Chapter 4
Sociocultural and Ecological Systems of Pastoralism in Inner Asia: Cases from Xinjiang and Inner Mongolia in China and the Pamirs of Badakhshan, Afghanistan

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Abstract In pastoral societies, economic and ecological aims are not necessarily in conflict. These societies, through mobility, engage different ecological niches as a livelihood strategy. Specific case studies from Inner Asia indicate that instead of seeking to replace pastoralism as an ecological profession through forced sedentarization, governments should seek to enhance its historically proven potential for food and livelihood security. The case from the Altay Mountains and the Tian Shan documents the effect of sedentarizing pastoral communities, resulting in the removal of sociocultural and ecological diversity, with profound consequences on income. It is an example of the central government asserting administrative authority in the name of ecological restoration while pursuing strictly an instrumental agenda of economic extraction of key renewable and nonrenewable resources. The case from Inner Mongolia shows increased economic and ecological vulnerability of pastoral societies caused by government-induced sedentarization programs but also illustrates the adaptive capacity of pastoral institutions under such policies. The final case, from the Pamirs, shows that under conditions of political and economic stress, interactions between diverse ecological professions such as farmers and herders is central to livelihood and food security through mutual dependence. It is the basis for survival.

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4.1 Introduction

Variation and difference are the hallmarks of pastoralism. Pastoralism is not merely a livelihood strategy but a way of life that is fundamentally based on adaptation to changing seasonal and, therefore, climatic conditions in different ecological contexts. Mobility through pastoral activities and the subsequent food security arising from those undertakings are not only a necessity but are a recognized behavioral norm with sociocultural significance. Thus, pastoralism is not only an ecological profession strategic to securing human survival, but in turn, generates a mutually reinforcing sociocultural identity that draws primarily from connectivity with the ecosystems in which humans seasonally dwell. The cultural values and social institutions, in turn, facilitate pastoral activities. The relationship is neither linear nor deterministic. Pastoralists are not hemmed into an ecological niche but rather engage in complex connectivity with diverse habitats. Environments simultaneously shape and are a product of human actions. Complexity and uncertainty effect pastoralism as a livelihood strategy and a way of life; the system is dynamic.

Central to understanding pastoralism is recognition of the mutual relationship between cultural and ecological diversity. Drawing on already published applied research on Inner Asia, specifically the Altay Mountains and the Tian Shan (Liao et al. 2014a, b), Inner Mongolia (Dong et al. 2007; Dong and Ren 2015), and the Pamirs (Kassam 2010), we will explore the implications of externally induced perturbations to pastoral systems as livelihood strategies. The first case study examines the implications of decades of centralized planning through collectivization, then decollectivization, and now sedentarization policies on Kazakh pastoralists and their livelihoods in Xinjiang (northwestern China). The second case study draws evidence from Inner Mongolia (China) to illustrate the impacts of institutional arrangements driven by privatization and their effects on pastoral livelihoods as well as adaptive responses to government policies. The third case study examines the relationship between pastoralists and farmers in mutually securing each other's food security and survival under conditions of war in Badakhshan (northern Afghanistan). We will conclude with a discussion of the diversity and potential insights the three case studies reveal.

4.2 Case Study 1: Livelihood Diversity and Pastoralism in the Altay Mountains and the Tian Shan of Xinjiang, China

4.2.1 Context

The Xinjiang Uyghur Autonomous Region is located in northwestern China, and lies in the center of the Eurasian landmass (Fig. 4.1). It spans more than 1.6 million square kilometers. Situated in the middle of the ancient Silk Road, Xinjiang has a

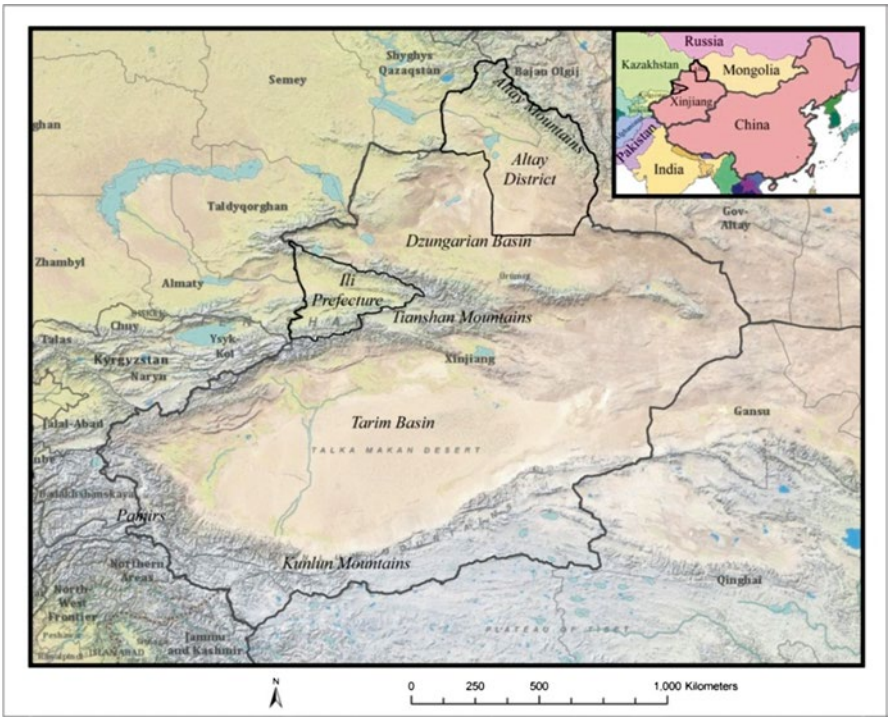

Fig. 4.1 Altay District and Ili Prefecture in Xinjiang, China

border of more than 5600 km, neighboring eight countries from the northeast to the southwest, including Mongolia, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, and India. The region is characterized by biophysical diversity: movement from the south to the north involves crossing physical landscapes that range from the second highest point (K2, 8611 m) to the second lowest point (Aiding Lake, −154 m) on the planet (Starr 2004).

The physical geography of Xinjiang can be summarized as "two basins within three mountains" (XUAR Chorography Committee 2010). The Tarim Basin is between the Kunlun Mountains in the south and the Tian Shan in the north. The Dzungarian Basin is between the Tian Shan in the south and the Altay Mountains in the north. In the middle of the Tarim Basin lies the Taklimakan desert, where the annual rainfall is less than 30 mm (Li 1991). As the region most remote from oceans in the world, the water vapor from the sea almost disappears because of distance and mountain barriers.

The Han Chinese name for the region reveals a history of repeated conquests, resultant rebellions, and external exploitation of this frontier region (Kassam 2001). In Chinese, the word "Xinjiang" consists of two characters: *xin* meaning "new," and *jiang* meaning "territory." The glyphic components of the character *jiang* consist of the bow, the earth, and the fields, meaning land that needs weapons to protect it.

Although non-Han Chinese sources maintains that Xinjiang was annexed by China in the 1760s, the Chinese government asserts the history of China's rule over the region dating back two millennia to the Han Dynasty (Starr 2004). Either way, the Han Chinese presence is driven by a frontier perspective. The Han Chinese perceived themselves as superior residents of the *core*, surrounded by the "barbarian" *periphery* (Amitai 2005), which also includes Xinjiang. Even in modern China, the indigenous peoples living in the ethnic regions are still given a special name: *shaoshu minzu* (meaning "minority nationalities"). A general perception of the ethnic regions is "backwardness," and people of the periphery require help in the form of development interventions from the core (Cerny 2010). The Xinjiang Production and Construction Corps was originally composed of soldiers who participated in the "liberation" of Xinjiang in the early 1950s. After the collapse of the Soviet Union, the primary mission of the Xinjiang Production and Construction Corps shifted from protecting the frontier from external threat to suppressing ethnic unrest largely due to limited local autonomy and unequal economic opportunities (Cliff 2009). In 1999, China embarked on the *xibu da kaifa* (meaning "great western development") campaign. This has informed its recent policy toward Xinjiang.

Xinjiang's economic structure displays distinct characteristics of periphery and frontier (Becquelin 2004). Since the foundation of the People's Republic of China in 1949, significant natural resources have been extracted to support economic development in the Chinese core, whereas manufactured goods are shipped in the opposite direction. Xinjiang is a major supplier of primary products, including energy, strategic minerals, livestock, and cash crops (Goodman 1989, 2004; Toops 2004). There is little doubt that Xinjiang will become the energy base of China, with reserves of more than 2.5 billion tons of petroleum and 700 billion cubic meters of natural gas (Xinhua 2007a).

Unlike the pastoral cultures of Xinjiang, who maintained complex connectivity with their habitat, the central government's connectivity has been instrumental as it views this region as a frontier for exploitation, and its connectivity with the habitat is purely an instrument, a source of wealth. Before the foundation of the People's Republic of China, livestock herding activities were organized in the unit of tribes. Each tribe had its own winter, spring/fall, and summer pastures, which were exclusive. In addition, each tribe had its own migration route. Although the pastures were shared by all tribal members, the livestock were owned by individual households (Mi'erzhahan 2004). Some wealthy households chose to settle in towns or villages, retaining ties with poorer herdsmen, who raised animals for them in return for a share in the herd (Benson and Svanberg 1998).

Changes started in the 1960s, as pastoralists were forced to "hand in" their livestock and herd for the communes. The pastoral unit (*muye dui*) served as a substitute for tribal institutional structures. In this way, the traditional resource use patterns were preserved, and pastures remained sustainable, until decollectivization spread to these remote areas in the mid-1980s. Subsequently, livestock and pasture lands were assigned to individual households according to their communal herding units. However, inequitable allocation severely limited some households' access to pastures and water resources (Miller 2000). Although individual households were stimulated

to acquire wealth under the newly introduced market-oriented economy, increases in livestock production have been largely achieved by exploitation of pasture resources. Although other reasons might have led to pasture degradation, arguably the resource use patterns under the current land tenure have played an important role in exacerbating the situation since its initiation (Longworth 1993).

