will avoid these deteriorated landscapes and require bigger and better pasture areas.

It is very interesting to note that nomadic herders generally do not know the exact number of their livestock. Those that have many animals find it difficult to know the exact number. Further, large animals such as camels and horses graze in pastures far from their owners and do not come back nightly. The nomads go look for them when needed to exchange horses for their use, or to bring camels back when they need to move from place to place. On the other hand, nomadic livestock herders bring small animals (goat and sheep) and cows back to their camp every night to avoid predation and for milking. To encourage cows to come back every night the nomads separate their calves and keep them close to home all day.

QUESTION 5: “Has the number of your livestock animals increased or decreased since 1990, and if so then by how much?”

Generally, the number of livestock animals in every family increased since 1990. Three major factors have influenced this trend of increasing herd size. One factor was that during the privatization of livestock, most families who worked for the state collectives and farms received some of the state’s livestock. However, not everyone who worked in the state collectives and farm received livestock. The animals were distributed according to the employee’s job type, according to the number of the years the employee had been in the state collective, and according to a variety of personal factors. Second, during the collective era the government limited private ownership of livestock to no more than 75 animals for a herdsman, and no more than 16 livestock for people employed by the state (such as teachers, doctors or government workers) who live in the soum centers. Now that those limits no longer exist, and nomadic herders can have unlimited number of livestock, all nomadic families are trying to increase the number of their livestock. Third, some livestock products have become more valuable and bring greatly increased prices during the last several years, such as cashmere. As a result, in eastern Mongolia the number of goats has increased to almost three times as many as before 1990.

In the interviews, the largest number of animals reported by a single family (in Segelen soum) was over 600 head of livestock. The lowest number reported was 60 animals owned by a herding family in Sumber and Dariganga soums. In general, many

families in Sumber and Matad soum were below the poverty level and own less animals than the country's average.

QUESTION 6: "If you have moved closer to any urban settlements since 1990, what are the major factors that caused you to do so?"

An estimated 65 percent of the nomads who were interviewed said that they have moved closer to urban centers since 1990. Nearly 25 percent said that they have not moved closer, stating that their traditional camping and grazing areas were already sufficiently close to the soum center. Another 10 percent answered they have not moved to be closer to a soum center and that their grazing areas are still not close to a soum center today. The nomadic herding families that make up that final 10 percent were located in Matad soum and Sumber soum of Dornod aimag.

The major factors motivating those who moved to be closer to the soum centers were discussed previously as part of the report on question number one. As reported there, 55 percent of the nomads interviewed answered that a major reason to live close to soum center is to have access to better economic and market opportunities. Thirty percent said they lived close to soum centers to be nearer to better water sources for their animals. Another 10 percent answered that they lived close to soum centers so that their children would be able to go school (school dormitories in soum centers for the children of nomad families no longer exist). The remaining 5 percent answered that they do not have adequate transportation to move further away from their soum centers.

QUESTION 7: “Are there any differences in your livestock herding practices that have taken place since 1990, compared to the time before that?”

In the interviews conducted with nomadic families in the Galiin Gol area of Sergelen soum, the respondents strongly indicated that there has been a noticeable and significant change in traditional livestock herding practices since 1990. Two herders stated that livestock are moved less frequently, and that the older, traditional seasonal grazing schedules are not consistently followed, particularly in the autumn season when livestock need to be fattened. This causes more livestock mortality in winter.

A senior herder in Dariganga soum stated that he has lived around Ganga Nuur for more than 50 years, and that they always used to follow very good seasonal grazing schedules. He said that today, however, herdsmen do not want to do the hard work required to move regularly for better pastures. Instead they prefer to move their livestock operations and camps less often.

One major factor that two nomadic herdsmen emphasized was that the growing lack of water wells in the remote pasture areas has made it increasingly difficult to graze animals. In the past, there was a systematic network of water wells dispersed throughout the large grasslands of the Eastern Steppe. Most of these wells were operated with animal power. The herdsmen would harness a camel to a wooden boom and walk it in a circle around the well, to pump up the water for the livestock to drink. Most of these wells were constructed or improved during the collective era, and were maintained by the state.

Now, however, the state no longer maintains those wells, and most of them have fallen into disrepair. Because of this, huge areas of otherwise good grasslands are not

available to be used by the nomadic herdsmen. This has increased the livestock concentration and resulting grazing pressures on the grasslands located near natural open water sources.

The local governments do not feel responsible for repairing and maintaining the network of wells, partially because the grasslands where the wells are located is owned by the Mongolian national government, and partially because the local governments don't have adequate resources to repair and maintain the wells. The national government is now so distant and economically stressed that it, too, is unable to perform this work. Unfortunately, the market economy does not provide sufficient incentives for any individual nomads to repair and maintain these wells because their use of each well is minimal. Ultimately, the central government is the only entity capable providing money for the local governments to repair and maintain the wells. However, this requires the development of a systematic program of collaboration between the central government, the local governments, and the nomadic livestock herders. At this time such a program does not exist.

Another point made by some of the nomadic herdsmen was that social and medical services are scarce and difficult to reach from remote areas. For instance, medical services used to be free to all Mongolian citizens, but now those who use medical services must pay for them. There is often no adequate transportation to bring the doctors to the countryside to help sick or injured herdsmen or their families. Those medical vans that functioned in the old collective days are often not in good condition, and the shortage of gas in rural areas also worsens the situation.

Interestingly, six nomads said that they have not noticed any change in livestock herding practices since 1990. But more than half of those individuals were new livestock herders with only a few years of herding experience. These responses were recorded in Sumber and Matad soums of Dornod Aimag.

QUESTION 8: “Approximately how many animals are currently being grazed in the area where you graze your animals?”

As mentioned previously, it was difficult for herdsmen to know the exact number of their own livestock. It is even more difficult for herdsmen to know how many livestock animals are owned and grazed in their area by other herding families.

Accordingly, this question usually was not answered with any consistency by the nomads that were interviewed. As a result, this research project has relied on information about total livestock numbers gained from other sources, such as the Mongolian Statistical Yearbook and reports and studies by rangeland scientists working in the Eastern Steppe (Moore, 2000).

Only three herders tried to estimate the total number of livestock being grazed in their area. A herder in the Galiin Gol area thought that current livestock population was over 10,000 animals, and that this number is far more than the carrying capacity of the pasture in that area. Detailed studies conducted by the Biodiversity Project have previously concluded that this area is already under pressure from overgrazing (Moore, 2000).

Discussions with the Eastern Steppe Biodiversity Project staff in Choibalsan in August, 2001, provided information and more details about this problem, based on their

study of the Galiin Gol area. They also agree that the trend of increasing livestock concentrations in that area is probably similar to that found in other areas, and that overgrazing of pastures is becoming a problem in other areas of eastern Mongolia. Major problems included the disrepair of the previous system of wells, the scarcity of open drinkable water and the livestock competition with wildlife species such as the Mongolian. One herder stated that if there were enough water wells in his traditional pasture areas, there would be less competition between livestock and the Mongolian gazelles.

In several interviews the nomads indicated their concern about the rodents. They believed that rodents are very damaging to the grasslands and are very dangerous threats to pasture land health. Similarly, several nomads mentioned that they believed that steppe fires were responsible for the poor condition of some pasture areas.

An old herdsman in Dariganga soum told about some of his past experiences with the use of chemicals to combat Brandt's Vole. He said that he thought this program of chemical control was very successful. According to him, many remote pasture land areas can not be used because of the encroachment of large numbers of Brandt's Vole. He also mentioned that the central government has not provided any funds recently to combat the invasions of this rodent.

QUESTION 9: "Do you think that overgrazing in your area is occurring?"

Eighty five percent of the nomads who were interviewed (17 herdsman) said that they thought that overgrazing is occurring in their pasture areas. Only one herder (in Matad soum) said he did not believe that overgrazing is occurring. One of the reasons for

this high level of agreement is that this field research was intentionally conducted in areas where intensive livestock herding is practiced in the last few years, and where overgrazing would be expected. In other areas, the level of grazing and overgrazing problems vary greatly. In the areas around Galiin Gol, Buir Nuur and Ganga Nuur, local government officials, the Eastern Steppe Biodiversity Project officials and some scientists in Ulaanbaatar all indicated that there are serious problems of overgrazing. One of the purposes of this research project was to learn directly from the nomadic herders whether they agree with scientists and government officials that overgrazing is taking place in these areas. This is important for local government and land managers to know so that they can plan further policies and programs to address this problem. This also will help with the design of programs to educate nomads on what is needed to better manage their pasture for livestock grazing.

QUESTION 10: "Do you think that current grazing practices will create overgrazing problems in your pasture area in the future?"

Seventy five percent of the nomadic livestock herders who were interviewed thought that the current grazing practices will create overgrazing problems in the future. The remaining 25 percent answered that they do not know. However, as reported above, almost all of the herders interviewed said that they believed that overgrazing is already a problem in their areas.

All five of the herders who were interviewed in Galiin Gol area in Sergelen soum said that overgrazing will create future problems. One likely reason for the prevalence of this view is that the Biodiversity Project has already held several meetings

and workshops in this area prior to this research project, and most of the people who attended those meetings have already learned about this problem. As part of this program, the Bag Governor was actively involved in those meetings and he visited some of the nomads in his bag jurisdiction to discuss grazing problems with them. One purpose of that program was to encourage the local government and the herdsman in that area to work together with the Eastern Steppe Biodiversity Project to repair and maintain some of the most important livestock water wells in remote pasture lands. As a result, there have already been some discussion and negotiations among the local government and livestock herders about whether they would be willing to move to those areas, if water becomes available. Therefore, Sergelen soum likely has a better chance to manage the Galiin Gol area by encouraging seasonal movement into other areas once the water well projects have been completed. One herder said that he is willing to contribute to the maintenance of the well in the traditional remote area where he used to live, and that once the well is repaired and in operation, he thinks he would be able to take care of it. He also said that water is a major problem and that if water is available in the traditional grazing areas he does not have any other reason to live close to the soum center. It is worth noticing that he is one of the wealthiest herders in the area, which means that he would not have problems with transportation to and from that area each year with his livestock and his family's camp.

