



# GRASSLAND ECOSYSTEMS

## SUSTAINING THE STEPPE: THE FUTURE OF MONGOLIA'S GRASSLANDS

**F**or thousands of years, most of central Asia's high steppe has been the realm of nomadic herders and their horses, camels, goats, sheep, and cattle. Today, this expanse of grasslands—the largest remaining natural grasslands in the world (WCMC 1992:287)—is divided, politically, between Russia, China, and the Republic of Mongolia. This entire region is sometimes called “Inner Asia.”

For Mongolia, with a human population of just 2.4 million in a land area the size of Western Europe, there would seem to be an abundance of pasture for its 30 million head of livestock. But natural conditions make the grasslands of Inner Asia highly vulnerable to damage from human activities and slow to recover. The growing season is just 4 months long. Annual precipitation ranges from just 100 mm in the most arid regions to 500 mm in limited northern areas, and in much of the region is less than 350 mm. The steppe is subject to intense winds, snow can cover the ground 8 months of the year, and in the dry season grass and forest fires are common. These ecological and climatic factors inhibit the growth of vegetation and increase the severity of erosion in areas with unprotected soils (Palmer 1991:55).

In an environment of extremes, herders have recognized the merits of moving their herds seasonally or more frequently. Herd mobility seems to sustain the fertility of rangelands, and thus benefits livestock health and food security. In the feudal period, herders would rotate animals over pastures where they had access to abundant seasonal grasses or shelter from harsh weather—usually pastures to which use rights were coordinated by local authorities, such as lords or monasteries and their officials. Occasionally herders would use a tech-

nique called *otor*—movement of livestock to even more distant and lesser-used pastures. *Otor* helped to intensively feed the animals and prepare them for severe, grass-scarce winter and



spring seasons and could be used to relieve pastures when a shortage of forage or degradation became evident.

Important aspects of these coordinated, large-scale, highly mobile systems endured in Mongolia even through the socialist government campaigns that organized livestock herders into collectives in the 1950s. Since 1990, however, Mongolia has reoriented its economy from central planning toward privatized land and free markets. This has brought new opportunities to some, but it has also created social and economic conditions that are undermining the long-standing mobile herding culture and perhaps threatening its continued existence. Systems of wide pastoral movement, in many cases, broke down when the collectives ended and have been replaced with lower-mobility, small-scale pastoralism. This trend may pose a significant threat to the sustainability of Mongolia's grassland ecosystems.

A similar shift from mobile herding to more sedentary livestock rearing mixed with farming systems had already occurred in the Chinese and Russian regions of Inner Asia, and the environmental effects are discouraging. Like Mongolia, these countries experimented first with organizing herders into collectives—Russia in the 1930s and China in the late 1950s. Then, decades later, they privatized livestock operations in a bid to modernize and increase production. Meat and wool production increased but with costs to the ecosystems, including pasture degradation. Estimates vary widely, but local studies in Buryatia and Chita in Russia and in Inner Mongolia in China suggest that as much as 75 percent of grasslands has suffered some degree of degradation (Humphrey and Sneath 1999:52; Gomboev 1996:21). According to Chinese government figures, just 44 percent of Inner Mongolia's grasslands are considered usable and in good condition (Neupert 1999:426).

By comparison, Mongolia's grasslands are in relatively good condition. Officials have calculated that moderate or severe degradation affects 4–20 percent of pasture lands (Government of Mongolia 1995:28).

The ecosystem problems in parts of China and Russia underscore for Mongolia the merits of preserving elements of the mobile herding practices. Incorporating mobile herding into the modern Mongolian economy may be essential to local livelihoods and national prosperity. Grasslands cover about 80 percent of Mongolia's 1.567 million km<sup>2</sup> land area and agriculture—mainly livestock herding—supplied 33 percent of Mongolia's GDP in 1998. Approximately half the national workforce works in the agricultural sector, mostly as pastoralists (herders) (National Statistical Office of Mongolia 1999:45, 54, 95; Statistical Office of Mongolia 1993:6). Mongolian exports of livestock products have collapsed since the end of the socialist trade bloc in 1989–91, but in better economic times, pastoralism supplied substantial raw materials such as wool and hides for Mongolia's export trade and fledgling industrial sector. And Mongolia's future economic growth depends at least in part on livestock production. Economic growth is a priority for Mongolia, whose per capita

GNP of US\$380 (1998) makes it one of the poorest countries in Asia (World Bank 2000:11).

At individual and local levels, the meat, milk, and transport that livestock provide are vital to the many herders and their families living in remote, inaccessible places. Price inflation and fuel and commodity shortages during the current transition to a market economy make livestock even more essential to households' food security.

## “Following the Water and Grass”

Large-scale, highly mobile herding operations have ancient roots. From the 17th until the 20th century, Mongolia was divided into administrative districts called *hoshuu* or “banners” ruled by a hereditary lord or a Buddhist monastery. The commoners were bound to particular geographic areas and required to work for local authorities. Buddhist monasteries, nobility, and the imperial administration owned millions of animals that were herded by subjects and servants who generally received a share of the animal produce in return.

The pastoral movement systems could be sophisticated. The herder groups were flexibly organized, consisting of one or more families. Herders and their families might move large groups of horses, sheep, goats, and other domesticated or semidomesticated animals to selected seasonal pastures in an annual cycle (Simukov 1936:49–55). Because different animals have different grazing habits, animals were segregated by species for efficient pasture use. Sheep, for example, crop so close that horses and cattle cannot get at what is left, forcing horses to dig up grass roots to eat. Some members of the herder group might specialize in working with a particular species. Others might cut wool, milk animals, make felt for tents, or help the group move to a new camp.