Despite a frontier perspective, in the past decade, the central government has initiated a series of ecological restoration, sedentarization, and development projects throughout its pastoral areas (Xinhua 2007b). These policies, ironically, were justified on the basis of current resource use patterns having seriously damaged the pasture lands (Harris 2010). Moreover, the Twelfth Five-Year Plan of China further confirmed the determination to "civilize" the pastoralists by settling them down and transforming them into modern ranchers (NDRC 2011). However, a review of these projects indicates further economic disenfranchisement and social marginalization for disadvantaged indigenous peoples, while generating questionable environmental benefits (Yeh 2009). Encroaching interests on the pastures from outside combined with inherent difficulty to manage the semiprivatized common resources have challenged the sustainable use of pasture lands. Given these challenges, pastoralists have been sedentarized, started cultivating crops, tried diversifying income sources, and even emigrated to other countries (Cerny 2010; Fernandez-Gimenez and Le Febre 2006).

4.2.2 Methods

Semistructured interviews were conducted with 159 households in the summer of 2011. Ninety-six of them were in Altay District, covering four counties: Aletai, Fuhai, Buerjin, and Habahe (Fig. 4.2a). Sixty-three of them were in Ili Prefecture, covering six counties: Zhaosu, Tekesi, Gongliu, Xinyuan, Nileke, and Yining (Fig. 4.2b). Although the sampling method was unstructured, we tried to interview respondents who represented diversified perspectives. We visited households on summer pastures, on transitional pastures, in winter villages, and in resettlement villages. Interviews were conducted at individual homes, including houses, huts, yurts, and tents. In sum, the aim of household sampling was to capture the relative variation in the physical environment, migration patterns, livestock structures, and income sources.

In each household, we first recorded the coordinates using a GPS instrument. Then we interviewed the male head of the household, if he was available. We only wrote down the personal characteristics of the major interviewee, but we recorded all comments contributed by other family members. When the head of the household was absent, we interviewed another family member who was willing to participate and talk. The questions were asked in Chinese and translated into Kazakh by a local facilitator, who was fluent in both Chinese and Kazakh. Questions sought to capture a broader perspective of livelihoods, which included household income, livestock and other assets, and subsistence activities.

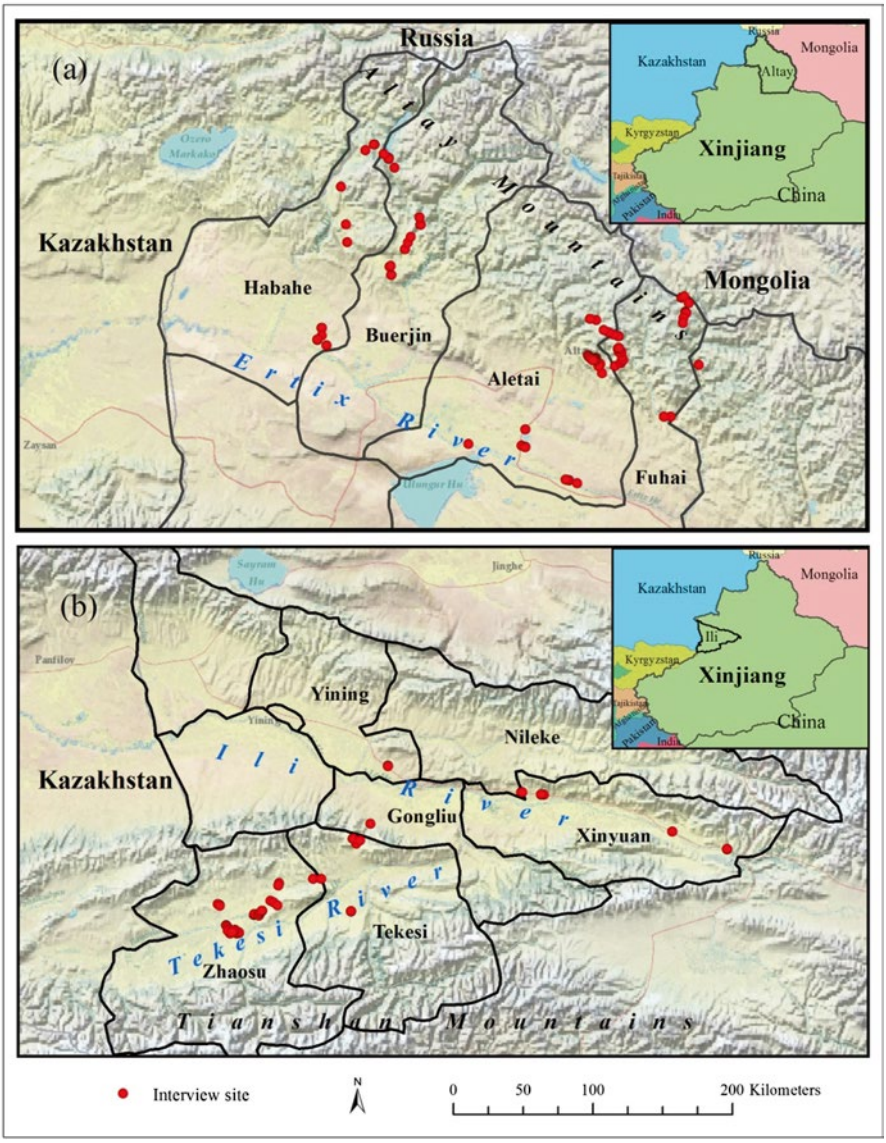

Fig. 4.2 Interview sites in Altay District (**a**) and Ili Prefecture (**b**) of Xinjiang, China

4.2.3 The Role of Livestock

The major livestock raised by pastoralists are cattle, sheep, and goats, but they also keep a small number of horses and camels (Table **4.1**). Each kind of livestock plays different roles. In general, cattle, sheep, and goats are mainly raised for markets, whereas horses and camels are largely used for transportation.

Table 4.1 Number of livestock owned by interviewed households

Livestock	In Kazakh	In Chinese	Median	Mean	Standard deviation	Maximum	Mininium
Cattle	*Sier*	*Niu*	10	12.08	10.11	60	0
Sheep/goats	*Koyi*	*Yang*	40	69.07	80.73	400	0
Horses	*Utt*	*Ma*	3	4.93	6.65	35	0
Camels	*Tuye*	*Luotuo*	0	0.89	2.15	11	0
Livestock units[a]			20.40	28.72	24.50	118.80	0

[a]1 livestock unit = 1 cow = 1 horse = 0.8 camel = 6.5 sheep or goats (Chilonda and Otte 2006)

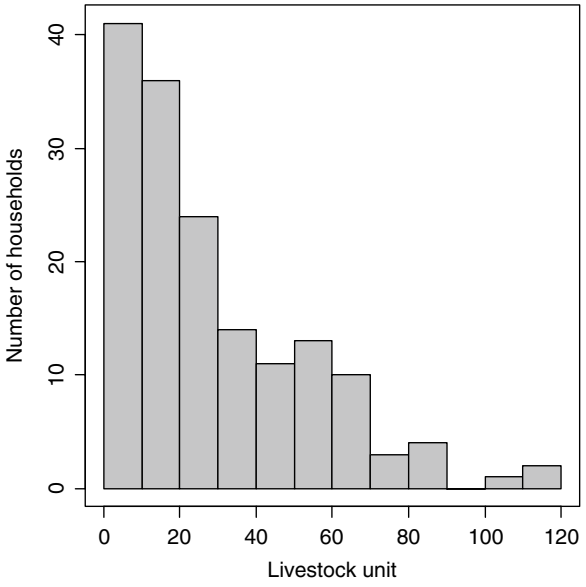

Fig. 4.3 Livestock unit distribution

The distribution of livestock units owned by individual households follows not a normal distribution but a Poisson distribution, with more households at the lower end (Fig. 4.3). Almost 40 % of them have less than 15 livestock units, whereas less than 15 % possess more than 60. This indicates that most of these households are maintaining their livelihoods on the basis of a very limited number of livestock.

A comparison of average livestock numbers in Altay and Ili is shown in Fig. 4.4. Individual households in Altay (32.1) raise significantly more livestock units than those in Ili (23.5). In terms of specific livestock types, the Altay pastoral households keep more cattle, sheep/goats, and camels, but their average horse number is slightly lower than that of their Ili counterparts. Arguably, such livestock structures in these two regions reflect the environmental differences: camels exist only in Altay, where the Gobi desert is prevalent; more horses are raised in Ili, where the pastures are of better quality.

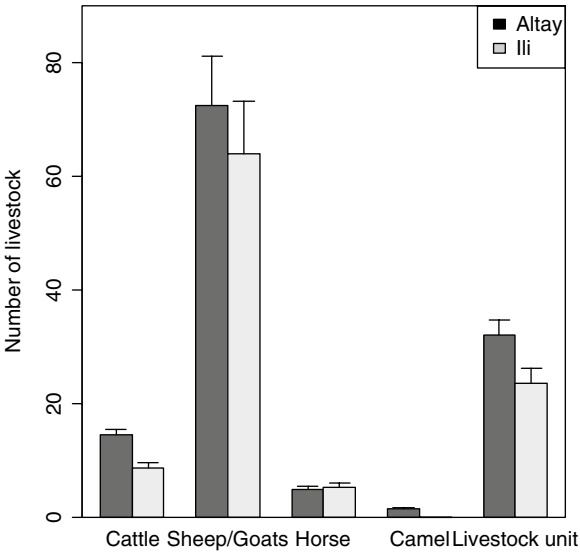

Fig. 4.4 Average livestock numbers in Altay and Ili

Most pastoralists only sell male calves, and keep females for milk or reproduction. According to the owners of large cattle herds, the proportion of females to males is between 10:1 and 5:1. Compared with other livestock, cattle are more susceptible to the threat of poisonous plants. Four respondents in Altay mentioned that their cattle died after consuming certain species of herbs. According to their description, the proliferation of poisonous species coincides with drought. When rainfall is low, most grass species wither, but poisonous plants prosper. Although cattle appear to know the toxicity of plants, they have no choice but to consume them when they are extremely hungry. Other kinds of livestock move more frequently to avoid the poisonous plants in their search for forage during drought periods.