Supplementary Data and Information

Upon my arrival in Ulaanbaatar for the field research and work for this thesis, I organized a meeting with a number of government officials, NGO representatives and rangeland scientists to discuss and share information and ideas about overgrazing problems, desertification, land restoration needs, and ways to manage pasturelands more sustainably. Ten key people were invited to attend and share their views and information. The participants included Adyasuren, Banzragch, Bayarjargal, Damdin, Myagmarsuren, Narangerel, Tserendeleg, Tsogtbaatar, Tsogtsaikhan, and Shiirevdamba. These people were invited for their expertise and knowledge, and they openly shared their thoughts and suggestions for this research project. The people attending the meeting were supportive of this research. This meeting and the information I gained from it were very helpful in the design and implementation of this field research project.

A long series of consultations with relevant scientists from the Mongolian Academy of Sciences and from the Eastern Steppe Biodiversity Project staff took place. These scientists and project staff included Batbuyan, Ariungerel, Tsogtsaikhan, Bolor-erdene and Dagvasuren. These consultations helped in the selection of the study areas for this research project. It was suggested that Sergelen soum of Dornod aimag and Dariganga soum of Sukhbaatar Aimag are the areas where the most critical overgrazing problems could be studied. During the last two years, 2000 and 2001, the Eastern Steppe Biodiversity Project has done field research work and organized two workshops in Sergelen soum. Accordingly, it was agreed that this study could provide an opportunity for future research by gathering information from interviews with livestock herdsman

from Galiin Gol river area in Sergelen soum. In addition, Buir Nuur area in Sumber soum was considered to be an area in which the pasture lands are in critical condition, and therefore was a good study area for this research project and offers an excellent opportunity to evaluate the current situation and identify critical changes in traditional livestock herding practices.

Interviews with Government Officials and Scientists

The vice governor of Sergelen soum provided very valuable information for this field study. He was born and raised in Sergelen soum and has been working with the local government for approximately 20 years. He was a very important source of information in terms of defining local concerns and needs and providing comparative views on the era of State Collectives and the present market economy. He stated that the livestock population in Sergelen soum has increased by 5000 head in last 6-7 years, but that nomads have lost about 15,000 head of livestock in a harsh blizzard last winter, (which lasted just for three days). Interestingly, another 2000 or so cows were lost in a snowstorm and never found. He thought that the cows probably went downwind seeking protection from the storm and crossed into the neighboring soum's territory, and that people there might have sold them for meat.

The Sergelen soum government estimated that they had a livestock population for the soum of a little over 100,000 at the end of 2001. Sergelen soum has the second largest livestock population in Dornod aimag. According to the Vice-Governor of the soum, livestock production is a largest economic sector for Sergelen soum. There is also

some limited agricultural production, in which about 200 families in the soum center grow some vegetables, such as potatoes and cabbage.

Since the privatization of state collectives and livestock, many families in the soum center have acquired animals. Most of these families still live in the soum center and keep their animals in the surrounding areas. Today there are about 12,000 livestock animals being grazed around the soum center. At the same time, the population of livestock owned by nomadic herdsman has also dramatically increased. Part of reason for this is that now there is no legal limitation on the number of livestock animals that a person or family is allowed to raise. In the past, families who lived in the soum center and were not herdsman, were allowed to own only 20 animals or less.

Two main environmental concerns were brought up by the Vice Governor of Sergelen soum. He stated that overgrazing was occurring around the soum center and along the Galiin Gol due to heavy concentration of livestock. The major factors causing this heavy concentration are the better market opportunities near the soum center, the availability of some social services, and the lack of water sources in the remote pasture areas. Another environmental concern he raised is the presence of rodent (Brandts' Vole) encroachment. He said that he thought that Brandt's Vole is really harmful for pasture land and that it causes pasture land deterioration. The population of Brandts' Voles has spread over large areas of pasture land since 1999.

The vice governor also provided some information and concerns about the traditional summer pasture areas, known as "Davaanii Zuslan." This area has adequate surface water resources and is located about 45-55 kilometers from soum center. But the

vice governor said that livestock herders do not want to move there because now they prefer to stay close to the soum center.

Bag #4 is an administrative unit for nomadic livestock herders that includes the area around Galiin Gol closest to the soum center. The Bag governor Menkhnasan emphasized the need for projects to improve water supply sources in remote pasture areas. He said that during the collective era that area had 41 water wells, and now only 16 of those are in operation today. Bag#4, and the Eastern Steppe Biodiversity Project have developed some pilot projects to repair and maintain some of the water wells in remote pasture areas in order to reduce the grazing pressure around Galiin Gol.

The Bag governor said that 25 herdsman families lost all of their cows during a blizzard last winter. That is the same natural disaster the soum governor referred to earlier. According to him, cows are one of the most productive animals for earning income for the livestock herding families.

The governor of Dariganga soum also was very concerned about rodent encroachment, overgrazing and sand movement, especially near the soum center. Dariganga soum has many historical and natural monuments, which have a great potential to provide the basis for the development of tourism. For example popular tourist destination is the scenic value of Ganga Nuur, one of the field study areas for this research project. He shared with me his interest in promoting the education of youth about the environment, and in traditional nomadic livestock herding practices. He said that he is interested in training youth about traditional herding methods, and about the proper selection of seasonal pastures.

The observations and comments of the governor of Khalkh Gol bag in Sumber soum were a bit different. He was not as worried about the overgrazing issue, because that bag has a large amount of grazing land. Because this bag center used to be a sum center, they used to have more livestock in the past than they do today. The reason for this is that the soum center was moved to another location about 65 kilometers away, and many people have moved away to the new soum center or to other areas since 1992. However, he suggested that there are two important environmental concerns. The most important was that the water level has decreased in Buir Lake and the Khalkh Gol river. But he did not quantify the decrease with any exact numbers, and I assume this would not be easy for him to do. During the last 2-3 years, precipitation has decreased noticeably in the region. In addition he was concerned that it might be the result of extensive water use and extraction from Khalkh Gol river on the Chinese side of the border. Khalkh Gol river flows from China across the border with Mongolia and flows into Buir Lake.

Another environmental problem that he was concerned about was rodent encroachment. Most people, including government officials, believe that the rodents are very damaging, without knowing much about the ecological relationship between the rodent and pasture habitat conditions.

The Hentii aimag Environmental Protection Office has produced relatively detailed overgrazing reports titled "The Condition of Grazing Land" based on the records kept by the soum land use manager's from all 19 soums in Hentii aimag. These reports, available from the Aimag governor's office, show that over 30 percent of total pasture has been degraded to a level between high and medium intensity. Galshar and Bayanhutag soums have the highest percentage of pasture degradation: 72.5 percent and

74.5 percent, respectively. These two soums also have the highest number livestock among other soums in Hentii aimag. Galshar soum's livestock population is 151,954 and Bayanhutag soum's livestock population is 113,817 animals. In total they make up about 18.7 percent of Hentii aimag's total livestock population. Another three soums are overgrazed on between 30.9 and 41.3 percent of their total land area. The major factor causing this high percentage of pasture degradation is heavy grazing year 'round in those areas for long periods of time, and the encroachment of rodents (Hentii Aimag "The Condition of Grazing land" report).

According to the head of the Environmental Protection office of Hentii aimag, overgrazing is a problem, particularly in eastern and souther soums. The eastern and southern soums are located in the steppe ecosystems, therefore they are more dry and warm. The northern soums that are located in forest steppe and forest ecosystems experience less overgrazing. There is less pasture land in these ecosystems and more favorable weather conditions than in the dry zones in the east and south. She also emphasized the rodent problem in southern soums. There have not been any ecological studies conducted on Brandts' Vole encroachment in Hentii aimag. This seems true for the entire country. According to Dr. Batbuyan, a scientist at the Institute of Biology, some studies have been done on Brandts' Vole, but these studies did not look at the Vole's population dynamics or habitat preference. However, he stated that these earlier studies were not available. The Eastern Steppe Biodiversity Project staff and some government officials said that there is a need for solid scientific studies on rodent distribution, and on the relationship between the rodents and the condition of pasture lands. The traditional perception about the impacts of Brandts' Vole should be reviewed

and a clear message on this matter needs to be disseminated to the nomadic livestock herders and land use planners at the soum and aimag levels. The Eastern Steppe Biodiversity Project can initiate such research pilot projects, however the lack of highly trained ecological scientists may delay the process.

Rangeland Specialist Ariungerel at the Biodiversity Project office stated that in the last few years, many small research studies have been carried out on general rangeland ecological conditions by various scholars from academic institutions, in cooperation with the Eastern Steppe Biodiversity Project. For example, research on the Mongolian gazelle has included extensive studies on gazelle migration route, and on Mongolian gazelle population dynamics over the last three years. This research provides important information that can be used by local land use managers to plan better pasture management and minimize the habitat and forage competition between livestock animals and the Mongolian gazelle. There is also a need for study of the effects of poaching on the populations of the Mongolian gazelle, which has increased since the transition to a market economy due to the increased poverty of the local people.

Interviews with the Project Staff

The Biodiversity Project staff were very helpful, and in particular D. Ariungerel, rangeland specialist, and L. Bolor-Erdene, Geographic Information System (GIS) specialist were very important sources of information for this research project. They both have worked in the Eastern Steppe for number of years, and D. Ariungerel in particular has been working as a scientist for over 10 years in eastern Mongolia. Based on their field research and the information they have gathered so far, they concluded that the

pasturelands have been degraded, that the rate of degradation is increasing, and therefore that there is an urgent need for better pasture management. Increasing overgrazing has been recorded through their field studies, particularly in Sergelen and Tsagaa Ovoo soums in Dornod aimag. They have suggested a number of activities to manage pastures better and more sustainably. These are:

- More water supplies (water well maintenance)
- Public education on the recognition of plant species that serve as indicators of rangeland health conditions; determination of pasture caring capacity;
- The exclusive leasing of some pasture areas to nomadic livestock herders; and
- The development of pasture management team including nomads, government and non-government representatives at local level.