There was enormous variation in frequency and distance of moves. In better-watered northern regions, herders might move livestock twice a year. In other areas, herders might make three to four long-distance moves; in some places, more. The ancient Chinese description for these pastoral activities was “following the water and grass” (Hasbagan and Shan 1996:26).

With local lords and monasteries to coordinate general access to pastures and to support pastoral movement, herding families usually could share seasonal pastures efficiently and avoid pasture overuse. These flexible herding systems and collective-use arrangements also ensured that water sources or the best pastures were not controlled by a few herders to the detriment of the whole herding system (Mearns 1991:31).

Such herding principles and techniques have been passed down through the ages with remarkable continuity. Some pas-

*(continues on p. 216)*

## Box 3.17 Overview: Mongolia's Grasslands

Nomadic herders have grazed livestock on Mongolia's vast but fragile grasslands for thousands of years. By rotating animals over shared pastures in collaborative seasonal and species-segregated patterns, herders have anchored their country's economy without degrading its ecosystems. Recent political and economic changes, however, may be eroding these sustainable practices. Analyses of neighboring grassland regions in China and Russia warn of the degradation possible when large-scale mobile herding practices decline and small-scale static systems expand.

Ecosystem Issues	
<b>Grasslands</b> 	<p>Estimates of grassland degradation are much debated and range from 4 to 33 percent, but the clear potential for further degradation is cause for alarm. Grasslands are the basis of livestock production and approximately half of Mongolia's workforce depends on pastoralism or agriculture for their livelihoods and food security. Overgrazing, mining, vehicular traffic on the steppe, and other pressures threaten grassland biodiversity. Among the mammals at risk are Mongolia's gazelles, wild camels and horses, and the Asiatic wild ass.</p>
<b>Agriculture</b> 	<p>Much of Inner Asia is not well suited for growing crops; half of all cultivated land in Mongolia is considered degraded. Sedentary livestock will require conversion of more land to agriculture to supply food and fodder for animals and people.</p>
<b>Freshwater</b> 	<p>Mongolian herding practices are dictated in part by the uneven and irregular distribution of water in Mongolia. Growing concentrations of herders and settlements near water sources intensify pressure on natural resources in those areas. Those same water sources supply irrigation water for agriculture; agricultural water use in 2000 is projected to triple its 1970 amount.</p>
<b>Forests</b> 	<p>Forests, found primarily in Mongolia's wetter, mountainous areas, are critical to the protection of soil, grasslands, water resources, and wildlife diversity. However, reduction of forests by logging, use for fuelwood, and forest fires is accelerating.</p>
Management Challenges	
<b>Equity and Tenurial Rights</b> 	<p>For centuries a variety of collective tenure arrangements have helped sustain grasslands and produce healthy livestock in Mongolia. The recent transition to private land and herd ownership, however, has decreased flexible systems such as rotational grazing and access to shared grazing lands. In some areas land tenure is ambiguous; in others wealthier pastoralists have fenced large areas of high-quality grasslands.</p>
<b>Economics</b> 	<p>Reorientation from a centrally planned to a market economy may spark environmental problems and widen income inequality; poorer pastoralists may not be able to capitalize on economies of scale and access large areas of high-quality pastures. The government has cut supportive services to herders since the breakup of collectives, and few pastoralists can afford the fuel or other inputs necessary to sustain mobile herding operations.</p>
<b>Stakeholders</b> 	<p>Privatization is bringing divisive elements to herding communities. The influx of new herders with limited experience in animal husbandry, the widening gap between rich and poor herders, and absentee herd ownership all weaken the system of shared beliefs and preferences for mobile herding that once helped protect grassland condition. Sustainable management suggests the need for government policies that facilitate and encourage mobility rather than sedentary production.</p>
<b>Information and Monitoring</b> 	<p>Pastoralists' ecological knowledge, understanding of local geography, and animal husbandry skills need to be incorporated into management policies. There also is room for scientific analysis and research to help guide a transition to privatization without losing the best aspects of mobile herding. Assessments of pasture condition, arable land, and livestock use, and identification of pastures that are of strategic importance to mobile herders would greatly aid the transition.</p>

## Timeline

**1691–1911** Mongolia becomes a frontier province of China. Herders move livestock for Buddhist monasteries, high lamas, and aristocratic lords in rotations over common lands; pasture rights are regulated by the local institutions and among clans and families according to customary law.

**1911** Expulsion of Manchus in northern Mongolia brings a decade of Mongol autonomy.

**1921** Bolshevik uprising in Russia inspires revolution in Mongolia.

**1924** Mongolian People's Republic is founded in northern Mongolia, creating the world's second communist state after the Soviet Union (USSR). The southern part of Mongolia remains under Chinese control and becomes the Inner Mongolian Autonomous Region in 1947, though it lacks real political autonomy.

**1929–32** The Mongolian government attempts to forcibly collectivize herding households. Thousands of Buddhist lamas are killed and private property is confiscated. Herders slaughter 6–7 million head of livestock in protest.

**1932** The Mongolian government shifts to a more gradual organization of collectives; cooperation among herding households is encouraged. Russia has already collectivized most rural residents at this time.

**1949** The communist People's Republic of China is founded. Rangelands in Xinjiang, Inner Mongolia, and other areas are nationalized, removing them from the control of landlords, Mongol princes, lamaseries, and clans.

**1950s–60s** Chinese and Russian governments emphasize agricultural expansion and highly mechanized farming methods.

**1950s** Socialist government campaigns in Mongolia increase momentum for the organization of pastoralists into collectives. Expansion of area under cereal and fodder crop production begins.

**1950s** Russia and China encourage use of foreign breeds of sheep and other livestock to increase productivity; these "improved" breeds eventually prove weaker and decrease herd mobility.