There is a common word for sheep and goats in Kazakh (*koyi*) and Chinese (*yang*). Pastoralists are fully aware of the difference between sheep and goats, but they tend to use *koyi* to refer to these two species. From fieldwork observations, only 10–20 % of the *koyi* are goats. Kazakh pastoralists think the sheep are more economically valuable than goats because sheep grow much faster in their context. In both Altay and Ili, sheep/goats are the dominant livestock species, and almost 90 % of livestock income is from them.

Although the number of horses is much smaller than that of cattle and sheep/goats, horses play a significant cultural role among Kazakh pastoralists. The Kazakhs are proud of their mobile pastoral culture. Children start to learn horseback riding at the age of 5 years no matter what sex they are. In addition, a variety of sports and entertainment activities on the pastures are based on horseback riding. As a major source of transportation, horses are seldom raised to earn cash except for a few households in Zhaosu County[1] in Ili.

[1] Zhaosu, as the hometown of "heavenly horses" in ancient tales, has a long tradition of horse raising.

Table 4.2 Income of sampled households

Sources of income	Mean income (yuan)	Standard deviation	Proportion of households involved (%)	Mean total income of households involved (yuan)
Livestock	37,612.6	45,612.2	76.7	49,019.7
Crops	6510.7	14,145.3	30.2	21,566.7
Wages	4839.2	18,332.0	17.0	28,497.8
Herding fees	2987.5	11,537.1	26.4	11,310.0
Subsidies	1867.5	9725.5	12.6	14,847.0
Small business	769.8	1757.9	19.5	3948.4

Only 36 of 96 households in Altay own camels, whereas none of the 63 households in Ili do. Although camels are helpful in moving belongings during migration, more and more households are choosing not to keep camels anymore. Instead, they rent a truck to move their belongings. The average truck rental fee was about 500 yuan, which was almost half the price of a sheep in 2010. Given that the median number of sheep was 40, the cost of renting a truck to move back and forth in a year would been 2.5 % of the sheep flock value.

4.2.4 Diversified Sources of Income Among Pastoral Households

Household income was either estimated indirectly or reported directly by the interviews, depending on the specific sources. In general, there are six sources of income: livestock, crops, wages, herding fees, subsidies, and a small business (Table **4.2**). Income here is just cash income without consideration of household self-consumption. According to our interviews, most households consume a very small part of their livestock or crop. Meat is considered a luxury that is mainly sold to earn cash, just as crops are aimed at regional markets rather than for local consumption.

Respondents usually reported the number of livestock they sold each year and the size of crop fields they cultivated. On the basis of the local prices[2] of livestock and crops around the fieldwork period, the income from these two sectors could be estimated. Herding fees were calculated according to the number of livestock cared for, the length of time the respondents herd for others, and the herding price for each kind of livestock.[3] Other sources of income such as wages, subsidies, or a small business were directly reported by respondents.

[2] In 2010, the price of a lamb was about1100 yuan, that of a calf was about 2500 yuan, and that of a horse was about 5000 yuan. The average income from a *mu* of crop field is about 800 yuan. 1 *mu* = 666.67 m^2.

[3] In 2010, the price for herding one cattle was 50 yuan per month and the price for herding a sheep/goat was 8 yuan per month.

Quite a number of respondents pointed out that the price of livestock had just increased to a satisfactory level in the previous couple of years. Therefore, the estimation is based on the highest price. Five years ago, the price of a lamb was about 200 yuan, which was less than 20 % of the value in 2010. Since pastoral households largely depend on the sale of livestock to sustain their livelihoods, their welfare is closely linked to the livestock price. This makes them vulnerable to unexpected price fluctuations and disease. In addition, some households mentioned that although they became well off because of higher livestock prices, the cost of other necessities increased accordingly, which offset their increasing income. Therefore, vulnerability continues to be a major concern.

The details of each income source are presented in Table **4.2**. The most import source is livestock. The average income from this sector is about 38,000 yuan, and 77 % of households are more or less dependent on the sale of sale livestock to sustain their livelihoods. For those engaged in this sector, the average total income is more than 49,000 yuan.

The second most important source of income is crop cultivation, in which 30.2 % households are engaged. Cultivation of hay and other crops used for livestock consumption is not counted here. Popular crops cultivated in the study areas are cash crops, which include certain kinds of beans and melons. However, crop cultivation is not Kazakh people's comparative advantage, especially under harsh environmental conditions that require more labor and capital investment. Therefore, quite a number of Kazakh households choose to rent their crop fields to Han Chinese.

Seventeen percent of households are engaged in wage labor. The average income from this sector is 4839 yuan, but for those who are involved in this sector, their average income is about 28,000 yuan. In general, there are two types of wage income. The first type is employment in government organizations. Respondents belonging to this group have a relatively steady income. The second type is temporary seasonal employment, which mainly includes construction and farming work. Some Kazakhs have to seek such employment on a daily basis.

More than a quarter of households take care of livestock owned by other individuals to earn income through a "hired herding fee." This has become prevalent especially in recent years, not only because some newly settled Kazakh pastoralists continue to maintain a substantial amount of livestock, but also because immigrant Han Chinese raise animals for profit and self-consumption. Except for a small proportion of hired herders who take care of the livestock of others throughout the year, most of them only do that during the warm season from May to September. Some hired herders expressed concerns about theft of livestock for which they are responsible. Loss of even one animal requires compensation, which takes them several months.

Households that depend on government subsidies to maintain their livelihoods account for 12.6 % of households. In most cases, subsidies were given to pastoral households as compensation for their giving up land tenures for pasture conservation purposes. As the implementation of pasture fencing is becoming inten-

sive, more households will receive income from this sector soon. Compared with others, households from a community in Kanasi National Park receive a much greater subsidy because of tourism development. This is because they are deprived of the rights to rent their houses to tourists, from which they could earn much more. Conflicts occur every year when it comes to their rights to rent their houses and how much compensation they should get if they give up renting. In addition, some households simply receive a subsidy for poverty relief. However, eligibility for a poverty subsidy is always controversial. Quite a number of respondents complained about the unfairness, because the subsidy was usually allocated to households who maintained a good relationship with the local officials.

About 20 % households run a small business as a source of income. This is practiced by their selling milk and processed milk products, either to middlemen who purchase milk from a number of households or to tourists. Another form of a small business is a small grocery store operated from a yurt, as access to certain grocery items is very limited on pasturelands.

4.2.5 Discussion

Evidence from Altay and the Tian Shan indicates pastoralism continues to be a viable livelihood strategy. We identified six distinct livelihood strategies as the optimal fit in our cluster analysis (Everitt et al. 2011). The summary statistics of the identified strategies are given in Table **4.3**.

Farmers (cluster 1) represents 13.8 % of the entire sample. On average, they receive more than 70 % of income from crops, which is almost four times as much as agropastoralists, for whom crop revenue is the second most important source of income. About 10 % comes from livestock, which is much less than for the agropastoralists, who derive more than 60 % from this sector. Another key distinction between farmers and agropastoralists is the average household income. Farmers earn only 55 % of what agropastoralists do. In addition, farmers' income is also about 40 % less than the overall average. Income from other sources is minimal for this cluster.

The households in cluster 2, mixed smallholders, earn the least income compared with other clusters, only 47 % of the overall average. They rely heavily on government subsidies to maintain their livelihoods. Another feature of this cluster is the reliance on a small business. About 20 % of their income is from selling milk products and grocery items, whereas none of the other clusters derive more than 5 % of their income from this sector. The remaining 20 % of income is either from livestock or herding fees. Mixed smallholders are not engaged in crop cultivation or wage labor at all.

The third livelihood strategy (cluster 3), agropastoralism, is a combination of livestock herding and crop cultivation. Agropastoralists are the second largest group, representing about 20 % of the whole sample. They have the second highest mean

Table 4.3 Livelihood strategies estimated via *k*-means cluster analysis

Variables	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Mean
Livestock (%)	10.7	10.7	60.2	0.0	95.1	2.7	57.2
Crops (%)	70.3	0.0	18.0	2.7	0.6	1.9	13.9
Wages (%)	6.1	0.0	9.9	88.2	0.4	0.0	9.7
Herding fees (%)	6.6	11.0	7.3	3.0	2.1	93.2	8.7
Subsidies (%)	2.2	43.9	1.4	2.0	0.1	0.0	4.9
Small business (%)	4.2	21.1	3.2	4.1	1.7	2.2	4.4
Other variables							
Household income	33,179.1	25,593.3	60,125	45,943.3	68,016.1	37,300	54,587.4
No. of households	22	15	32	12	71	7	159
Fraction of household (%)	13.8	9.4	20.1	7.5	44.7	4.4	100.0
Strategy name	Farmer	Mixed smallholder	Agropastoralist	Wage laborer	Pastoralist	Hired herder	Whole sample

income among the six groups. Livestock revenue, as the most important income source for this cluster, constitutes more than 60 % of their income. This is followed by crop revenue, which accounts for almost 20 % of the total.

The distinguishing feature of wage laborers (cluster 4), representing 7.5 % of the sample, is their dominant reliance on wages as a source of income, which accounts for almost 90 % of the total. This cluster is the only one that gains no income from livestock. Their income from other sources is also minimal. Although wage laborers are the third wealthiest group, their income is still about 15 % less than the average.

Cluster 5, pastoralist, the largest group among the six clusters, represents almost 45 % of the entire sample. More than 95 % of the income of pastoralists is from livestock, whereas the other sources are negligible. Their dominant reliance on livestock makes them the wealthiest group. They earn more than 68,000 yuan annually, which is 2.5 times more than the poorest cluster.