The Eastern Steppe Biodiversity Project has already created a pasture management team such as that suggested above, in Galshar soum of Hentii aimag, and everyone involved is eager waiting to see the results in the near future.

According to Rangeland Specialist Ariungerel, scientific research was done by the Mongolian Academy of Sciences in the region, showing that if overgrazed pasture is left undisturbed and without animals for 5 to 6 years, the grassland will regain its naturally healthy condition. The same study for agricultural land suggests that it takes 15 to 20 years to regain the natural vegetation cover. However, the Biodiversity Project staff generally thinks that the process of land restoration and recovery is difficult to predict because soil structures are quite different from place to place in eastern Mongolia. Specifically, Dariganga, Ongon, and Naran soums in Sukhbaatar Aimag experience a different kind of overgrazing problem due to desertification and sand movement. The

pasture land plant species composition in these soums have been substantially changed, according to a Vegetation Map that was developed in 1982 (Mongolian Academy of Science, 1982). Some of the recent studies done by the Biodiversity Project in the mountain steppe ecosystem suggest that grazed areas will return to climax natural conditions if left undisturbed and without animals for about 10 years, and cropland will return to natural vegetation conditions if given more than 10 years.

Currently, the Eastern Steppe Biodiversity Project has 11 volunteers in seven soums of eastern three aimags, who work in the buffer zones soums located adjacent to protected areas. They help to develop and implement management plans for these areas. Also they focus on social issues to help local people improve their livelihood through various social project funded and assisted by the Eastern Steppe Biodiversity Project.

I met with one of the volunteers and had very useful meeting and have gained great deal of information. Batsaihan is a volunteer, who works in Erdenetsagaan soum of Sukhbaatar aimag, which has the largest territory among the soums in that aimag. Erdentsagaan soum has a buffer zone committee in operation. According to him, the overgrazing problem around the soum center is critical, especially during the summer. This is partially due to the presence of a valuable open water source, the Chono Haraih river, that flows through the soum center. Herding families also concentrate there to take advantage of the greater market opportunities available close to the soum center. Those herders located close to the soum center can sell more animals for meat to the residents of the soum center during the summer season, because livestock are in better condition at that time. Generally, the people in Mongolia do not butcher animals in winter and early spring, when the animals are weak or in poor condition. People butcher more animals in

late November, when it can be frozen naturally outdoors, and then use that meat through out the winter and spring until animals are able to eat the new spring grass that comes in early June.

Nomadic livestock herders in Erdenetsagaan soum, who move close to the soum center in the summer, often move back further away from the soum center in the winter. In part, this is because during the winter livestock herders can rely on snow to provide water for both animals and people. However, Batsaikhan noted that today nomads do not travel very far to utilize other areas, as they traditionally did in the past. The major reason is that wells are not available in most of the remote pastures, so that there is nothing to attract livestock herders to move out to those distant areas. Also the practice of “otor” (a special seasonal grazing pattern in late summer and early fall in which the livestock are taken to better pastures far away to fatten them for better survival for the winter) is not generally practiced. Again, this is in part because of a lack of water sources in those remote areas, now that the wells no longer operate. According to him, the Erdenetsagaan soum government is interested in extending the nature reserve into greater areas of the soum territory. The Lkhachinvandad Nature Reserve is in Erdentsagaan soum, which has a ranger employed by the Protected Areas Administration based in Choilbalsan. The Tumen River regional development is an international project¹⁸ funded by UNDP, which is about to implement 5 small-scale projects in Sukhbaatar aimag. Those include a project involving Mongolian gazelle, river protection, tourism, migratory birds and solid waste in Baruun-Urt.

¹⁸ The “Tumen River” regional development project includes China, Japan, North Korea, Mongolia, Russia, and South Korea.

CHAPTER VI

IDENTIFIED CAUSES OF OVERGRAZING

Not much is known yet about the present conditions of pastureland in the eastern steppe of Mongolia. However, there is some evidence that the changes in traditional livestock herding practices in the Eastern Steppe that resulted from the transition to a free market economy, are adversely affecting the health of the pasturelands. It is very important to assess the effects of these changes in livestock grazing practices on the health of the Eastern Steppe. This field research is intend to identify the major causes of pasture land degradation and soil erosion in the Eastern Steppe that have resulted from the recent social and economic changes in traditional nomadic herdsman livelihoods.

The typical *Stipa*- grassland ecosystem of eastern Mongolia is still one of the most important grazing resources in the country, with its vast size and well-preserved ecological conditions. According to Sheehy (1995), ecologically degraded grazing land in Mongolia, has been damaged as a result of livestock concentration and other causes associated with human activities and livestock production systems. However, the majority of grazing land area remains in good to excellent ecological condition. Even the areas that are most degraded appear to respond positively to reduced grazing pressure.

In the meantime, Moore (2000) stated that, according to Mongolian scientists, there is growing evidence of a fundamental change in the Eastern Steppe ecosystem. Some scientists now even go far as to call it a growing ecological imbalance. When

rangeland is used intensively, “useful” biomass is reduced 1.4-1.7 times, and biomass of unpalatable species increased by 50-70 percent. Sedge grass, sagebrush and woody species are left in the following communities: forb-sagebrush, forb-sedge grass, sedge grass silver weed (*Potentilla acaulis*) forb-wormwood, silver weed-wild thyme, white sedge grass, forb-couch grass and broom grass (Chognii O. 1982).

Generally, estimates of the amount of land degradation in the country vary widely and are unreliable. The National Plan of Action to Combat Desertification estimates that 7 (seven) percent of the land in the country is degraded, while the National Environmental Action Plan estimates that 24 percent of the rangelands or 19 percent of the country is subject to moderate to severe desertification (Project Document 1997). Very recent data produced by the Hentii aimag Environmental Protection Agency shows that an average 35 percent of the pasture land in that aimag suffers from overgrazing and from moderate to severe degradation.

Steppe fire and rodent encroachment have played a significant contribution to pasture land degradation and soil erosion. For instance, steppe fires burn almost all vegetation cover, and during the time the vegetation takes to recover subsequent water and wind erosion damages the grasslands. In addition, some recent studies suggest that the concentration of animals in localized areas and the associated degradation of vegetation may also be the factor favoring increases in rodents such as Brandts' vole (*Microtus brandii*).

Based on data and information obtained through this field research project in the Eastern Steppe, the following major causes of overgrazing have been identified. These

causes have also been observed and supported by various other studies conducted recently in the same region.

Livestock Concentration

As was mentioned in earlier chapters, since 1990 there has been an urban to rural migration trend as people have once again taken up extensive livestock production as a means of survival, due to economic privatization and large scale lay-offs in state farms and collectives. Since 1994 there has been a concurrent trend of people moving from more remote rural areas to pasturelands located near urban centers, because state services and support facilities, especially markets, water sources, schools and clinics, have broken down in remote rural areas. The people moving close to the soum and aimag centers with all their livestock, in order to take advantage of proximate to markets and services, create extra pressure on pasture land. This is now causing noticeable pasture land degradation and desertification as a result of overgrazing around the urban centers. Based on field research results the major factor causing higher livestock concentrations are identified as follows:

Limited Markets Opportunities

One of the primary material advantages for traditional nomadic herdsmen, that resulted from the transition to a free market economy, was the privatization and transfer of livestock ownership back to the nomadic families that originally were collectivized in the late 1950's. For about 30 years, traditional livestock herding nomadic families were employed by the state collectives and owned a limited number of private livestock

animals. They were paid a salary by the collectives and social and medical services were provided by the collectives as well. Their salary was generally enough to support a family's basic needs. In addition, nomads consumed the products from their own privately owned livestock, for their household use. Even they were paid a relatively small salary, the socialist fixed pricing system allowed nomads to survive adequately on that small amount of earnings.

There was no problem in finding the markets to sell wool, skin and other products from their private livestock animals. The state collectives were able to buy their products. However, the situation has changed greatly since the early 1990's, due to the transition to a free market economy. One of the basic messages of the free market system was that each family of traditional nomads now must take care of marketing its own livestock and animal products, in order to survive. But the new free market system has not yet established a way to market products in remote rural areas. Instead, soum and aimag centers have become the major market centers in each region, for selling and trading livestock products. An estimated 55 percent of traditional livestock herders who were interviewed in this research said they think that a lack of market opportunity in rural areas forces them to move close to soum and aimag centers. This is an adequate number to consider that lack of market opportunity in the rural remote areas is one of the main factors of livestock concentration around soum and aimag centers.

Choibalsan, the center of Dornod aimag, is overgrazed for an estimated radius of 20 kilometers around it (Ariungerel D. 1999). The number of livestock animals in Choibalsan increased drastically in last 6-7 years. Choibalsan was a major industrial center in eastern Mongolia up to 1992, supporting numerous factories engaged in

activities such as carpet making, meat processing and flour production. Due to financial hardship and administrative and managerial restructuring, most of these economic entities went out of business and stopped operating. This led to a large lay off their employees, who desperately needed to find a way to support their families. According to the discussions with nomadic family members, no jobs were created by the local and national government to replace those jobs lost in the lay offs. The people who were left jobless generally decided to raise livestock animals. But they still lived in the aimag center or moved only to the edge of town. This was a main reason of the livestock increase and concentration around Choibalsan.

Another study area is Sergelen soum, which is located about 65 kilometers north of Choibalsan. At the end of the year 2000, the soum counted 101,600 head of livestock, which is the second largest livestock population for a single soum after Choibalsan (formally Herlen soum). In Mongolia, each aimag center is also the soum center for its administrative and territorial unit. In our meeting, the soum vice governor reported that in the last 4-5 years, livestock numbers have increased by 3,000 to 5,000. Today about 12 thousand animals are present in the vicinity of the soum center. According to the soum vice governor, today most herdsmen prefer to stay close to the soum center. In earlier days, nomads used to move around as far as 60-70 kilometers from the soum center in search of better pastures.