**1955** A ceiling is placed on private livestock holdings in Mongolia to encourage the emergent collectives.

**1957** China begins to establish large collectives (People's Communes) in rural districts and eradicates customary use-rights for pastures. Grasslands become pressured as livestock herds and cultivated area expand.

**1960s** Virtually all of Mongolia's herding households are members of collectives and all land is owned by the state. Households look after a share of the collectives' herd, although they are also permitted to own some private stock. Mongolia begins expanding its cultivated area.

**1980s** China begins shift from a centrally planned to free-market economy. Agricultural communes are dissolved and livestock distributed to pastoral households. Farmers and pastoralists have leases for lands, but uncertainty over pasture rights and location discourages mobility. Fenced areas emerge in the once-unbounded steppe. The communist era ends in Russia. Influenced by political change in the USSR and Eastern Europe, Mongolia begins a transition to a democratic government and market economy.

**Early 1990s** Farms in Russia retain communal structure despite the new central government policies; many farm leaders are reluctant to hand over land and livestock to individual private farmers.

**1991** Prices are freed from state control. Constitution of Mongolia acknowledges the principle of private land ownership, but pastureland is specifically excluded from private ownership and lease systems are developed. Mongolia begins to dissolve collectives; herd numbers soon increase more than 20 percent.

**1994** More than 90 percent of Mongolia's animals have been transferred to private ownership. Many are owned by "new" herders who were allocated animals in the dissolution of the collectives; some opt for more sedentary herd management. Land degradation is perceived around herders' settlements.

**2000** Severe economic crisis that began with the breakup of the USSR continues to limit economic growth and reconstruction in Mongolia. Government resources to support mobile herding are scarce and the gap between wealthy and poor herders grows.



toralists still shift their herds 150–200 km between summer and winter pastures. Others shift their herds 25–50 km, and some less than 10 km depending on social and economic conditions (Humphrey and Sneath 1999:221–222). But many pastoral systems are, fundamentally, still mobile, and pastoralists continue to stress the benefits of mobility and cooperative grazing for pasture and livestock health.

Science tends to support what herders have observed for generations. Ecological studies show that continuous grazing of livestock in the same pastures can be much more damaging than systems of pasture rotation (Tserendash and Erdenebaatar 1993:9–15). Dense populations of sedentary livestock can impair grass regrowth. Some plant species may gradually disappear and be replaced by poorly palatable weeds or poisonous plants that can sicken or kill livestock. Once a pasture's soil is severely damaged, wind can cause desertification.

### A New Era in Mongolia: 1921–90

**T**he pastoral culture experienced major new influences in the 20th century. After only a decade of Mongol autonomy, following the collapse of the Chinese Qing Dynasty, struggles for power led to the

1921 Bolshevik-inspired revolution. Socialist central planning emerged under the leadership of the Mongolian People's Revolutionary Party in 1924. This era introduced technologies like irrigated agriculture and farm machinery. It also introduced state-controlled pastoralism and brought the beginnings of industrialization. Mobile herding techniques generally endured—even improved in some ways—during this period.

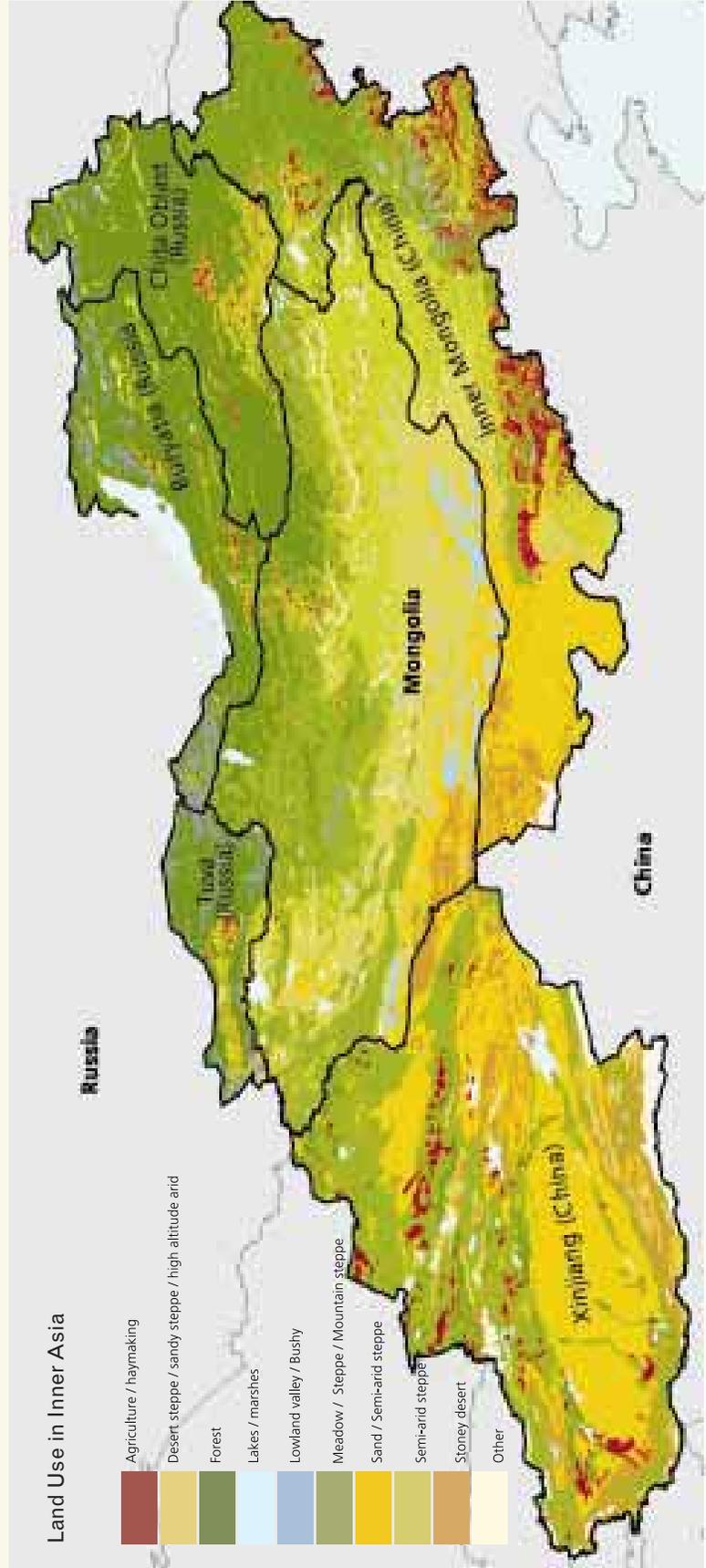
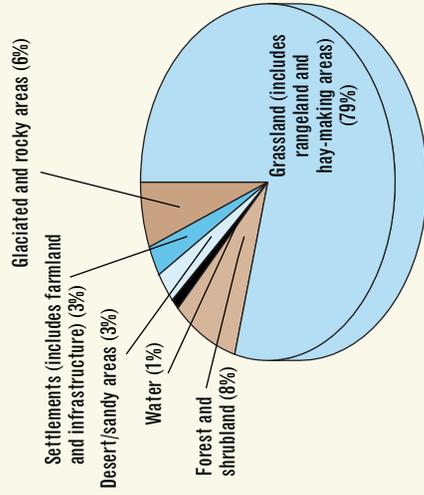
One of the first steps of the Soviet-style government was to organize herders into collectives. Early attempts at collectivism were so unpopular they had to be abandoned. However, in the 1950s, Mongolian pastoralists were organized as wage workers employed by about 250 *negdels* or collective farms and about 50 state farms, each managing pastoral or agricultural activity in a rural district or *sum*. A *sum* consisted of a central settlement of a few hundred households and a large area of grassland used as pasture by the herder households, most living in mobile felt *yurts* and herding the collective or state farm livestock and a few personal animals. Although the new *sum* districts were generally smaller than the earlier *banners*, most pastoralists continued to rotate pastures throughout the year and make use of *otor*. However, in some regions the distance of seasonal moves was reduced (Humphrey and Sneath 1999:233–264).