Cluster 6 exhibits characteristics that can be best described as hired herder. Households in this cluster derive 93.2 % of their income from herding fees. Their income from the sale of livestock is minimal, but their work is similar to that of pastoralists in terms of tending to livestock. A major difference is that hired herders do not own most of the animals they herd. Although this cluster accounts for less than 5 % of the entire sample, all other clusters are more or less engaged in herding livestock for others. As an emerging source of income, being a hired herder is becoming more prevalent. Hired herders earn a mean income of 37,300 yuan, which is 30 % less than the average.

Although pastoralism is the preferred livelihood strategy, only 45 % of households are currently able to derive a large share of their income from livestock. The ongoing transition, which is from depending heavily on livestock herding to relying on diversified income sources, is exactly what the government wants to achieve in the Twelfth Five-Year Plan. The official policies aim at sedentarizing pastoralists and transforming them into modernized ranchers who are able to produce large quantities of dairy products and meat using an industrialized approach. However, only the first half of this approach is being implemented, and the second part has been abandoned. In the implementation of these policies, new houses ranging from 60 to 90 m^2 with a 3-*mu* (about 2000-m^2) yard are sold to pastoralists with a subsidy. In addition, another 50-*mu* (about 3.33-ha) hayfield is given for free as a bonus. However, almost all respondents complained that a 50-*mu* hayfield is far from being enough to sustain a viable number of livestock. What makes the situation worse is that the quality of the bonus hayfield is much worse than that of the land they owned before. There is little water, and the soil is highly saline and alkaline. Some households also noted that the assigned hayfield is too far from the village, which makes it difficult to manage the land.

In response to a series of socioecological changes and policy pressures, pastoral households are trying to diversify their sources of income. However, such diversification is accompanied by reduced welfare, which is directly reflected in household income; therefore, it is hard to conclude that diversified income sources can always contribute to household welfare. From our analysis, higher income diversity is associated with lower annual household income in the pastoral context (Liao et al. 2015).

In response to the identified socioecological challenges in the pastoral contexts, researchers working in different study areas almost unanimously reached the conclusion that future development activities need to be built on the foundation of the livestock economy instead of seeking other ways to replace it (Behnke 1993; Sandford 1983), especially in the arid and semiarid lands. Research findings in the same context have indicated that mobile livestock herding is inherently diverse and highly adaptive, which involves complex spatial movement, land use patterns, and a livestock portfolio (Liao et al. 2014a, b). It is such that ecological diversity allows pastoralists to make better use of the rangeland resources constantly in disequilibrium.

4.3 Case 2: Adaptation To Mitigate Pastoral Vulnerability Associated with Institutional Transformations in Inner Mongolia, China

4.3.1 Context

Inner Mongolia, covering a total area of approximately 183 million square kilometers and a total distance of about 2400 km from west to east, is located in northern China, bordering Mongolia to the north and Russia to the east. Over 90% of the territory is covered by rangelands, which can be classified as temperate meadow, temperate typical grassland, temperate desert grassland, and temperate desert from east to west. With the largest rangeland regions, Inner Mongolia is regarded as one of the five pastoral production bases in China. Over centuries, nomadic pastoralism has been practiced as the dominant land use in vast rangeland areas, and history has proved that nomadic pastoralism is the best production model for protecting the rangeland ecosystem of Inner Mongolia (Wu and Du 2008). Petroglyphs in this region indicate that nomadic pastoralism appeared as early as 3000 years ago (Wu and Du 2008).

Historically, the rangelands of Inner Mongolia in China as well those of Mongolia (which was separated from the Chinese Empire in 1919) were alternatively controlled by different pastoral groups, including Huns, Xianbeis, Rourans, Turkics, Uyghurs, Khitans, Jurchens, and Mongolians (Wu and Du 2008). Pastoral production on the rangelands of this region can be categorized into five phases in the administrative systems according to Wu and Du (2008): "phase I, the tribal nomad system before the Genghis Khan' reign; phase II, the subinfeudation nomad system of the Genghis Khan; phase III, the league and banner Zhasake nomad system from the Qing Dynasty to the Republic of China in the twentieth century; phase IV, the small-area nomad system from the founding of the People's Republic of China to 1996; and phase V, the land contract enclosed-stocking system from 1996 (initiated in 1980s) to the present." The fifth phase is the most critical period, with major destruction and degradation of grasslands, decrease of livestock capacity, and decline of herders' income in the entire region of Inner Mongolia (Wu and Du 2008). Implementation of the Livestock and Grassland Double-Contract Responsibility System (LGDCRS) started in the 1980s,

and expansion of the Grassland Ecology Protection Projects (GEPP) which is aimed at "retire livestock, restore grassland" initiated in 2000 are two distinct drivers for dramatic changes in socioeconomic institutions in pastoral areas in Inner Mongolia in recent decades (Wang and Zhang 2012).

With the transition from a command economy to a market economy in the early 1980s, the LGDCRS has been implemented in Inner Mongolia with the aim of promoting grassland protection and livestock husbandry development through acceleration of the transition from transhumant grazing to settled living and grazing, enhancing the grassland livestock breeding and increasing planted fodders and forages (Li and Zhang 2009). The year 2000 was the turning point in the government's attention to rangeland ecosystem protection because of frequent sandstorms in northern China and severe floods in southern China, and the GEPP of fencing grassland, decreasing livestock numbers, implementing grazing bans, and ecological resettlement of herders has been implemented on the basis of the conclusion that overgrazing was the major cause of grassland degradation and sandstorms. China's grassland policies and projects are normally firstly tested and implemented in Inner Mongolia and gradually extended to other pastoral areas across the nation (Zhang et al. 2007). As a result of the LGDCRS and GEPP, pastoralists from the steppes of Inner Mongolia to the alpine meadows and cold deserts of the Tibetan Plateau across the dry steppe and desert of Xinjiang in western China are facing unprecedented transformations of traditional livestock grazing and grassland management practices. A better understanding of consequences derived from these policies and projects is necessary to assist pastoralists and policymakers to envision new models for promoting sustainable pastoral production and grassland management. Therefore, this case study was conducted to evaluate the feasibility and sustainability of these policies and to explore pastoralists' adaptive capacities to those institutional changes in Inner Mongolia.

4.3.2 Methods

Integrated approaches including literature review and fieldwork visits were used in this case study by the third author. General information about the LGDCRS and GEPP in Inner Mongolia and the whole of China was collected from public reports, government documents, and online libraries. Through literature reviews, data on and information about the implementation of the LGDCRS and GEPP were collected from scientific publications, online documents, and expert opinions. During three fieldwork visits between 2004 and 2007, participatory observation and in-depth interviews were used to collect data from 56 households who have been affected by the LGDCRS, GEPP, or related interventions in three prefectures: namely, Alashan, Xilingol, and Hulunbir. These areas are also sites representative of three types of grasslands, desert steppe, typical steppe, and meadow steppe, in Inner Mongolia (Fig. 4.5). For household interview, the hand-written survey questionnaires included (1) local traditions of pastoral production and grassland management; (2) attitudes of interviewees to the LGDCRS,

Fig. 4.5 Sampling sites in Inner Mongolia, China

GEPP, and related interventions; (3) interviewees' perception about grassland conditions and understanding of the importance of grassland protection; (4) local adaptive actions to improve pastoral production and grassland condition; and (5) interviewees' suggestions for sustainable pastoralism and grassland management. Additional information about challenges, opportunities, and changes related to implementation of the LGDCRS and GEPP, external support, and internal partnerships was collected and recorded through group discussion and personal communications. The data quality was ensured by careful investigation and cross-checking with different sources. Systematic qualitative techniques recommended by Patton (1990) and Miles and Huberman (1994) were used to analyze all the data.

4.3.3 Ecological Vulnerability of Pastoralism with Institutional Transformation

The survey indicates that the local pastoralists across all sampling sites have historically practiced transhumant grazing on the communal rangelands by moving their livestock from winter pastures to spring–autumn pastures to summer pastures in a collective way called *otor* on the basis of the traditional norms or agreements made among them. By

doing so, the local pastoralists can not only avoid overgrazing of the rangelands by adjusting the grazing time and intensity according to plant production, but can also ensure the livestock's feed and water requirements and keep livestock healthy through frequent movement. With the implementation of the LGDCRS in the early 1980s, the livestock were divided by each household according to the numbers in each family, but the rangelands were not contracted to the individual households until the mid-1990s. As a consequence, each household increased its livestock numbers to graze the communal rangelands without any control since the traditional institutions of pastoral collectives were abandoned in the name of household responsibility advocated by the LGDCRS. Some interviewed pastoralists stated that they have doubled or even tripled their livestock population within 10 years from the initiation of the LGDCRS, leading to problems of rangeland overgrazing and eventually rangeland degradation and desertification. One of the interviewed pastoralists in Xilingol said: "I have seen the dramatic declines in grass height and cover of my pastures since I increased my cattle population by two times since the beginning of livestock contract responsibility, some of my grazing pastures have become desert lands due to overgrazing."

In the mid-1990s, the grasslands were divided among individual households on the basis of the contracts between the government and the pastoralists, which maintained that ownership of the pastures was controlled by the government and the use right of pastures was given to the pastoralists. As each pastoral households wanted the pastures close to water resources or their house, the large pastures originally shared among the pastoralist collectives for transhumant grazing use had to be segmented into small pieces. Each household received smaller portions of pasturelands far from their original winter, spring–autumn, and summer grazing areas. Because of shortage of labor, some households had to abandon or transfer the summer pastures or spring–autumn pastures that were too far away to other pastoralists. The pastoralists raised more livestock on the remaining pastures with the expectation of high profit from high-intensity livestock grazing. However, in reality, their expectations were defeated by the degradation or desertification of intensively grazed pastures. Some pastoralists have experienced vicious cycles of "increased grazing livestock number–deteriorated rangeland conditions–declined livestock production–lowered family income." In contrast, the abandoned pastures were either lightly grazed by a quite low number of livestock or overgrazed by a huge number of livestock as the communal properties and the leased pastures were often heavily grazed since the tenant did not care anymore about protection of other people's property. As a consequence, these pastures have been degraded in the form of either shrub encroachment or land desertification. Moreover, the field observation shows that the communal pastures (passages) for seasonal livestock movement have been often overgrazed and degraded with the fencing of individualized rangelands under the LGDCRS (Fig. 4.6).