However, not all soum centers in eastern Mongolia have attracted people and livestock, and so many are still ecologically healthy. A rough estimate is that only one third of the 17 soum centers in Dornod Aimag are ecologically threatened (Project Document 1998).

The study carried out by the Eastern Steppe Biodiversity Project in Sergelen soum suggests that there is a concentration of about 9000 livestock animals within 5 kilometers of the soum center, with noticeable overgrazing up to 20 kilometers from the center. It is also reported that large livestock (cows and horses) prefer the tall grasses (*Stipa spp.* and *Leymus chimensus*) which are found on the more remote pastures, while the small livestock prefer shorter grasses closer to the better-used pastures, where they also gain more protection from wolf predation.

For the case of Sergelen soum and Erdenetsagaan soum, and a few other areas, access to open water sources were a great factor for the livestock concentration. The causes created by a lack of water resources will be addressed in the next section of this chapter.

Access to Limited Water Sources

Generally, eastern Mongolia has very limited drinkable open water resources both for humans and livestock. Although there are many lakes in the area, the majority of them contain high salinity. In addition, a trend of decreasing annual precipitation has caused drought and increased pressure on limited available water sources in the Eastern Steppe.

According to the interviews and meetings with nomadic herdsmen and their family members, the limited access to drinkable water sources has caused livestock concentration in areas where drinkable open water is available. Specifically, this situation was observed in Galiin Gol river in Sergelen soum, Buir Lake area in Khlakh gol soum in Dornod Aimag, Chono Hariah river in Erdenetsagaan soum and Ganga Lake

in Dariganga soum in Sukhbaatar Aimag. Thirty percent of the nomads interviewed answered that a lack of water was a problem that caused them to bring their livestock to areas with open water sources, in spite of the problems of livestock concentration. I personally had expected a higher percentage of the nomads to identify the scarcity of drinkable water as the cause for livestock concentration. However, frequently the presence of good drinkable water sources and the location of the soum centers overlap in the Eastern Steppe, thus the nomads' answers may be split between access to market opportunity and access to water supplies. For example, Sergelen, Erdenetsagaan and Dariganga soums are located at rivers and the pasture around them have been heavily used for grazing. The pasture lands around soum and aimag centers that are located near open water sources therefore get extra pressure as nomadic herders seek locations near both urban centers with market opportunities, and near drinkable water sources. Based on the answers from the interviews with nomads, and concerns raised during the discussions with nomads' families, it seems clear that the scarcity of drinking water is a cause of livestock concentration which will likely result in pasture land degradation if is not seriously addressed in the near future.

In our discussion with the vice governor of Sergelen soum, he pointed out that overgrazing appears most noticeably within about 5 kilometers radius around the soum center. A quick survey confirmed that within 5 kilometers to the south of that soum center, along the Galiin Gol river, one can find the most serious land degradation with the greatest soil erosion (Appendix G. Photos 3 and 4).¹⁹ It was also demonstrated in the

¹⁹ The photos are taken in August 2001. August is most favorable season for livestock in the Eastern Steppe.

survey done by the Eastern Steppe Biodiversity Project that in that area there is an average of 1.25 hectare grazing area per sheep per year, but in general the optimum would be 9 (nine) hectare grazing area per sheep per year. This study showed that the area is carrying a high density of livestock due to only available open water. The area around Galiin Gol river was heavily grazed all year around for last 10 years because of its close location to the soum center and because it is the only available open water source in the area. A local government official said that there is a good grazing area approximately 45-55 kilometers away, but not many people move their livestock there. The reasons for this vary from family to family.

One of the most valuable findings in this field research involved learning about the willingness of some nomads, particularly wealthy ones, to move to remote pasture areas, if the water supply issue was solved. The study suggested that wealthier livestock herders have less difficulty in transporting their herds and homes than others. This pattern was observed in the Galiin Gol area of Sergelen soum, which was the most heavily grazed area due to access of open water resources. The Eastern Steppe Biodiversity Project initiated some pilot projects with possible funds for maintaining water wells in remote pastures. I learned that some of the project proposals under consideration and may be started as early as 2002. The soum government has expressed its interest in better pasture management practices and wants to be actively involved in these projects.

The area around Buir Lake in Sumber soum does not have pasture lands available with water sources, away from the lake area. In addition, according to the nomads who were interviewed, the majority of families around the Buir Lake lack adequate

transportation to move further from the lake with their livestock. In addition many of these livestock herding families were recent nomads with less concern about mobility and inadequate knowledge of the benefits of traditional livestock herding practices.

In Erdenetsagaan and Dariganga soums of Sukhbaatar Aimag, open water resources are only used for 2 seasons (Spring and Summer), unlike Buir Lake or Galiin gol in Dornod Aimag, which are grazed by livestock up to 4 seasons. However, according to nomadic herders, the livestock population is still far higher than it is supposed to be even in the areas where livestock graze only for 2 seasons.

Another concern raised by local government officials was that the water level has decreased in the rivers and lakes. According to the Bag governor in Sumber soum, the Khalkh Gol river and Buir Lake water levels have decreased during the last 10 –15 years. One reason he identified, based on his long-term observation, was a trend of decreasing precipitation in the areas. The climate change pattern and its consequences will be discussed in the later section of this chapter.

Limited Availability of Basic Social Services

Not surprisingly, many traditional nomadic herdsman and their family members in eastern Mongolia recalled past social services run by the state collectives in remote areas and in soum centers. One of the important services highlighted by many herders in discussions was that school dormitories were available for livestock herder's children in the soum centers during the socialist era. Over 10 percent of the herdsman who interviewed said that in order to support their children's school education, nomads now have to move close to soum and aimag centers and graze their livestock around it.

During the collective era, the cost of the dormitories for the nomads' children and also all the associated expenses were paid by the state collectives. Even during school breaks the collective trucks would take the children to their homes in the countryside and when it was time to return to the schools the collective's trucks would go and bring them back to school.

Another service the nomads recalled and said was important was the medical services that used to be provided at bag centers. Each bag had a medical practitioner who was able to give immediate medical assistance needed at nomadic families camps. Because the budgets for local soum hospitals have been cut, these rural medical services were not available in many bag territories for several years. However, in recent years some medical practitioners at the bag level have become available again. In order to call for immediate medical help from the sum doctor and for other communication purposes, each bag then was connected to its soum center with a wire-telegraph communication. In many bags this communication system is no longer available.

In addition, according to the information obtained from livestock herders and their family members, there used to be small shop in each bag center so nomads could buy most of the commodities they needed. Today they generally have to travel all way to the soum center or aimag center unless they expect traders to come trade some goods for their livestock products such as wool and skin. But the traveling traders are not regular, so nomads can not really wait until some one shows up to buy and sell. Livestock has always been sold alive due to difficulties in efficiently freezing meat products in rural areas. Livestock herders can not sell fresh meat by waiting for some traders to come and

buy it. It is extremely difficult for nomads to sell their meat and animal products in market with such poor infrastructure.

Based on interviews and discussions with nomadic herdsman and their family members, the availability of social services that can support nomads in remote areas, engaged in the practice of traditional livestock herding methods, are extremely important. Although this element does not appear prominently in the interviews, it commonly pointed out by many members of the nomadic families in the discussions with them following the interviews. Therefore it needs to be considered as a part of sustainable grassland management measures in the Eastern Steppe.

Rodent Encroachment

During this field research, nomadic livestock herdsman, nomadic family members and the government officials expressed their concern over rodent encroachments that affect on grasslands health conditions in the Eastern Steppe. By saying rodent encroachment they refer to only a particular species, which is Brandt's vole. It is very common species in eastern Mongolia and throughout the steppe grasslands of the country. Some of the herders interviewed recalled the past local and national government measures intended to minimize the distribution and spread of these rodents. According to them, one successful program was application of a chemical pesticide used in grasslands to prevent further enlargement in occupied areas.

Several soum governors, particularly in Sergelen, Dariganga have expressed strong concerns about the recently increasing encroachment of Brandt's vole in their soums and its potential for causing extensive damage to their grasslands. According to

them, the Brandt's vole population increased dramatically in the last 5 - 6 years, as judged by the growing areas where the rodents have become entrenched (interviews with soum governors, August, 2001). However, grassland ecology and vole population dynamics have not been studied adequately yet. According to the local governments and to livestock herders, the presence of Brandt's vole is a factor in pasture land degradation and causes overgrazing in the Eastern steppe.

In 1958, the government started a campaign of aerial chemical pesticide application to reduce the population of Brandt's vole. However, the ecological and reproductive dynamics of the vole have not been adequately studied and no environmental and biological impact assessments of aerial pesticide application have been carried out. It has been observed there have been periodic (every decade or so) population booms of Brandt's vole. Sometimes the population explosions are so severe that they force herders and gazelles out of the region in search of fodder.

Recently some scholars suggest a different view on Brandt's vole than is customarily thought in Mongolia over last 4-5 decades. Komonen (2000) concluded that Brandt's vole population explosions follow overgrazing, and they do not destroy the healthy rangelands. But current field studies and scientific evidences are not enough to confirm these observations, according to the scientists and the project rangeland specialist in Choibalsan. There is a great need for more detailed study of Brandt's vole encroachment and its habitat, population ecology and effects on grassland ecosystems in eastern Mongolia.

Climate Change

It is now generally recognized that climate change is a globally identified problem caused by green house gas emissions and other factors. As part of the global community, Mongolia has observed climate change as well. Mongolia has recorded an increase of the average temperature by 0.7°C during the last 50 years. According to predictions, summer temperatures are expected to decrease, in contrast to the global and regional averages. The steppe and forest-steppe zones will likely expand to the high mountainous and taiga zone.²⁰

There has been clear evidence of growing aridity in the Eastern Steppe during the last 70 years. According to the Hydrometeorology and Environmental Monitoring Agency in Choibalsan, the amount of precipitation has also decreased in the last several years. The decreasing rainfall pattern results in an increasing dominance of Manchurian-type flora, and in particular of *Stipa* spp. which are taking over and dominating the more palatable and nutritious short grasses.