This “collective” system actually enhanced mobile pastoralism in some ways. The collectives maintained machinery

### Box 3.18 Land Use in Inner Asia

The Asian steppe, including Mongolia and parts of China and Russia, support the most extensive natural grasslands in the world (WCWC 1992:280-292). The climate is harsh; on some regions of the steppe, snow can cover the ground for 5–8 months of the year. Extreme heat and drought are possible, too, particularly in the southern desert regions that cut off Mongolia from Tibet. In effect, much of Inner Asia is not readily adaptable to most economic activities; large areas of the Russian Federation, for example, consist mostly of high mountain ranges.

But livestock have thrived on the steppe for centuries. In fact, most of Inner Asia that is accessible is used for livestock grazing. Agriculture is also a significant land use, although less than 1 percent of Mongolia's land area is classified as arable (Mearns 1991:26). Thus, the way of life for many is rural, and the importance of herds as sources of food, wool, and transportation is paramount.

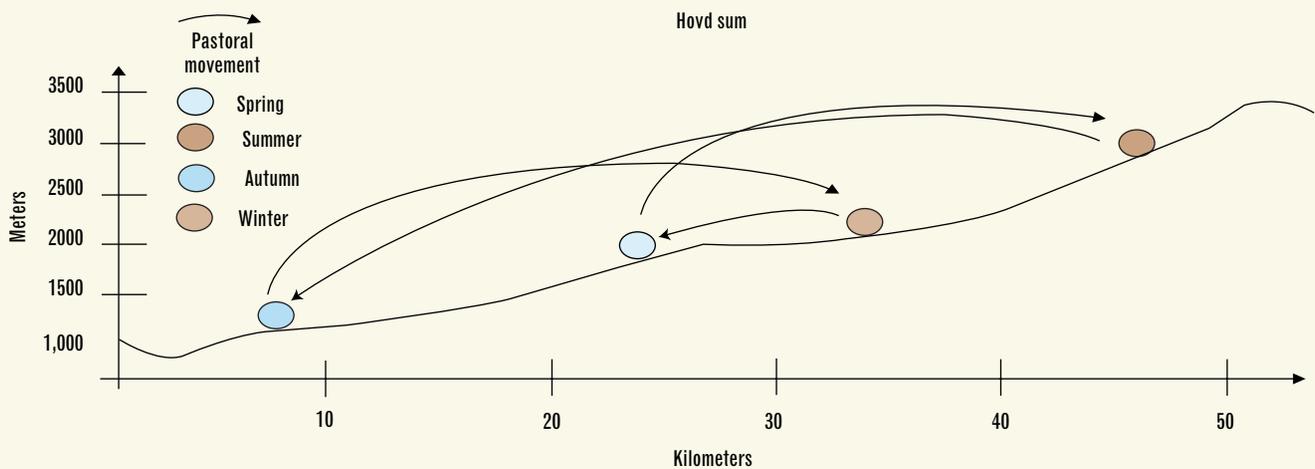


Source: MacArthur Environmental and Cultural Conservation in Inner Asia Project (MECCIA) 1995.

### Box 3.19 Pastoral Movements

A variety of pastoral systems are practiced in herd movements in Inner Asia, depending on environmental, social, and economic conditions. In one area of Mongolia (Hovd *sum*, Uvs *aimag*), for example, most pastoralists use pastures that are high in the mountains in the summer—areas above 2,400 m. In autumn pastoral households move down near the lakes, at around 1,600 m. Winter is spent higher on the mountain slopes, at around 2,200 m, and the spring pastures are at a slightly lower elevation—2,000 m. In another, less mountainous area of Mongolia (Dashbalbar *sum*, Dornod *aimag*), the pastoral population generally spends the winter and spring in low areas in river or stream valleys and move to pastures in higher altitudes in the summer and autumn. The average movement in this area is about 25 km (Humphrey and Sneath 1999:236–247).