In the early years of the first decade of this century, the GEPP was initiated in Inner Mongolia to mitigate the dramatic rangeland degradation and desertification. This policy was designed to restore the degraded rangelands mainly through compensation of the pastoral households on the b asis of their pasture sizes to reduce the grazing livestock population, to ban livestock grazing on degraded rangelands, to raise livestock in the stall, and to practice pasture fallow at seasonal or yearly intervals. However, evidence indicates

Fig. 4.6 Degradation of the communal pastures out of the fence (Xilinguole). (Photo by Xueliang Bai, 2012)

that this policy was far from effective. In numerous site visits, it was found that in most areas unpalatable or poisonous grass dominated the plant communities of the banned pastures, although some of the pastures banned for grazing were higher in plant cover than the grazed pastures. During a field visit to Alashan in early May of 2007, an old camel herder said when looking at the fenced pasture: "The plants growing in the fenced pastures turn green very late in spring and look worse than the plants growing in the open pastures. The new branches and leaves of edible shrubs are unable to grow well without browsing by camels when livestock grazing is banned. We know from generations to generations that livestock grazing can promote the growth of foraging plants and suppress the appearance of weeds. However, the role of grazing livestock has been totally overlooked by policymakers. This has resulted in reduced plant production and increased weedy plants." In most cases, the local rangeland monitoring agencies guarded the rangelands during the daytime, but the local pastoralists grazed their livestock on the banned rangelands secretly at night. As a result of illegally heavy "night grazing," some of the rangelands were seriously degraded, especially in the dry years.

4.3.4 Economic Vulnerability of Pastoralism with Institutional Transformation

The LGDCRS was originally designed to improve the production efficiency of pastoral systems and to prevent rangeland degradation on the basis of the belief that the collective system was highly associated with the low production of the pastoral system and

uncontrolled livestock population growth. However, as stated already, the LGDCRS did not work well in preventing rangeland degradation. Moreover, the survey showed that the LGDCRS was not effective in promoting production efficiency of pastoral systems. Instead, the LGDCRS led to economic vulnerability of pastoral production systems in most cases, as it lowered the ability of pastoralists to benefit from the rangelands (Li and Huntsinger 2011). The pastoralist interviewees stated that they had practiced the *otor* for free livestock grazing without a cent of investment before the implementation of the LGDCRS, so they could deal with the problems of feed and water deficiency in dry years by moving their livestock from one pasture to another under their collective's coordination. However, now they have to rent other pastoralists' pastures to meet feed and water requirements of livestock in the dry years, as they cannot practice *otor* within their fragmented pieces of pastures. Alternatively, they have to buy supplementary fodder from other pastoralists or outside cultivators to balance the livestock's feed requirement and to dig deep wells to meet the livestock's water requirement in dry years. As a consequence, their investments in pastoral production dramatically increased and the risk of losing profits from livestock production was also greater. For example, a pastoralist in Xilingol said: "In the past [before the LGDCRS], we did not need to pay fees to anybody for practicing *otor*, now we have to rent the *otor* pastures in harsh years by paying a high amount of money, even paying animal pass-by fees and animal watering fees. Often, there are many uncertainties to find the *otor* pastures and there are no guarantees we will make profits by renting *otor* pastures." This is verified by field surveys of pastoralists in the same district (Li and Huntsinger 2011):

> Last year [2006] I [a herder called Bater] went out early in June to try to seek a place to otor, but failed. Quite often you hear of a possible pasture in some place, but you can never believe what you hear. You need to go there and see the real situation. Like in my case, once I heard of a place that would allow otor for a lower price, so I rode a motorcycle to the place to see, and found the price was actually very high for what was there. Due to this delay in finding suitable rangeland, I couldn't practice otor on time last year.
>
> We [another herder called Ale and his lessor] had agreed to a charge of 8 yuan [US$1.1] per sheep per month [in 2006], but later when another herder promised to pay 10 yuan [US$1.4] per sheep per month, the lessor immediately violated our agreement and rented to the herder offering more money. Then I had to search for another pasture.

Moreover, buying the supplementary fodder to meet the livestock's requirement was not an economically sustainable way to maintain the pastoral production in rangeland areas of Inner Mongolia. The interviewed pastoralist in Xilingol also stated: "Some households spend a lot of money to buy the supplementary feeds for their livestock in harsh years, while their gains from selling livestock are often lower than their payments for supplementary feeds. They have to borrow money or make loans for to make their living, making them fall into a poverty trap." This statement is supported by field investigations by Wang and Zhang (2012) in another pastoral district of Inner Mongolia, Chifeng, as follows:

> Zha Lazeng, the former [Gonger] village chief, bought forage for four years. In 2009 he sold livestock for about 40,000 yuan but spent 20,000 on forage. Drought made the livestock production a loss. A few years ago incomes might have been lower than the present, but costs were also relatively low so he was never in debt. Now, after he had paid the forage and other

> costs, he could not make a living by just relying on income from livestock. He borrowed 10,000 yuan in 2009.
>
> Another woman named Si Qin married into the village in 2004. Since her marriage, her family borrowed money every year. As the weather became drier, their life became much worse. In 2005, her family rented a piece of rangeland for 800 yuan and harvested 10,000 kg of forage. As the weather became drier it was difficult to rent pasture which they could harvest for forage. They started to buy-in forage at very high prices, especially in a dry year. In 2007, she had spent a few thousand yuan for forage, but in 2009 it rose to about 30,000. To afford the cost of forage Si Qin borrowed a large amount of money. By 2010, the loans totaled 70,000 yuan.

Similarly, the GEPP did not work well in promoting the development of a pastoral economy and even led to economic vulnerability in pastoral societies of Inner Mongolia. Although the GEPP provided some eco-compensation to pastoralist households in the name of "Payment for Ecosystem Service" on the basis of the size of their pastures banned for grazing, the high expenditure of building sedentary houses and livestock sheds, cultivating and harvesting forage, buying and transporting supplementary fodder, and caring for animal health resulted in no benefits from pen-feeding/stall-feeding livestock production associated with the GEPP. Some of the pastoralists in Alashan noted: "We are traditionally camel nomads in desert areas, we have never practiced forage cultivation and stall-feeding, we do not have techniques to process the feedstuffs, to raise the camel in stalls. Mostly importantly, camels are semi-wild animals that need free movement in open pastures to retain their health. Once the camels are fed in the stall, we lose the benefit from the pastoral production." The interviews indicate that because of the high cost of fodder in Alashan and Xilingol districts, families have abandoned livestock production as a livelihood strategy. This phenomenon can also be found in other pastoral districts in Inner Mongolia. For example, in field investigations in the village of Gonger in Chifeng, Wang and Zhang (2012) stated:

> All the herders [in Gonger village] paid high costs to buy fodder. According to their calculations, if a sheep was fed solely with purchased fodder, then at least 3 kg were needed each day, which cost about 3–5 yuan. If the period of feeding lasted for six months, then the forage alone would cost 500–700 yuan, whereas the best price for one lamb was 400–600 yuan. As a result, herders' livestock decreased but their loans increased. In 2010, about twenty households, or 25% of all households in Gonger Village, had no livestock. It was evident that feeding animals with forage purchased from the market was unsustainable.

The resettlement strategy connected to the GEPP has increased the economic burdens of pastoralist households, as they have to invest a lot of money in housekeeping and family expenses. The government provided some subsidies for building houses (normally 8000–10,000 yuan) and livestock sheds (normally 4000–5000 yuan) according to the GEPP, but the pastoralists spent more than twice the amount of these subsidies to build a house and a shed (Fig. 4.7). The government also paid eco-compensation (about 5000–10,000 yuan per year per family on the basis of their family size and banned pasture areas) to the pastoralist households for their living expenses, although these payments were far less than their living expenses. One of the interviewed pastoralists stated: "When we lived in the yurt on the rangelands, we did not need to pay for construction materials for the house, electricity, fuel wood,

Fig. 4.7 Newly constructed feed stall thanks to the government subsidies in Xinlinhot, Inner Mongolia. (Photo by Li Yang, 2013)

animal feed, our daily food (milk and meat). Since we moved into resettled buildings in town, we have had to pay for everything, electricity, coal, animal feed, and our daily food, even water. All the countable and uncountable expenses are far beyond the compensation provided by the government. Very often, we have to get loans or borrow money to make our living or transform our livelihood from livestock keepers to something else". The field visit indicated that most of the resettled pastoralist households fall into a poverty trap, although some of the resettled pastoralist households succeeded in livelihood transformation and life improvement.