During this research several people who were involved in discussions expressed their concern about climate change. Particularly, the bag governor of Khalkh gol was very concerned about the reduced precipitation in the last 4-5 years and the concurrent decrease in water level both in Buir Lake and Khalkh gol river in Sumber soum. Also, some nomadic herders in Sergelen soum who were interviewed said that summers are getting drier and hotter, and that winters are getting more severe. In recent years, very hot summer temperatures were recorded with peaks to 40°C in the Eastern Steppe. In the

²⁰ National Environmental Action Plan. Main Document. Final Draft June 2000.

meantime, severe winters have occurred repeatedly. For instance, last year's winter storms and blizzards were some of the worst in recent decades in terms of livestock loss in Sergelen and other nearby soums. Decreased livestock survival in recent severe winters was also associated with a decrease in hay making since the closure of state collectives and farms. Livestock now must rely entirely on grazing regardless of weather conditions during the winter. This is one of the recent challenges in traditional livestock herding practices.

The Eastern Steppe is considered to be an arid grassland ecosystem. Precipitation is an extremely important factor to maintain grassland health and to sustain valuable grazing land area in long run for livestock production in eastern Mongolia. A significant portion of the precipitation returns to the atmosphere through evaporation; about four percent infiltrates to the aquifer, and six percent contributes to surface flow (Suttie J. 1996).

If climate changes bring less precipitation, which results in drier summers, and bring more severe winters, this may significantly affect traditional livestock herding practices. In turn, grassland ecosystems may be damaged by the pressure of extensive utilization for livestock grazing. Many may say that climate change is a natural occurrence; however its effect can be reduced if timely and proper management are applied. For instance, grazing land use zoning and seasonal planning may help to lessen livestock loss from the severe climate in the region.

Based on the findings recorded through this field research, recent climate changes observed in Mongolia are one of the factors that may adversely affect grassland health and livestock herding livelihoods. The lack of precipitation resulted in limited grass

fodder growth for livestock animals. This will likely create overgrazing problem due to livestock concentration and over stocking. Throughout this study, a considerably amount of information and concerns were recorded suggesting that climate change is one of the factors in overgrazing in the Eastern Steppe.

Steppe Fire

Steppe fire was one of the primary topics raised during the discussions with local and national government officials and nomadic livestock herders in the Eastern Steppe. Every year wildfires, caused by human careless activity, devastate major parts of the Eastern Steppe, often forcing the government to declare the affected regions to be natural disaster areas. The damaging effects of fire include the health hazards caused by inhaling smoke; the illnesses caused to livestock by grazing on burnt and blackened land; and the spread of weedy types of plants following the passage of a fire, some of which are poisonous to livestock. More seriously, fire is also directly dangerous to human life, livestock, gers (nomadic traditional dwellings also known as “yurts”), and other property may also be destroyed. The Sergelen soum vice governor reported that the direct damage and losses caused by steppe fires in 1986 and 1997 was very high. These fires killed humans and many livestock, and destroyed many herders’ camps. As result of the 1986 steppe fires, almost all livestock shelters and camps were destroyed in traditional spring and winters camps. At that time, the state collectives decided to build many new springtime and winter shelters and camps along the Galiin Gol river, which today has become seriously overgrazed.

Interestingly, some herdsmen in Khalkh Gol river suggest that livestock fatten better on summer pastures where there has been a fire. It was also admitted by some herdsmen that gazelles and other wildlife might come back into area that has been burned, presumably because of the quality of green growth. But others comment that sheep and goat prefer not to graze in burned areas during the growing season, and instead those areas may be grazed in the winter season. Some herders even said that it is not possible to graze livestock within three years after a fire occurred. Views on livestock herding on pasture areas where fire has occurred were various.

Some nomadic herdsmen in eastern Mongolia plow the land around their ger and livestock shelters during the spring as part of prevention from steppe fire damages. This program was encouraged during the collective era. Strong winds are common in spring and early summer, which increase the danger of steppe fire to humans and properties. The most dangerous times of the year for steppe fires in the Eastern Steppe are from April until late May, and from September through October.

If steppe fires are very hot and frequent, they can destroy vegetation and increase soil erosion. According to the survey conducted by Ariungerel (1999), after a fire perennial plants and plants that are desirable for livestock do not grow well, and instead annual plants and weeds become more abundant. For example, *Leymus chinensis* and some *Artemisia* species are dominant after the fires. In addition, vegetation cover becomes sparse. It is very common to have *Leymus chinensis* in burned areas.

However, fire ecology has not been studied adequately yet in the Eastern Steppe. Some research study has been initiated by the Eastern Steppe Project with collaboration of scientist from the Academy of Sciences. The results are expected to be reported in the

near future. Most of the fires, up to 95 percent, are recorded as caused by human activities. They are often caused by careless use of fire and hot ashes from households, and from automobiles, especially tractors that have not have a safe exhaust pipe.

Based on the information gathered and the statements in interviews about the growing concerns over steppe fires in the Eastern Steppe, there is a need for further study of steppe fires and their direct and indirect effects, including fire-caused damage to nomadic livestock herders and the grassland ecosystems upon which they depend.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

Mongolia enters the 21st century as a dramatically changed country as result of its recent transition to democracy and a free market economy. This transition, which started in 1990, has already given the Mongolian people greater freedom and opened up better economic opportunities for many of them. Nevertheless, the country's economic transition has been accompanied by an economic collapse that has had a devastating effect on the lives of many Mongolians. Many families have suffered from the mass job losses caused by the closing of state collectives and state enterprises, and they have had to cope with a dramatic loss of income. Many of these families, especially those who lost their jobs in state collectives, were forced to turn to the land for their family's livelihood, through raising livestock as a means for their survival. As a result, the number of livestock herdsman in the country grew nearly 300 percent, from 147,508 in 1990 to 417,743 in 1999. In addition, according to the Mongolian Statistical Yearbook for 1999, the number of families who are not herdsman but are nonetheless partially dependent on livestock production, particularly in soum and aimag centers, has increased dramatically due to the mass job lay offs.

The Mongolian traditional livestock herding lifestyle was one of the two main economic stabilizers during the transition to a free market economy, due to its flexibility, resilience and resistance to the transition's economic changes. In general, the shrinkage

of the formal state economic sector was not matched by equally rapid growth in the private economic sector. The only private economic activity that showed any real growth in the early years of the transition was livestock production, where privatization had encouraged a rapid expansion of herds. For example, the livestock population increased by nearly a half million head during the last 10 years in eastern Mongolia alone. In the meantime, available grazing pasture areas have become limited as a result of several factors created by the recent changes.

The socialist era had many greatest successes, especially in the social sector, such as high standards and achievements in health, education, literacy and the social security system. In every country, it is the state's responsibility to assure universal access to good quality health care, basic education, and social protection, regardless of its social and economic situation. However, recent social and economic changes have resulted in a tremendous loss of the previous social system and its operating network of schools, hospitals and other facilities, as a result of the sudden financial shock and poorly managed rapid privatization process.

The nomadic livestock herdsmen in the Eastern Steppe have experienced both positive and negative effects from the transition to democracy and a free market economy. The positive effects include the private ownership of livestock, new market opportunities and the greater freedom of expressions and movement. Previously, it was a difficult and arduous task for a person to get the required governmental permission to move his residency to another area. Today, many traditional livestock herdsmen families also enjoy better livelihoods due to their increasing number of private livestock as a result of the privatization of state collectives, in spite of the economic and social hardships they

have experienced. The negative effects of the transition include the problems caused by the lack of social services in remote areas, the reduction in basic educational opportunities, and the increase in the number of people living in poverty.

The vast grasslands of the Eastern Steppe have also suffered from the transition to a free market economy in variety of ways. One of the negative impacts on the grazing lands has been caused by the discontinuance of the traditional seasonal grazing schedules that Mongolian nomads have been following for thousands of years. Traditional livestock grazing practices used to result in more even use of the entire pasture land area of the country, with more frequent movement of the livestock, based on considerations of pasture conditions, herd size and composition, weather conditions and the preferred geographic locations of camping sites. As result of the abandonment of traditional livestock herding practices, in connection with the limited market opportunities, social services and access to water sources in remote grazing areas, the number of livestock animals that are grazed in the limited pasture areas around soum and aimag centers and near open water sources has increased tremendously in the last ten years. This has caused serious overgrazing in some of these areas of the Eastern Steppe.

This Master's thesis concludes that Mongolia's recent economic and social changes have created a favorable opportunity for traditional nomadic livestock herdsman families to own their livestock animals and compete on a free market. Today nomadic livestock herdsman families can own an unlimited number of livestock, and the resulting increased livestock production has provided a better life for their families. However, some of the results of the recent transition to a free market economy have been very damaging to some areas of the grasslands in the Eastern Steppe, especially areas around

urban centers and open water sources. In addition, some natural factors such as reduced precipitation, frequent steppe fires and the encroachment of rodents have all caused problems that directly contribute to the trend of increasing degradation and soil erosion in the grasslands of the Eastern Steppe.

Based on the current conditions and health of the grassland, that is partially the result of the new economic and political system, there is an urgent need for better pasture land use management in order to assure the sustainable use of the vast grazing lands in the Eastern Steppe of Mongolia.

The author of this thesis makes the following recommendations for restoring and protecting the ecological health of damaged areas of the Eastern Steppe, and for assuring the sustainable use of the Eastern Steppe for livestock grazing.