Cross-section Showing Pastoral Movement



Source: Figure is adapted from Humphrey and Sneath 1999:237.

for transportation and hay-cutting services. Herding households were moved on long legs of the annual migration by collective trucks; and hay deliveries helped feed livestock during the winter and early spring. Recalled one herder, “In the collective period . . . *otor* was very good. The services provided to the herdsmen were excellent. Also, the making of hay [for fodder] and the repair of *hashaa* [enclosures and sheds] was done well” (Humphrey and Sneath 1999:39). Herding households were encouraged to work together. State loans were supplied for infrastructure improvements that would benefit pastoralists, such as boring wells, purchasing hay-making equipment, and constructing winter animal shelters.

But collectivism discouraged individual initiative. Noted the same herder, “Herdsmen had hay and so forth provided for them, and were instructed where and when to move, so they did not choose places to pasture the livestock themselves. They worked only at the command and direction of their leaders . . . cutting and making hay, shearing sheep . . . dipping the animals, all these things the brigade or groups did together. So [during collectivism] people . . . just followed instructions and waited to be told what to do” (Humphrey and Sneath 1999:39–40).

Still, Mongolia basically retained its mobile herding system and a relatively low livestock-to-pasture ratio. This pattern of land use does not appear to have caused much pasture degradation (Asian Development Bank/PALD 1993).

## Chinese and Russian Experiences with Grassland Management

**A** comparison of Mongolia’s grasslands to neighboring Chinese and Russian grasslands during roughly the same period (1920–90) underscores the pitfalls of abandoning large-scale, mobile herding techniques. Even in areas of Mongolia where livestock densities are comparable to neighboring regions of China and Russia, the Mongolian regions tend to be far less degraded, according to estimates and herders’ perceptions. This may be because Chinese and Russian central governments placed more emphasis on settled pastoralism. Russia also relied heavily on highly mechanized farming methods.

In Russia, most herders were organized into collectives by the 1930s. Within a few decades, livestock in some parts of Russia were kept relatively immobile on fenced pastures. Heavy machinery and chemical fertilizers were used to cultivate fodder crops and grain.

In China’s Inner Mongolia in the 1950s, families were similarly settled into “People’s Communes.” The communes centered on a village in a district with local government facilities, while herding families on the steppe were organized into production “brigades.” The brigades retained some mobility and herded the commune livestock on seasonal pastures as

directed by officials, along with the small number of personal livestock that households were allowed to own. The decrease in pasture rotation, however, required an increase in hay-making facilities and winter animal sheds.

China, like Russia, dictated a drastic expansion of agriculture in the 1950s and 1960s. Large-scale irrigation projects enabled fodder to be grown, so pastoralists no longer had to move livestock to different seasonal pastures.

Even the remnants of the former specialized herding systems in China’s Inner Mongolia disappeared by the 1990s. The new post-Maoist government, as part of its economic reforms, dissolved the communes. Because the government’s recent experience in allocating agricultural land to farming families in the rest of China had been relatively successful, the administration sought to apply a similar policy to pastoral regions. Livestock were distributed to pastoral households and quotas for animal production were phased out. Hay-making fields also were allocated to households. By the 1990s grazing land was divided and allocated to individuals and groups of households using long-term leases (Humphrey and Sneath 1999:165).

These 20th century political and economic changes brought benefits to Chinese and Russian pastoralists, but also introduced new inequalities and ecosystem problems. Growth in production was one benefit. In China’s Inner Mongolia, the number of livestock rose from about 17 million head in 1957 to more than 32 million in 1980 (Inner Mongolian Territorial Resources Compilation Committee 1987:519–520). These increases were largely the result of a shift to fast breeding sheep and goats and away from larger livestock such as horses, cattle, and camels. Herders also gained rudimentary electrical service, roads, and wells provided by the central government. In Buryatia, Chita Oblast, and Tuva in Russia, farms provided members with guaranteed wages, living accommodations, pensions and insurance, medical facilities, kindergartens and schools, shops, central heating, fuel and firewood, clubs, libraries, and recreational facilities (Humphrey and Sneath 1999:79).

With economic reforms and the beginning of a market economy in the 1980s, living standards in China rose from the extremely low levels that had prevailed in the People’s Communes. Some herders became wealthy; those who had better access to markets or who were able to buy machinery and vehicles usually were those who could obtain low-interest government loans through ties to the local administration. Those households could hire labor to look after large herds and could invest in hay-cutting machinery and other assets. Some could pay for special access to high-quality areas of pasture in addition to the minimal pasture allocated to each herding household. Those with the financial means fenced these formerly common lands, limiting the mobility of others to use or move across them.

Thus, benefits were brought at high cost to cultural traditions and ecosystems. Large-scale pastoral movements

between seasonal pastures have been largely eliminated by the land allocations, and there has been a corresponding decline in the use of the pastoral technique of *otor*. The effect has been to increase the amount of hay cut to feed livestock, to increase the tendency for livestock to graze in one location all year, and to intensify the concentrations of animals in certain areas. Individual herders can no longer graze different species of livestock on a range of accessible, suitable territories. For example, riverside pastures that had been available to cattle from the whole district might today be divided among different households. Locals have identified deterioration of pasture in intensively grazed areas in Russia and China's Inner Mongolia, especially around water sources and households.