4.3.5 Social Vulnerability of Pastoralism with Institutional Transformation

According to the survey, the implementations of the LGDCRS and the GEPP led to not only the breakdown of the pastoral collective, the operational unit responsible for customary norms, regulations, and actions in pastoral production systems for centuries, but also the loss of indigenous knowledge, cultural traditions, and pastoral identity. Moreover, social conflicts and disparities emerged among the pastoral communities and between the pastoral households. Social vulnerability of pastoralism was thus increased and accelerated. As stated by one old male herder in Xilingol: "Before the LGDCRS, we followed the traditional mobile routines to herd our livestock between the *otor* pastures which were divided among different pastoral communities according to customary regulations. We can borrow other pastoral communities' *otor* pastures to herd our livestock during severe drought on the basis

of oral or written agreement that we gave some gift livestock in return or we lent our *otor* pastures to them for grazing when they faced similar problems. Within our own communities, we negotiated among all the household representatives with the coordination of community head (normally a distinguished elder) to make decisions such as how many livestock that each household should keep, what time and what kind of animals should be grazed on what pastures, how many people and who should be responsible for herding livestock, and how the profits from pastoral production should me distributed throughout the whole community. In such a way, all the pastoral groups can coexist harmoniously. However, we have been losing all of these indigenous institutions with the implementation of the LGDCRS, which may result in frequent conflicts among the pastoral households over water resource sharing, livestock passage utilization, and pasture boundary clarification. Sometimes, there are fights and violence among pastoral households due to communal livestock passage use or unclear pasture boundaries." This was verified by Zhang's (2012) interview with a pastoralist named Baolidao in same district as follows:

> He was once again agitated when he complained about the trampled rangeland. His rangeland is around 16,000 mu and borders his sister (interviewee) Gaowa's rangeland. His sister's herds often move to graze on his rangeland and his rangeland has been destroyed. He complained to his sister once but she did not think it was a problem since it is impossible to control the movement of animals. Afterwards, he turned to the county Grassland Station for a solution. 'What is the purpose of ecological resettlement? The state says that it is for the rehabilitation of the rangeland. I asked the officers if they will regulate or not [the invasion by my sisters' animals].' However, the officer suggested that he had better negotiate with his sister or else should catch the invasion activities in the field and then call them to come. 'How can I get the time to watch in the field every day? Is that not their job?' He had no plan to set up fences because it was rather costly.

In addition, an elderly male herder in Xilingol also stated: "In the past, we collectively grazed the livestock on the rangelands through division of labor among different households in the whole community. Different households took different responsibilities, such as herding the animals, caring for children and elders, collecting fuel wood, harvesting feed, etc. In this way, we could use the human labor efficiently and maintain the pastoral production effectively. With the implementation of the LGDCRS, individual household had to shoulder all the workloads, herding, milking, caring children, collecting fuel woods, and harvesting feed, etc. Because of labor shortage, some households in my community have abandoned some of their pastures or some households have totally abandoned livestock grazing by leasing their pastures to others. As a result, there are disparities between poor pastoral households and rich ones. Moreover, the undesirable things such as criminals, violence and divorces have increased in the society."

The GEPP has promoted the resettlement of pastoralists with the purpose of reducing grazing pressures on the rangelands. Roughly, 8 % of the rangelands in Xilingol were projected for ecological resettlement (Brown et al. 2008) and about 49,000 pastoralists in this district were resettled between 2003 and 2010 (XLDRC 2011). According to the strategy of the resettlement connected with the GEPP, the pastoralists live in the areas where cultivated forage-based livestock stall feeding cannot be performed and should be moved out and resettled near the towns or cities to develop livestock stall

Fig. 4.8 Resettled pastoralist households thanks to the government subsidies in Xinlinhot, Inner Mongolia. (Photo by Li Yang, 2010)

feeding systems or work in the secondary and tertiary sectors. For those resettled households, the government has allocated a detached or semidetached brick house and other facilities such as a livestock shed/stall (Fig. 4.8). Additionally, the government has provided the resettled pastoralists with some ecological compensation for their living expenses, loans for purchasing livestock and feed, and training for alternative livelihoods. However, the interviews indicate that there remain many social problems in the ecological resettlement process. Some respondents claimed that they failed to adapt to the resettled life, since they cannot find an alterative livelihood to livestock grazing as they said: "Herding animals on rangelands is our traditional life, we can't do any other jobs than livestock herding from old generations. Stall feeding (livestock) is hard work, which needs advanced technology and higher input. We can't afford to do it." Moreover, social tensions have appeared among resettled communities. As one elderly female noted: "After we moved to this resettled community, I found more conflicts arose among us. In the past, we lived far from each other in the yurts on the rangelands, and we treated each other in a very friendly manner when we met. But now, we live in a crowded community and the neighbors can easily break friendships because of minor conflicts." Because of discomfort with living in town or urban areas, some resettled pastoralists have moved back to their fenced pastures for herding livestock secretly such as night grazing.

In addition, the survey indicates that the GEPP has led to more conflicts between government officials and pastoralists. The pastoralists often wanted more compensation for living expenses, stall feeding and shed construction costs from the government, whereas the government officials forced them to move into the resettlement buildings without more support. The pastoralists struggled with the government offi-

cials for more benefits. Government officials frequently monitored the illegal grazing activities on the banned rangelands and they often fined pastoralists or confiscated their livestock as punishment for the illegal night grazing. As passionately explained by one male camel herder in Alashan: "We play the game of 'cat and mouse' with government officials, we mostly lost the game as 'the mouse'. We know the importance of rangeland conservation, but how can we survive without herding animals? What are the ideal options to mitigate the contradictions between livestock grazing and rangeland conservation? What are the ways to alleviate the conflicts between us and government officials in the process of GEPP implementation?"

4.3.6 Local Adaptations To Institutional Transformations

According to Kreutzmann (2003), "pastoral practices have always adapted to new and threatening challenges and found an outlet to cope with mounting constraints." However, implementation of the LGDCRS and GEPP has caused many difficulties for pastoralists in Inner Mongolia, and the local pastoralists have strived to develop adaptation strategies to mitigate these problems and even to convert the disadvantages into opportunities. Collective action is one of the key strategies which has been successfully adopted in some pastoral societies in Inner Mongolia. The survey in Hulunber indicated that the pastoral groups in one *gacha* (Mongolian term for "village") in Xinbaerhuyou *banner* (Mongolian term for "county") have practiced collective grazing systems without dividing the rangelands into individual pastoralist households from the very beginning of the LGDCRS. Instead, they distributed the communal rangelands to a group of pastoral households and established the collective institutions for livestock production and rangeland management according to the old grazing tradition. They have sustained the *otor* pastures and kept mobile grazing the whole year round, and they have practiced the division of labor and profit sharing among all the pastoral groups on the basis of agreements and regulations made by the collective. In such a way, they can sustain livestock production and maintain the rangeland health, even in adverse weather conditions caused by climate change or climate variability. As stated by one of the interviewed pastoralists: "Although we may not have gained big profit from this production mode (collective grazing), we can get relatively stable and reliable incomes for a good living, even in dry years. The risks of livestock loss in the disasters of drought, snowstorm, and (rangeland) pests have been greatly reduced. Most importantly, we maintain the rangeland conditions very well. There is less rangeland degradation in our *otor* pastures." With the release of the 2002 revision of the Chinese New Grassland Law, which allows pastoralist groups to make contracts for using the rangelands with the government, this production mode (collective grazing) has been promoted as one of the successful models of the pastoral system in China.

Revival of *otor* practice is another adaptive way applied by some pastoralists in Inner Mongolia. From site visits in Xilingol, it has been found that some pastoralists whose contracted pastures are close to each other or who are relatives and friends have joined together to form grazing groups and to reactivate the *otor* grazing system

on their allocated winter, summer, and spring–autumn pastures in a collective way based on the oral or written agreement among them. This phenomena has also been observed by other scholars in other pastoral areas of Inner Mongolia. For example, Wang and Zhang (2012) reported the following from a survey in the village of Gonger in Chifeng District :

> Suri the village head overcame these difficulties unbalance winter and summer pasture uses through cooperation. In contrast to other herders, Suri did not stop grazing the winter pasture. Every winter, he coordinated with his brother-in-law…. The two households had worked together to enclose their winter pasture. In winter the two households would take turns to send their labour to care for the livestock grazing there… in the face of continuing drought Suri collaborated with seven other households to form a group to graze cattle on the summer pastures. The village enclosed a piece of summer pasture in 2009. From 2010 the village heads decided to give the pasture to the sub-village to use. Single households could not use it because the labour in any one household was insufficient. However, eight households were able to use the pasture collectively. All of their cattle grazed there. Each week the eight households sent three herders from different households to stay in the summer pasture to care for the animals.

"Company + farmer" is a new production model supported strongly by the government to build cooperation between dairy or beef companies and local pastoralists, especially the resettled ones. This new model encouraged the individual livestock producer to enter into a contract with professional dairy or beef companies such as Yili and Mengniu (two of the biggest dairy companies in Inner Mongolia) as the livestock product (milk, beef) suppliers. The companies have provided the feedstuffs and milk cows for their stall raising. Some of the resettled pastoralists have practiced this production mode as an adaptation. From the cooperation with professional companies, they can earn a considerable income for family, and mitigate conflicts with neighbors and reduce the risks of livestock loss in droughts or snowstorms. However, some negative consequences of this model, such as low milk price for sale to the contracted companies and lack of technical support for improving their skills in livestock rearing, have limited the massive extension of this model among the pastoralists. In addition, some young members in the pastoralist households have changed their livelihood strategies by migrating as laborers to cities, starting small businesses, or becoming tourist guides. As a consequence of livelihood diversification, the pressures of human and livestock populations have been lowered to some degree. However, the livelihood transformation of young generations in pastoral societies may lead to the problem of increased marginalization of pastoralism. As one worried old herder in Xinlingol expressed: "If our next generation moves to the town or city, who will do the herding in the future. We may lose our pastoral traditions one day."

4.3.7 Discussion

Since the 1980s, the LGDCRS has been implemented in Inner Mongolia and expanded to all pastoral regions in China with the aim of mitigating "the tragedy of the commons," described by Hardin (1968), that unclear property rights were

associated with the degradation of a common pool resources such as the community pastures. However, in recent decades, there has been lot of debate about Hardin's solution for alleviating the "tragedy of the commons," which is the privatization of communal land. Some scholars insisted that the "the tragedy of responsibility" might be a more accurate term to describe the situation of pastoralism in Inner Mongolia (Li and Huntsinger 2011) and even in the whole of High Asia (Kreutzmann 2003). The clarification of property rights by individualizing the rangelands did not help the pastoralists effectively manage these natural resources in Inner Mongolia (Li and Huntsinger 2011). We argued that the failures of the LGDCRS and the related interventions in addressing the grazing livestock production and rangeland management can be well noted as "the drama of the commons" (Ostrom et al. 2002), implying that land grabbing and expropriation of resources occurred in an environment in which customary rights can easily be breached and community practices do not count. The increased rangeland degradation with the implementation of the LGDCRS pushed the government to implement the GEPP, which includes a grazing ban, grassland fencing and fallow, and pastoralist resettlement. However, evidence from Inner Mongolia shows that the GEPP did not work well in preventing rangeland degradation as expected by the government. We can conclude that the institutional changes associated with the LGDCRS and GEPP have broken the coupled human and natural system of pastoralism, leading to ecological, economic, and social vulnerability of pastoralism there.