1. It is recommended that institutionalized arrangements be provided for traditional livestock herders to market their livestock products from remote pasture areas. One way to achieve these institutionalized arrangements could be the re-establishment of traditional informal pastoral cooperation at "khot ail" level (two or more nomadic livestock herdsman families that camp together) to pool their resources and manage the areas they graze under joint leadership. This informal arrangement can help because it allows the families in that group to share their transportation and labor, whereas an individual family may often lack these resources. This kind of cooperation may be important to many nomadic families, especially the creation of joint funds to buy necessary equipment and vehicles to transport their livestock products to markets at soum and aimag centers. Improving access to transportation could be one of the most important elements in helping nomads in remote areas successfully market their products.

It would be a great benefit to nomad families to help them gain enough financial resources to cover the necessary costs for transportation, and hired labor when necessary.

Another way to achieve a better marketing could be the local government's direct assistance in providing market information for nomads. The local government probably has the opportunity to acquire more information about potential buyers of certain type of livestock products than the livestock herdsman in remote areas. The bag governors could add this to their responsibilities. Soum and aimag governments could possibly assist with some additional training for the bag leaders to help them to perform this additional function.

2. It is recommended that a program be established to repair and maintain the network of water wells in remote areas, to assure that nomads will have access to water so that they can utilize remote traditional grazing areas. This project could be achieved through a close collaboration of local governments, the national governments and nomadic livestock herdsman. The local governments could receive funds and resources for well maintenances and repairs from the central government. Other possible sources of funds and resources for this program could include livestock grazing permit fees or taxes, and also support from donor agencies. Once the funds are available, there are private companies at the aimag level with adequately skilled personnel and the necessary equipment to maintain and repair the wells. After the water wells are repaired and being properly maintained, the local government could work with "khot ail" groups of nomads, or with individual nomadic herdsman families, to assure that the wells are cared for and used properly. The ownership of these wells should stay with the local government, because the land and water resources are owned by the state. The local governments

therefore should have the responsibility for maintenance and repair of the wells. The necessary funds could be acquired from the collection of livestock taxes, which area already required. In addition, pastureland use fees could also provide a main source of funds for this purpose, if such fees are officially approved by the Parliament in the future.

3. It is recommended that actions be taken to restore social services in remote rural areas. This could be accomplished through a cooperative program undertaken by both the national and local governments. Two main approaches might be very important for this program. First, central government funding should be provided to cover the costs of restoring social services at least in the beginning. These social services might include providing a medical practitioner for each bag, and re-opening communication services between the bag and the soum centers. This should include the resumption of regular mail delivery services once or twice a week to bag centers, so that nomads can have access to latest newspapers and correspondence in rural remote areas. Second, there is a need for training and education for the personnel to provide these social services at the bag level. One way to achieve this might be local government scholarship programs to help local high school graduates to go college in return for their commitment to later return to their community to help provide these social services. Doctors and teachers are especially needed for the bag and soum centers to provide these social services.

4. It is recommended that a system of market incentives be implemented to encourage better management of livestock herd size, and to encourage livestock herders to raise the more productive types of livestock animals. This could be accomplished through market incentives such as progressive livestock taxes or grazing permits, with the tax per animal based on the number of livestock. There could also be different taxation

levels based on the different locations of pasture areas and on the different types of livestock animals. The funds generated by these livestock taxes or grazing permits could be used to help fund the three preceding recommendations.

5. It is recommended that a system be developed that can assure fair access to grazing lands and water sources, and that can equitably resolve conflicts between nomadic herdsman over pastureland use. This could be accomplished through a system of grazing permits that provide for the exclusive use of certain areas by certain herdsman, and that can be adjusted as needed to account for changes in pasture health and weather conditions. The bag governors could be liaisons between the local government and traditional livestock herdsman to oversee the implementation of grazing permits to avoid further conflicts over pasture land use. Grazing permits could be issued to herdsman families to assure their continued right to use those areas that particular family has used for generations. Grazing permits could be issued for a longer term, such as 10 years, to avoid the need for frequent renewals of these permits.

6. It is recommended that further scientific studies be performed on the effects of long-term climate changes, rodent encroachments and steppe fires in the Eastern Steppe. An educational program is needed to inform and educate the traditional livestock herding nomads about the results of this research, and its implications for their future herding practices. The Eastern Steppe Biodiversity Project is the most likely agency to carry out these kinds of scientific studies, in collaboration with the Mongolian Academy of Sciences. At the same time, local governments could request funding from the central government or national agencies for pastureland ecological health studies within their jurisdictions. The Academy of Sciences then could include funding for such research

studies in their budget for central government approval. The Eastern Steppe Biodiversity Project is probably the best resource for organizing ecological trainings and workshops for nomads to better understand climate change, steppe fire ecology and rodent ecology, and learn how to apply that information to their grazing practices. Training could be more effective if it is well organized at the bag level in close collaboration with soum government.

7. It is recommended that the national and local governments seek to reduce the number of livestock herdsman through skill training and job creation programs. These programs could help livestock herders find employment in other jobs. First, the local governments could offer job skill training programs at the soum level for interested herdsman. The range of job training topics should be wide as possible such as vegetable growing, sewing, shoe making and carpentry, depending on each soum's available resources and raw materials. Second, this program should include a program for small, affordable, low interest bank loans to help trained individuals start their own businesses. In addition to providing this kind of training, local governments could also look for ways to create more jobs. This plan for job training and the creation of jobs could eventually become an important part of the poverty alleviation programs at the soum and aimag levels.

In conclusion, the author hopes that the observations and recommendations made in this thesis may contribute to the development and adoption of better grazing practices and improved land use management systems that will assure the sustainable use of the vast grasslands in the Eastern Steppe of Mongolia. It is essential that these reforms protect both the health of grasslands, and the cultural integrity of the traditional nomads

of Mongolia. The nomadic livestock herdsman have the knowledge and motivation to help develop solutions that are realistic and can work in the complex situations that cause overgrazing pressures. Solutions that do not have the support of the nomads are not likely to be effective. The national and local governments and scientific institutions that are working to protect the Eastern Steppe rangelands can maximize the success of proposed reforms by involving the nomadic herdsman families themselves in the process of protecting the grasslands. In part, this requires educating them to help them better understand the problems and the proposed solutions. Ultimately, the only realistic and effective solutions are those that put equal emphasis on protecting the grasslands and maintaining sustainable livelihoods for Mongolia's nomads.

APPENDIX A

INTERVIEW QUESTIONS

1. How many kilometers is it from the place you are currently staying to the closest urban settlements?
2. What is your family size? What is your family income per month? What are the major income sources?
3. How many people in your family are currently employed at a job outside of the family's livestock herding?
4. How many head of livestock do you have?
5. Has the number of your livestock animals increased or decreased since 1990, and if so then by how much?
6. If you have moved closer to any urban settlements since 1990, what are the major factors that caused you to do so?
7. Are there any differences in your livestock herding practices that have taken place since 1990, compared to the time before that?
8. Approximately how many animals are currently being herding in the area where you graze your animals?
9. Do you think that overgrazing in your area is occurring?
10. Do you think that current grazing practices will create overgrazing problems in your pasture area, in the future?

APPENDIX B

CONSENT FORM

You are invited to participate in a research study conducted by Mr. Enkhbat Altangerel, from the University of Oregon, the Environmental Studies Program. I hope to learn current status of pasture land use in the Eastern Steppes of Mongolia. Further this research will serve as part of his Master's Thesis at the University of Oregon to be completed in March 2002. You were selected as a possible participant in this study because of your current location is in the relevant study area and because you are involved in some way with nomadic livestock herding families or practices.

If you decide to participate, you will be asked for an interview for about 30 - 60 minutes, using the accompanying list of 10 questions. I will audio tape the interview and take some notes of your answers. There are no risks, discomforts, inconveniences, or costs of participating. The results of this research may help the government of Mongolia develop better land use plans, environmental management plans and local development plans that address your needs and concerns. However, I cannot guarantee that you personally will receive any benefits from this research.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Subject identities will be kept confidential by the use of numeric codes. Audiotapes will be destroyed after the research use. Only general information not identified with any participant will be released to the government or any other person.

Your participation is voluntary. Your decision whether or not to participate will not affect your relationship with any person or institution in Mongolia. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty.

If you have any questions, please feel free to contact the project investigator Enkhbat Altangerel at his local address, the Ministry of Nature and the Environment of Mongolia in Ulaanbaatar. Local contact phone is 329619. Also you may contact the Environmental Studies program at the University of Oregon in Eugene, Oregon, United States, and the advisor for this project, Dr. John Baldwin. You may contact them at the following (541) 346-3895 or by email at jbaldwin@oregon.uoregon.edu. If you have questions regarding your rights as a research subject, contact the Office of Human Subjects Compliance, University of Oregon, Eugene, OR 97403, (541) 346-2510. You have been given a copy of this form to keep.

Your signature indicates that you have read and understand the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time and discontinue participation without penalty, that you have received a copy of this form, and that you are not waiving any legal claims, rights or remedies.

Print Name _____

Signature _____

Date _____

APPENDIX C

LETTER TO PARTICIPANTS

My name is Enkhbat Altangerel. Currently, I am a second year graduate student in the Environmental Studies Program at the University of Oregon in USA. Today I would like to introduce you about the research project I am working on in this region. This project is a main part of my Master's Degree Thesis, which I plan to complete in March 2002 at the University of Oregon.

In this project, I would like to learn about the present status of the grasslands used as pasture for livestock grazing in the Eastern Steppes of Mongolia. This project is intended to investigate the health of the grasslands in this region, particularly around urban settlements. My research project involves gathering information about the use of the grasslands by livestock herders, from interviews with the residents of these areas. In the interviews, I ask about 10 questions and record the answers that I receive. If you are interested in considering participating in an interview, I will read the questions to you in advance of the interview, so you will know what the interview will be like.