Where static herds do not have access to natural water sources year round, water must be trucked to those pastures; and vehicular traffic damages the fragile surface of those pastures. The need to increase production of hay and fodder to feed the settled livestock also damages the thin steppe soils. In the substantial areas of Inner Asia where soil cover is weak and the climate harsh, converted pastures supply low crop yields while exacerbating erosion and desertification (Humphrey and Sneath 1999:91); plowed grasslands rapidly lose topsoil to strong winds and soil moisture decreases.

Other problems include reduced production of grass in hay-making pastures each year, since people routinely cut in the same places. Herders in China's Inner Mongolia have been known to plow the spring pastures to plant hay and grain because they cannot afford the high price of grain sold in markets. Grassland specialists in Xinjiang estimate that it takes 15-20 years for plowed land to regain its previous productivity as pasture (Humphrey and Sneath 1999:106) because plowing destroys the extensive root system that supports perennial grasses.

Another issue is the introduction of foreign livestock breeds. Merino sheep, for example, were crossbred with Mongolian sheep starting in the 1950s to increase the productivity and quality of livestock products. Many of the "improved" breeds were weaker and slower moving than indigenous breeds, thus requiring heated sheds to survive the winter, further reducing herd mobility (Humphrey and Sneath 1999:239). In Buryatia in Russia, researchers noted that foreign breeds indirectly affected forest ecosystems. Building winter sheds and supplying fuel and housing for newly settled

herders requires timber. As a result, forest areas along the Russian border have been heavily exploited. By comparison, most Mongolian herders still use *yurts* for shelter and burn dried dung for fuel; wooden houses are generally found only in central villages. Thus, forest pressures from Mongolia's pastoralists are lower (Humphrey and Sneath 1999:12).

A decline in nomadic practices brings cultural advantages and disadvantages. Interviews with herders from various parts of Inner Asia suggest that many still prefer a mobile life, particularly middle-aged and older herders. Others recognize that nomadism is essential for pasture health but can be a hard life. Time spent in *otor* is time cut off from other people and, often, from social services like formal education, health



care, and postal services. Static farming and livestock rearing let families cultivate vegetables, drink water from wells, and access markets more readily (Yenhu 1996:21).

## Mongolia after Socialism: Parallels to China and Russia

In 1990, Mongolia began a transition toward a free-market economy. In some ways, the lives of its herders and its economic climate show parallels to China and Russia. There are more sedentary living complexes, divided pastures, and pressures on grasslands and other ecosystems. As a consequence, overgrazing and soil degradation have increased. Records show that the number of dust storms in Ulaanbaatar, the Mongolian capitol, have increased from 16 per year on average during 1960-69 to 41 per year during 1980-89 (Whitten 1999:11). Mongolia's National Environmental Action Plan warns that desert in the country's southern region may be advancing northward by as

much as 500 m per year (Government of Mongolia 1995:27-28).

### **INCREASE IN LIVESTOCK NUMBERS**

Mongolia has dissolved its collectives, and most of the livestock and other agricultural resources have become the members' property. As in China's Inner Mongolia in the 1980s, this move toward privatization and markets has promoted rapid growth in Mongolian livestock numbers. That growth occurred as herders first sought prosperity through larger herds, then as they sought to at least earn subsistence income as the economy took a downturn. From 1990 to 1998, Mongolia's national herd increased by more than 20 percent, from 26 to 32 million head (Statistical Office of Mongolia 1993:28; Ministry of Agriculture and Industry of Mongolia 1998:2).

### **DECREASE IN COMMON PROPERTY GRASSLANDS**

To date, the Chinese have progressed farthest in the transition from collective use of pastures to individual use, though Russian Buryatia and Chita are not far behind (Humphrey and Sneath 1999:97). Now Mongolia is following suit. All pastureland remains "common" land under the jurisdiction of provincial and district-level authorities, suggesting that Mongolia still has some of the largest areas of common grazing land in the world (Mearns 1996:308-309). In practice, however, access to and control of common grasslands is not clearly defined. Ownership and use of public land is a controversial topic in Mongolia, with active debate in the Mongolian parliament about the merits of private rights to land and how to ensure that the rich do not acquire all the best pastures. With ambiguous use rights and declining use of collective management, some herding families have begun to rotate their herds less, fearing that others may use the best pastures if they vacate them.

Furthermore, the dissolution of the motor pools of the old collectives and the increase in the cost of gasoline is making seasonal movement difficult for many pastoral families. Where they once used trucks, they now rely on animal transport. The organization of *otor* movement and the regulation of access to pasture, which had been overseen by collective and state farm officials, have declined.

### **INCREASING DEPENDENCE ON PASTORALISM**

During the breakup of the state collectives, livestock were allocated to its former members—to herders and to those who performed other jobs, like veterinarians, drivers, and canteen workers. In some districts the majority of the population became directly dependent on their allocation of livestock for subsistence. The number of registered herders nationwide was 135,420 in 1989—less than 18 percent of the national workforce. Since the economic reforms of the 1990s, that total has more than tripled to 414,433 in 1998 (National Statistical Office of Mongolia 1999:95,45; Statistical Office of Mongolia 1993:6).

Many of these "new herders" maintain permanent dwellings in the district center and are less familiar with or guided by the traditional mobile grazing systems than the households who were part of the specialized herding brigades of the collectives. Some have part or all of their livestock herded by relatives or friends with access to more distant pastures. Others who have migrated from urban areas to take up herding are treated as outsiders and resented for what locals see as increased grazing pressures on local pastures. The presence of these migrants weakens the potential to successfully manage common grazing areas (Mearns 1996:328).