To address the ecological, economic, and social issues in the pastoral realm in Inner Mongolia, it is necessary to rebuild the indigenous human ecological relationship of pastoralism. The approach of coupled human and natural systems suggested by Liu et al. (2007) can be used to activate the revival of indigenous knowledge, customary norms, and traditional practices such as *otor* in Inner Mongolia. The coupled human and natural system approach can help pastoral societies find appropriate ways to cope with institutional changes by facilitating effective collaboration among social scientists, biophysical/physical scientists, practitioners, managers, and users. Moreover, the implications of the coupled human and natural system approach are critical to sustain pastoralism in Inner Mongolia in both policy and research dimensions. Human components need to be emphasized and well integrated with scientific objectives and policy priorities to equitably balance local people's needs with national or regional conservation and development policies and strategies. The coupled human and natural system approach can help researchers identify the complexities such as reciprocal effects, the influence of differing scales of biological and social organization, and emergent properties (Liu et al. 2007), which could lead to innovative scientific insights that are essential for the development of effective policies that will promote and maintain the ecological and socioeconomic sustainability of pastoralism (Dong et al. 2010). It can also help policymakers understand the interface between social, economic, physical–biological, and ecological models in promoting sustainable pastoralism, which may result in innovative policy decisions that can balance the needs of society with the best scientific knowledge available. Future programs of institutional changes in pastoral society such as small-town

urbanization must include interdisciplinary investigations of socioeconomics, human dimensions of natural resource use, adaptive management processes, information management systems, and syntheses of the state of scientific and indigenous knowledge.

4.4 Role of Ecological and Sociocultural Diversity in the Pamirs of Badakhshan, Afghanistan

4.4.1 Context

The Pamirs, neighboring the Altay Mountains and the Tian Shan, are located between Europe to the west and Asia to the east and between the Middle East and northern Eurasia. This region of Inner Asia has historically sustained extensive nomadism, agropastoralism, and agriculture in its valleys, producing food for subsistence and marketable crops through glacier-fed irrigation (see Fig. 4.9). As the Pamirs were part of the Silk Road, diverse ethnicities engaged in trade which also facilitated exchange of ideas; they were not isolated, as is commonly asserted of mountainous societies (Bliss 2006; Felmy and Kreutzmann 2004; Grotenhuis 2002;

Fig. 4.9 Strategic location of the Pamirs

Kassam 2009a; Kreutzmann 2003; Olimova 2005; Wood 2002). The notion that mountains offer both refuge and isolate human communities is not tenable given the historic evidence of agropastoral activities combined with mining, trade, porterage, smuggling, and even raiding (Kreutzmann 2003). The physical remoteness of the Pamirs has not prevented outside political interference nor limited commercial relations and other exchange within the area. Because of its strategic significance, Inner Asia has been the target of invasions from Arabia, China, Mongolia, and Persia. Most of Inner Asia was under Persian influence until the Arab invasions under the Umayyad and Abbasid dynasties starting in the seventh century. Fatimid religious and cultural ethos also contributed to a flowering of pluralistic Islamic thought, philosophy, and mysticism in Inner Asia (Daftary 1990; Hunsberger 2000).

Since the nineteenth century, the Pamirs have been within the imperial vision of Euro-American interests. Transformation is a continuous and dynamic process in the Pamirs, and the changes from the nineteenth century onward can be viewed as results of the imperialist impulse and are characterized by two phases: (1) the European colonial presence and (2) unfettered globalization. The peoples of the Pamirs have been at the forefront of violations of their autonomy and self-determination in the form of imperial machinations of the British Empire and Russia, and subsequent Cold War alliances between the West and the Eastern Bloc countries. By 1979, the Pamirs had become a major deployment point for the Soviet military poised to invade Afghanistan. Ultimately the Soviet military withdrew amid fierce local opposition with significant financial, military, and logistical support from the USA. In the wake of the Taliban victory, and the subsequent defeat of the Taliban by the US-led alliance after the events of September 11, 2001, a world war manifested as an internal war continues indefinitely with a significant cost to Afghan lives. Now not only are the traditional rivals of the Cold War such as Russia and the USA participating, but China, India, Iran, Pakistan, and Turkey are also exerting their strength as regional powers with global reach. The 36-year global war localized to Afghanistan has left a fragmented state, warlordism, and opium cultivation for global markets, and contributes to regional instability. The consequences are very real and potentially fatal for the people of the Afghanistan as well as those from outside who seek to contribute to their livelihood security and well-being.

Under these conditions, livelihood systems are compromised and the threat of famine is ever present. With sustained political instability, economically the Afghan Pamirs have remained largely ignored by the central government, so local agropastoral knowledge continues to sustain livelihoods of the population and small-scale production prevails. Physical and institutional infrastructure such as roads, health care, education, and electricity have been limited, if not entirely absent (Bliss 2006; Felmy and Kreutzmann 2004; Kassam 2009a). Nonetheless, evidence from the Pamirs of Afghanistan reveals a narrative of pluralism and resilience under conditions of war, dramatic climate change, and potential food crises (Kassam 2009a).

4.4.2 Qualitative Examination of Diversity

As in the case study from the Altay Mountains and the Tian Shan, the livelihoods in the Pamirs illustrate that the inner workings of a system are revealed when it is subjected to systemic stress or perturbations (Kassam 2009b: 233 n5). This is the case of relations between pastoralists and farmers in the Pamirs of Inner Asia. We will qualitatively examine the role of diversity at the level of ecological niche, cultural and religious difference, and ecological professions such as farmers and herders to understand its potential impact on food and livelihood security.

4.4.3 Methods

In 2006, the first author interviewed a group of people from the village of Pul-i-Zirebon. The interviews were based on participatory action research methods (Chambers 1997; Greenwood and Levin 1998; Kassam 2009b). These group interviews were subsequently complemented by individual interviews to obtain greater detail and triangulate information from a variety of sources. Thirty-eight individuals, all male, were interviewed as part of this preliminary research. In the course of the interviews, it became clear that the survival of these people in the face of war and the uncertainties of sociocultural and environmental change depended on mutual support between ethnic groups. Difference seemed to be central to mutual livelihood security for a variety of ethnicities in the region. In 2008, follow-up interviews were conducted to validate the information from 2006 and examine in more qualitative detail the role of sociocultural and ecological difference in providing capacity to adapt to systemic perturbations and stress. To examine this finding, 61 individuals were interviewed, included 45 men and 16 women. In 2009, additional interviews were conducted with Arab Pashtuns (13 women and 7 men) while they were in their encampments near Pul-i-Zirebon, as were more follow-up interviews with the Shugnis in Pul-i-Zirebon (nine women and three men), a total of 32 individuals. The iterative nature of the interviews facilitated exploration of the rather complex interconnections between diversity, ecological zones, and adaptation to sociocultural change. The research was complicated by border crossings from the different regions of the Pamirs of Tajikistan into Afghanistan. In terms of safety and logistics, these were challenging undertakings.

4.4.4 The Role of Difference in Livelihood and Food Security

Although the first author found supporting and complementary evidence that Kyrgyz herders and Wakhi farmers collaborate in the Wakhan region of Afghanistan for mutual food and livelihood security (Kassam 2010), this case study will focus only on the Arab Pashtuns and the Shugnis in Badakhshan, Afghanistan to illustrate this complex and symbiotic relationship.

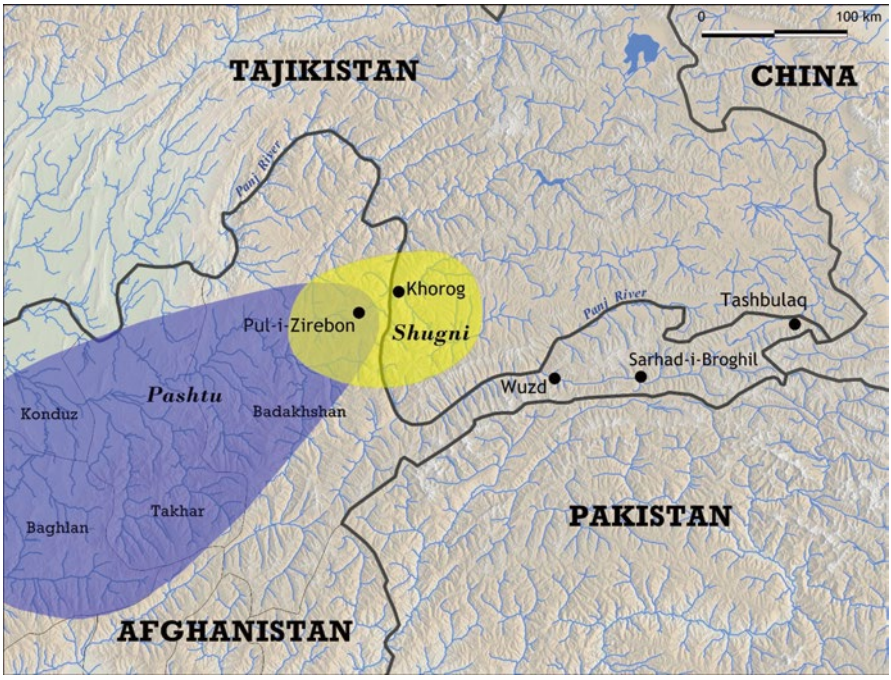

Fig. 4.10 Map of ethnic Pashtun migration from the lowlands into Shugni homelands

The Arab Pashtuns are pastoralists. In the spring, families migrate with their animals from lowlands in the provinces of Baghlan, Konduz, and Takhar to the highlands near Pul-i-Zirebon, in the province of Badakhshan (see Fig. 4.10). Since both humans and livestock depend on salt, villagers from Badakhshan have historically traveled to lowland markets such as Faizabad to purchase it (Barfield 1981). These interactions established trade relationships between the two groups. The Arab Pashtuns are Sunni Muslims and speak Dari, an Indo-European language related to Persian. The Shugnis are highland farmers who live in the region of Pul-i-Zirebon near Lake Shiva, Badakhshan, who also have animals. In the summer, Pashtun encampments and pastures border their villages and pasture lands. The Shugnis are Ismaili Muslims and speak Shugnani (like Wakhi, an Indo-European language of the Pamir group).