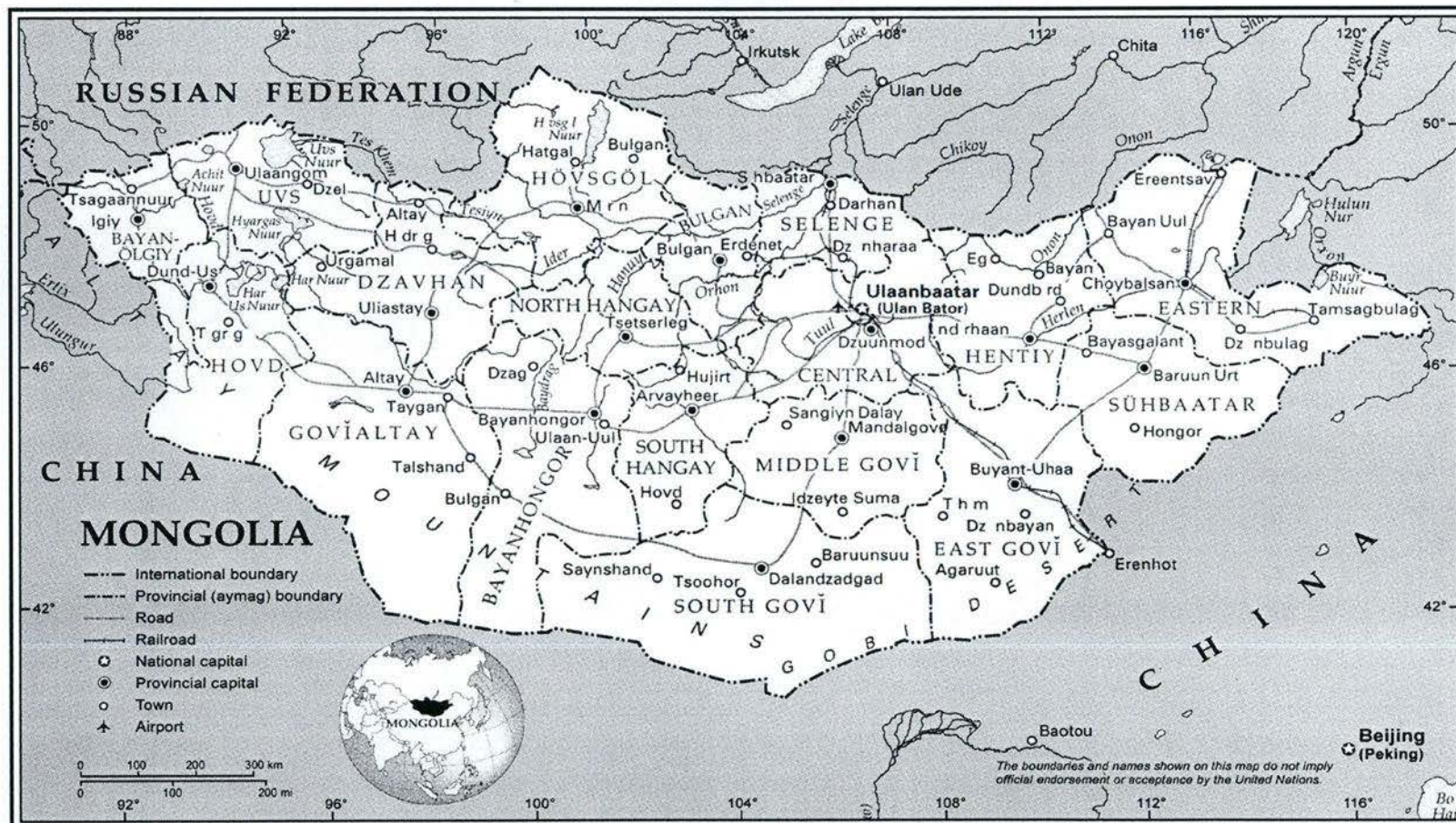
Your involvement in this project is fully voluntary. There is no pressure on you to be involved in this project. This project is a personal research project and is not sponsored by the government of Mongolia or any governmental agency. There will not be any problems created if you choose not to participate.

Your name will not be known, used or published if you do participate in an interview for this research. The names of the participants will be kept confidential, through the use of secret codes used to identify the participants.

If you decide to participate, you are free to withdraw your consent and discontinue participation without any penalty.

APPENDIX D

MAP OF MONGOLIA

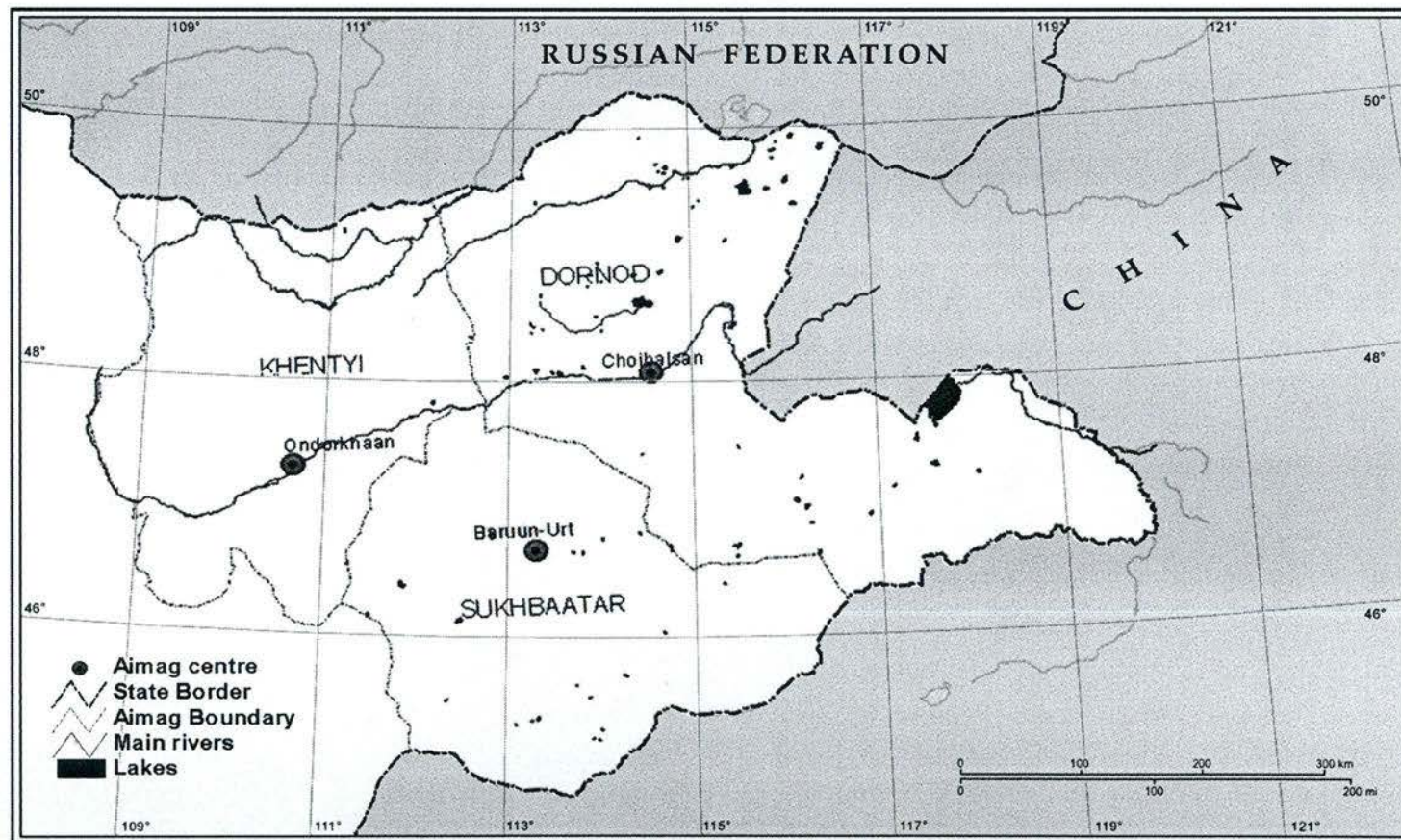


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Department of Public Information
Cartographic Section