### **ECONOMIC CRISIS**

In the collective era, Mongolia exported 25,000–40,000 tons of meat, 25,000–30,000 tons of livestock, and more than 60,000 horses each year. The vast majority of these products went to the Soviet Union and other members of the socialist trade bloc. With the collapse of the socialist trade bloc, those export markets almost disappeared. Mongolia's meat exports in 1998 amounted to just 7,500 tons, and livestock and horse exports were insignificant (National Statistical Office of Mongolia 1999:144). At the same time, Mongolia's access to affordable imports was undermined; pre-1990, Mongolia spent one-third of its GDP on imports from the Soviet Union, including all petroleum products, 90 percent of imported machinery and capital goods, and 70 percent of consumer goods (Mearns 1991:30).

Accordingly, there has been a collapse in living standards and a declining level of public services like veterinary services and provision of farm machinery. The economic crisis also has lowered agricultural output. The area under cultivation, yields per hectare, and overall production for staple crops like wheat and cereals all have decreased since the end of central planning. Many farmers cannot afford to buy machinery, seeds, and fertilizers (Economic and Social Commission for Asia and the Pacific 1999:336).

In retrospect, many herders stress the relative wealth, security and convenience that the collective period offered, in comparison with the shortages and uncertainty of the current transition to a market economy. Some pastoralists have tried to establish "cooperatives" by pooling their shares of the old collectives to take ownership of its assets, or to share transportation and other costs. However, most of these cooperatives have gone bankrupt as the economy has failed to improve.

### **INCOME INEQUALITY**

Although economic liberalization has enabled some individuals to make money, those in the agricultural sector have struggled to realize any profit. Similar to China's Inner Mongolia, Mongolia is experiencing a growing difference between the living conditions of rich and poor herders. Today, about 37 percent of livestock-owning households struggle to subsist

## Box 3.20 Livestock Density in Inner Asia

Densities of livestock in Inner Asia are significantly higher in parts of Inner Mongolia and Xinjiang compared to neighboring Mongolia. But it is not necessarily the case that high livestock densities mean reduced grassland productivity. In fact, researchers studying pastoralism in Inner Asia found that the mobility of the herd and the herd structure seem to be stronger determinants of degradation. For example, records from the 1930s suggest that Inner Mongolia supported about the same quantity of livestock

(when calculated in terms of a standard unit of livestock) as it has in the 1990s—the equivalent of about 70 million sheep (Sneath 1998, citing Chang 1933). But in the 1930s, the herds contained a much smaller proportion of sheep and goats and the system of pastoralism was much more mobile. Environmental problems are perceived where herders have shown a tendency to graze their herds year round in specific areas. Pressure on grasslands is exacerbated when some of the best natural pastures are converted to hay making and agriculture.

### Livestock Density in Inner Asia



Source: MECCIA 1995.

on the income from less than 50 animals, and 11.5 percent had less than 10 animals in 1998 (National Statistical Office of Mongolia 1999:96). This situation is likely to have worsened during the harsh winter of 1999–2000 when more than 2.2 million livestock died of starvation (UNDP 2000).

One benefit of the emergence of a small stratum of wealthy livestock owners is the potential for them to reestablish some larger pastoral operations that can benefit from economies of scale and the old systems of extensive pastoral movement. The number of households in Mongolia that owned more than 1,000 animals rose from seven in 1992 to 955 in 1998; 33 of these owned more than 2,000 head of livestock (National Statistical Office of Mongolia 1998:96; *Zasagyn Gazar Medeel* 1992). The richest employ neighboring households to help herd livestock and can maintain trucks, jeeps, and wider systems of pastoral movement than

most other households. Poor herders cannot afford such moves and, with smaller herds, have less incentive to do so. Their more meager flocks can survive on pastures around their fixed dwellings (Humphrey and Sneath 1999:254).

Poor herders also face more labor and education challenges now than they did under collective systems. For many it has become more economical to remove children from school to stay home and help with herding rather than employ laborers to look after herds (Ward 1996:33).

### RELIANCE ON HAY AND FODDER CROPS

Unlike neighboring China and Russia, Mongolia has largely continued to use local breeds that can graze on natural pastures year round. But hay supplies are still critical in winter and early spring (Humphrey and Sneath 1999:236). In fact, the loss of the hay provision the government once supplied to Mongolian

Population and Livestock Density in Selected Districts

Country/Village	Population Density (person/km <sup>2</sup> )	Livestock Density (SSU <sup>a</sup> /km <sup>2</sup> )	Percentage of Useful Land <sup>b</sup> Cultivated	Percentage of Pasture <sup>c</sup> Considered Degraded
<b>China</b>				
Chinggel Bulag	0.70	54	0	54.4
Hosh Tolgoi	2.10	56	0.3	?
Handgat	3.25	54	0.44	12
Hargant	1.40-	36	0	22.9
<b>Russia</b>				
Argada	11.30	270	33	88.3
Gigant	4.00	125	18.8	76.9
Sholchur	1.80	65	0.9	1.5
<b>Mongolia</b>				
Hovd sum	0.96	48	0.008	0.07
Dashbalbar	0.40	22	0.17	0.03
Sumber <sup>d</sup>	1.56	36	1.2	2

<sup>a</sup>SSU, standard stocking unit: sheep = 1, goat = 0.9, cattle = 5, horse = 6, camel = 7.

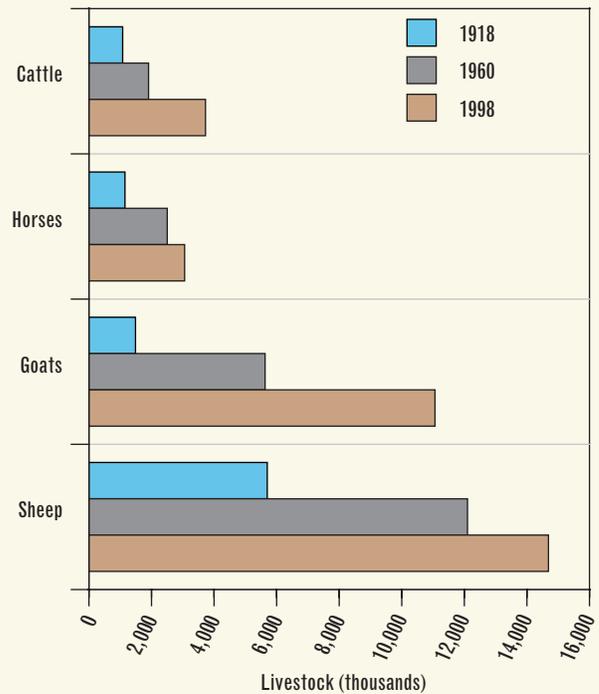
<sup>b</sup>"Useful land" is all land not specifically unusable for farming economy as a whole. It includes arable and hay-making land.

<sup>c</sup>"Pasture" is land specifically designated for pasture.

<sup>d</sup>Data do not include the administratively separate town or Choir.

Source: Humphrey and Sneath 1999:77.

Growth in Mongolian Livestock Populations



Source: Humphrey and Sneath 1999:44–45.

collectives seems to be harming livestock nutrition, especially as pastoralists make shorter and less frequent moves.

The lack of adequate hay production leaves flocks vulnerable to starvation, as evidenced during the winter of 1999–2000. Thousands of hectares of pasture were buried under heavy snow into the spring, yet the government was unable to provide supplementary feed because of limited funds, lack of hay stocks resulting from prior drought, and transportation problems (FAO 2000).

Another problem is that some of the pasture used for hay production is not ecologically suited for it. Perhaps 10 percent of the 1.34 million ha under cultivation in 1990 is now affected by erosion (Whitten 1999:14).

Mongolian herders have noted the negative impacts of recent trends. Remarked one man, “In the 1970s all the households used to go on *otor*, and the households were

spread out at a distance from one other. But now most of the households do not move from their winter camps, so in the winter and autumn pastures the animals have eaten all the vegetation. So there has been significant pasture damage and reduction in vegetation” (Sneath 1993).

## Modernization and Mongolia’s Future

Looking at China’s Inner Mongolia, some already foresee the passing of the era of mobile pastoralism. Economics could encourage production systems in which calves and lambs are shipped to farming areas for fattening, rather than raised on grass. For some

herders, benefits of such a transition could include increased income, more leisure time, and greater economic security (Humphrey and Sneath 1999:93, citing Li et al. 1993).

It is too soon to tell if such a scenario is inevitable for Mongolia, or if the country can find a way to balance the old herding techniques of pastoral mobility with the new forces of urbanism and market economics. On one hand, old techniques of pastoral mobility still exist even in China's Inner Mongolia, with livestock raised to full weight on the steppe. On the other hand, the herding patterns that collectives used had retained some aspects of the older systems of land use, but the dissolution of these institutions brought a decline in large-scale pastoral operations and expanded the herds kept for use by individual families.

Currently, grazing land in Mongolia remains a public resource despite attempts to introduce legislation for its private ownership. However, without support, the poorer households with small numbers of livestock and limited domestic labor will have difficulty maintaining systems of wide pastoral movement, even where pasture land is not divided among individuals. A more sedentary life does not inevitably lead to pasture degradation, but the movement of the herds in relation to available pasture does appear to matter to herders. For example, in Dshalbar, Mongolians have a relatively settled way of life, with houses in the district center, but herders with a vast area of pasture at their disposal still make use of seasonal movement and occasional *otor* (Humphrey and Sneath 1999:212).

Other complicating influences include a tripling of the human population in Mongolia in the last 60 years and projected high growth rates for several more decades. This adds pressure to expand the pastoral economy and animal herds, although the number of livestock may be approaching the maximum level that Mongolia can support with the resources currently available to the pastoral sector. The desire to live near roads, markets, schools, and modern services also will draw people and their herds to populated areas where degradation is already a problem.

With current high inflation, debt, and depressed trade, it seems unlikely that local or central governments will be able to encourage large pastoral enterprises by renewing the government-supported motor pools and machinery for hay pro-

duction. Yet such investments and government leadership may be essential if large-scale pastoral movement systems that include the majority of herders are to be retained. District governments might be able to coordinate labor for the maintenance of public resources such as wells and hay production, for example. Or, small farms and associations could be combined in scaled-down versions of collectives for more specialized and mobile livestock herding, even if households are more settled.

It is possible that wealthy Mongolian herd owners will accumulate sufficiently large livestock holdings to establish intermediate-scale pastoral operations, using labor from poorer households. However, decades may pass before such operations become large enough to encompass the majority of grazing land, and there would still be need for district authorities to coordinate herding and land use.

Significant investment in improved transportation services for herders could bolster environmentally sustainable systems of large-scale pasture rotation and might also benefit livestock processing industries by facilitating their purchase of livestock products at competitive prices. In China, at least, the close presence of markets and relatively high demand for pastoral products has enabled some herders to make a good living. But in Russia and Mongolia, the distance to markets, the high cost of production inputs like fuel, and low demand all depress the livestock economy. In Russia and Mongolia, the prices for livestock products like meat, cheese, and wool are very low; sugar, tea, flour, and other foods are expensive (Humphrey and Sneath 1999:75).

Market failures may cloud Mongolia's ability to see the short-term benefit of preserving large-scale herding patterns. This is especially true in the face of some farmers' increased wealth and the lack of policies that support and encourage mobile herding and collective action. But where herders' lives become highly settled, the grasslands appear to be overused. Pastoralists recognize the threat to the future productivity of their livestock operations. Herding populations from Tuva to western Mongolia and Mongol-inhabited parts of Xinjiang are deeply concerned about the environment. Whether that local awareness will translate into political change and sensitivity to ecological vulnerability, or what path "modernization" will take, is difficult to gauge.