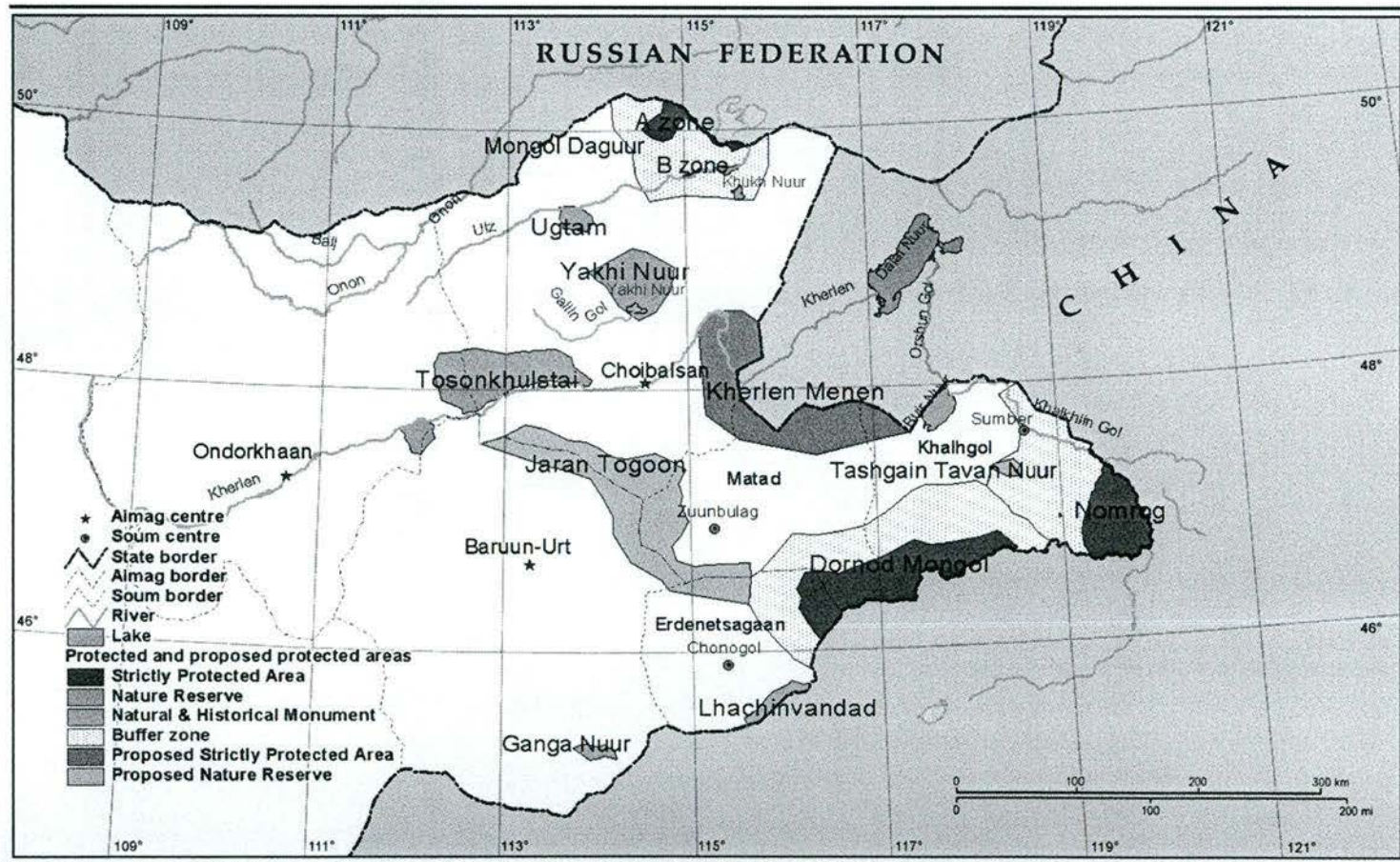
APPENDIX E

MAP OF EASTERN MONGOLIA



APPENDIX F

MAP OF EASTERN MONGOLIAN PROTECTED AREAS



APPENDIX G

PHOTOS FROM FIELD RESEARCH

PHOTO 1. Nomadic herdsmen

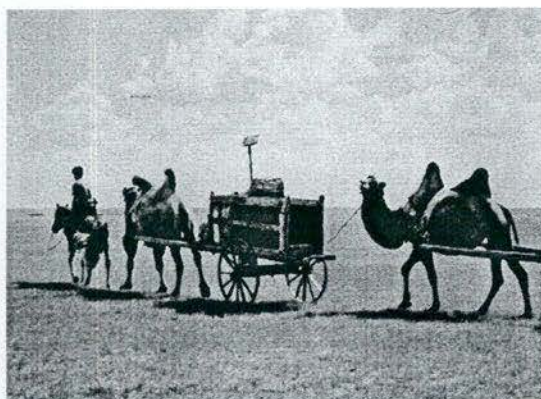


PHOTO 2. Dismantled “Negdel” structure

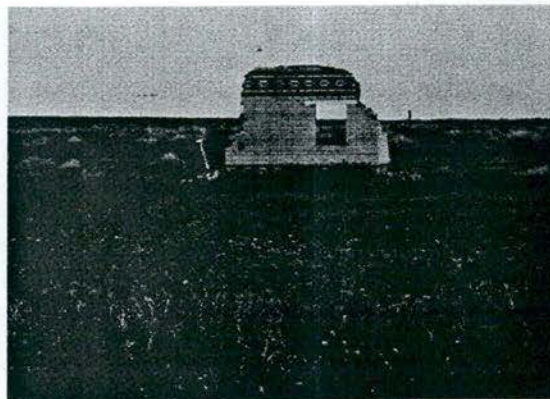


PHOTO 3. Galiin Gol area in Sergelen soum of Dornod Aimag

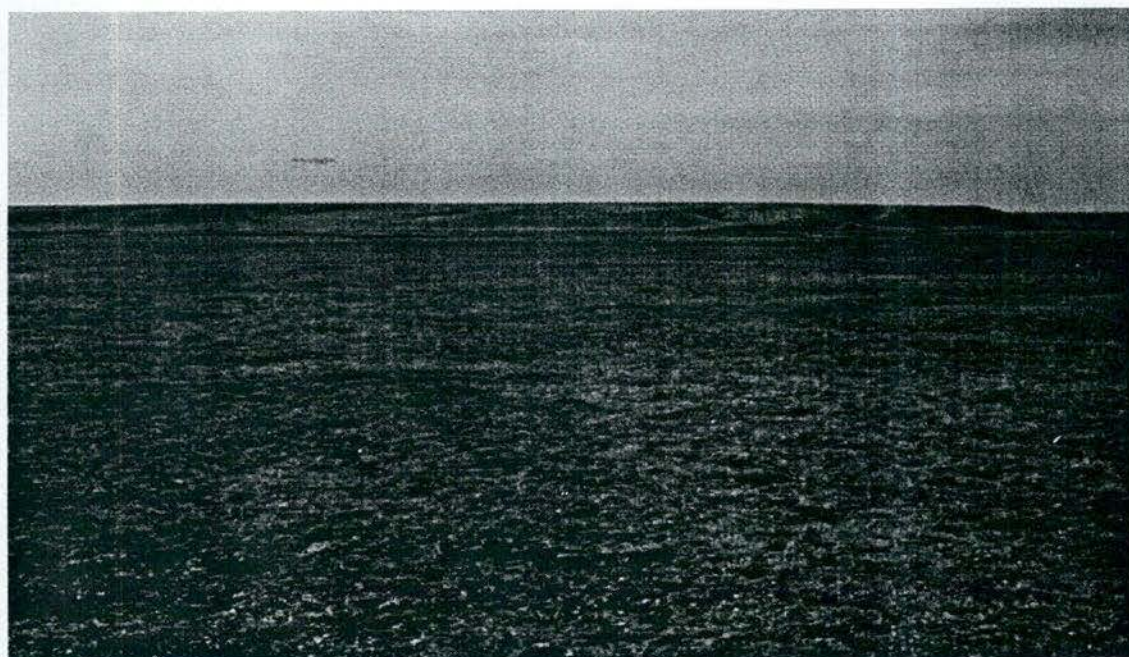


PHOTO 4. Yakhi Nuur area in Sergelen soum

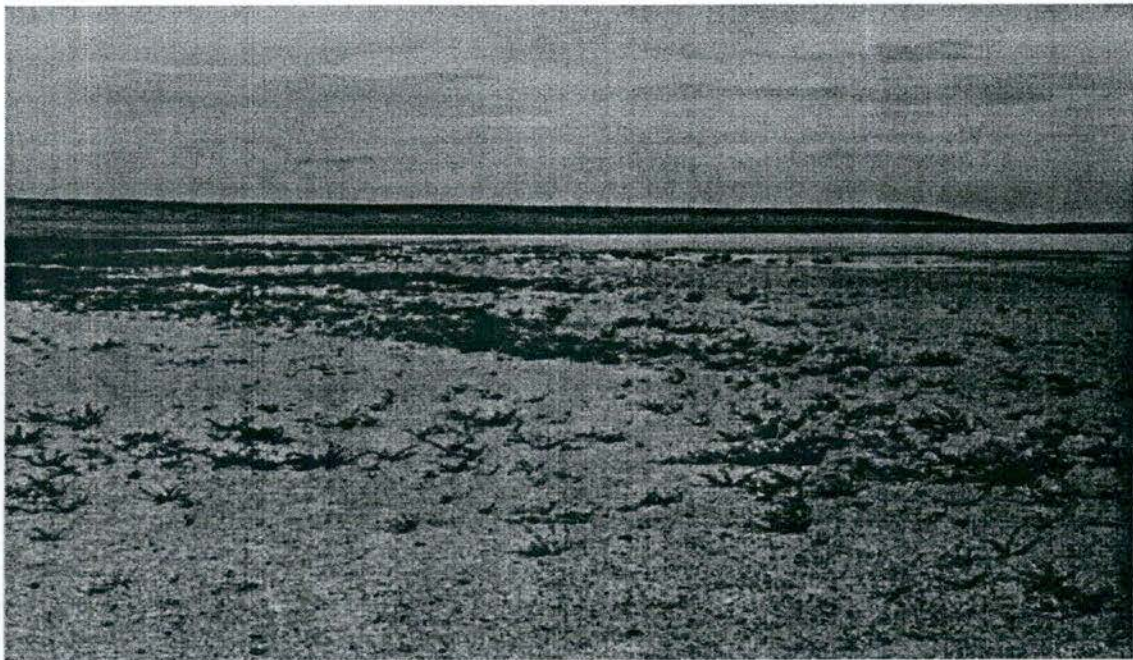


PHOTO 5. Camels in the Eastern Steppe

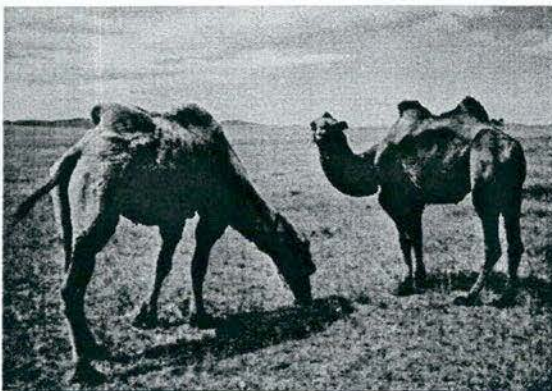
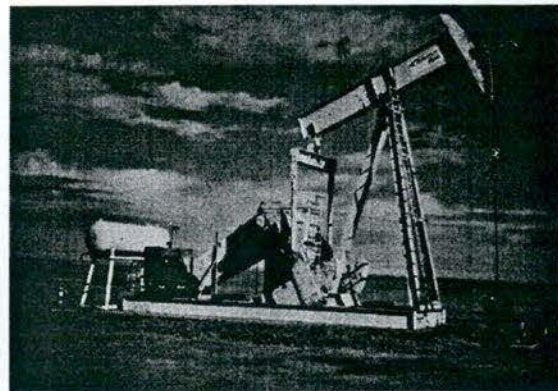


PHOTO 6. Oil exploration in the steppe



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