The ecological professions of these ethnically and religiously diverse groups are distinct, and seasonally their habitats overlap. Instead of the potential conflict between herders and farmers, it is noteworthy that their interaction is complementary to mutual needs. The Arab Pashtuns arrive in Badkhshan in June and return to the south in September, traveling for 3 weeks to 1 month in each direction (see Fig. 4.11). The Pashtuns consider themselves the wealthier members of the relationship. The measure of their wealth is the number of animals: while the Pashtun nomad is said to have 800–1000 sheep and goats, a Shugni farmer is considered

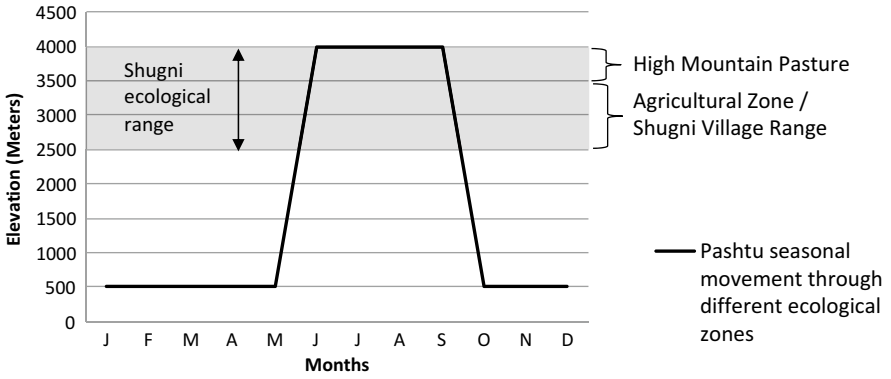

Fig. 4.11 Seasonal overlap of the ecological space of the Pashtuns and Shugnis

wealthy if he has 50 animals. The Pashtuns openly acknowledge the relative poverty of their Shugni neighbors: "We do not fight with them [the Shugni] because they are so poor. Instead, we consider them our brothers." Equally the Shugnis acknowledge the relative wealth and political power of their nomadic trading partners.

The Shugnis grow mainly wheat, barley, and peas and keep livestock such as goats, sheep, and a few cattle, as well as horses and donkeys. When they have surplus crops, the Shugnis are unable to move these commodities to the lucrative southern markets, so they rely on trade with the Pashtuns. Although the Arab Pashtuns carry sufficient rice on their animals in their migration to the highlands of Badakhshan to sustain themselves, they also buy wheat from the Shugnis, as well as dried yogurt while they are in the highlands. The Arab Pashtuns are an important (albeit seasonal) force in Badakhshan as they are the link between the lowlands of the south and the highlands of the north. The difference between these ecological zones works to their advantage in trade and facilitates a symbiotic relationship with the Shugni farmers in Badakhshan. The relationship has been mutually beneficial. The Shugnis obtain tea, salt, oil, ironware, cloth, and kitchenware from the Pashtuns, and sometimes donkeys, cows, sheep, and goats. Mostly, items are exchanged and not purchased with cash. The subsistence agriculture of the Shugnis does not provide the villagers in Badakhshan with sufficient cash to purchase salt, tea, cloth, and ironware from distant markets, and they must make long journeys to Faizabad and Rustaq to obtain necessary goods. Aware of the cash needs of villagers, the Pashtuns bring sufficient cash to the highlands to purchase wheat from the Shugnis (Barfield 1981). This allows the Shugnis to get access to currency for other purchases.

These transactions, which occur between individuals (generally men), are based on relations established between the Shugnis and the Arab Pashtuns over a few of generations. During the interviews, both villagers and nomads reported sustaining relations that were first established by their grandfathers more than 47

years ago. We observed Arab Pashtuns arriving in the village with their camels, horses, or donkeys, having tea at the *Mamon Khana* (guest house), meeting their friend in the village, securing the wheat they require, having the wheat milled into flour, and sometimes spending the night at the home of their Shugni host, and then returning to their encampment. In 2008, dry weather and a shortage of rain resulted in a poor harvest. The cold winter and greater snowfall in 2009 exacerbated the food problem, as supply roads were closed. Conservative estimates indicate that 66 people died of severe malnutrition: 57 children, 7 pregnant women who died while giving birth (newborns, not counted here, did not survive either), a 75-year-old man, and a 60-year-old woman. As the villagers were receiving emergency food aid, the Pashtun nomads arrived to purchase wheat. It is clear that some villagers traded the emergency supplies for cash needed to buy other necessary items. For the Shugnis, there is a delicate balance between survival and famine.

As a result of relations with the Pashtuns, a Shugni villager may ask his nomad friend to bring some items from southern markets, such as cloth and kitchenware**,** on his next trip north. When the Shugnis go south, the Pashtuns extend similar hospitality. Whereas Shugni women do not visit the homes of the Pashtuns in the lowlands, the Pashtun women do visit the homes of the Shugni women when they are in the highlands. In the villages, the Pashtuns not only have an assured place to sleep, but also experience the stability of long-term hospitable relations.

The Pashtuns also help their Shugni friends to secure seasonal employment in the lowlands, particularly in the winter when agricultural activities are at a minimum. The less wealthy Shugnis seek such employment in the southern lowlands and often live at the homes of their Pashtun friends. Their work tends to involve caring for and feeding livestock, collecting fuel for heating the Pashtun homes, and fetching water. They may also work as agricultural laborers, plowing fields in the lowlands and planting rice. They are paid in cash and payment is mutually decided before they come to the south to work. This type of seasonal employment lasts for 1 or 2 months.

As noted earlier, the Shugni farmers also keep animals, using mountain pastures in the summer. However, as they lack the resources to retain a large group of animals through the harsh winter, the Shugnis trade their goats and sheep with the Arab nomads. The Pashtun nomads can pay in cash or exchange the expensive items they have transported from southern markets for goats and sheep to renew or increase the size of their herds. This trade saves the Shugni farmers from potentially time-consuming and expensive travel to lowlands markets. The wealthier Shugnis, those who have more than 50 animals, will give some of their male goats and sheep to the Pashtuns to tend in their pastures during the summer months. In the autumn, on their journey back, the Pashtuns return the animals to the Shugnis. Similarly, during their stay in the highlands, the Pashtuns will bring their injured animals to the Shugnis to tend in the vicinity of their villages. In the winter season, the Shugnis give their male horses and bulls to the Pashtuns to take south and in the spring they bring them back. The Pashtuns also store their extra supplies such as tea and salt in the homes of the Shugnis.

The Shugnis maintain that conflict with their Pashtun neighbors is rare but may arise when the Pashtun shepherds are careless and let their animals graze in Shugni pastures, on crop land, or on land designated for growing fodder. Although the niches overlap, the presence of spatial boundaries speaks to the old adage that "good fences make good neighbors." The Shugnis also pointed out that conflicts are usually resolved in favor of the side that possesses the most resources to influence decisions made by local government arbiters. This would likely be the Pashtuns.

However, both the Shugnis and the Pashtuns are at the mercy of regional government commanders who are extorting animals from the two communities. These local commanders are particularly vicious to the Pashtuns, who have relatively more wealth to extort. The long war and resulting alliances have exacerbated arbitrary enforcement of law. Use of pastures in Badakhshan is highly competitive, and access to new pastures is acquired through purchase, rental, or theft. Pasture rights were established and reorganized in 1921 by Nadir Khan. The Pashtuns have exclusive rights to pastures in the form of *firmans* (deeds) issued by the government. These rights—which are not tribal or common property, but individual family rights—are guaranteed by the state, and they may be bought, sold, rented, or inherited. Whereas the Arab Pashtuns have individual titles to summer pasture use, the Shugni villages have collective title to their traditional summer pastures. The idea of renting pastures reinforces the notion of private ownership (Barfield 1981). In our interviews, the Pashtuns reported increasing difficulties with local government because their lands are under threat from local commanders. In the highlands, these commanders buy up from the government the pasture land on which the Pashtuns have traditionally grazed their animals. They then rent it back to the herders for 4000–5000 afghanis (US$80–100) per season, a significant capital outlay in this region. In many cases, the Pashtuns have deeds to prove grazing rights from the time of their grandfathers, but the local commanders insist that they pay to use the land. Furthermore, in the spring migration of the Pashtuns to the highlands with their animals from lowland provinces such as Baghlan, Konduz, and Takhar, these local commanders control the trails and demand animals in return for safe passage. When the Pashtun tribesmen refuse, the commanders or their henchmen beat the tribesmen and take their animals by force.

The Pashtuns and Shugnis do not practice intermarriage, thereby retaining their cultural distinctiveness. However, Shugni women recalled that in the past when their families were indebted to the wealthier Pashtun tribesmen and women were given to repay the debt: "In earlier days, our ancestors were very dependent on Pashtuns because they were prosperous, and our ancestors were always in debt, which they could not repay, but they would give away their daughter in return for the debt. Now there are no such cases, and may God prevent their return." The giving of daughters as repayment of debt is no longer practiced. Barfield (1981) reported that sometimes close ties between wealthy Shugni farmers and Pashtun nomads are secured by a one-way marriage relationship between Shugni women and Arab Pashtun males. He maintained that Arab Pashtuns refuse to let their women marry Shugni men. However, the interviews indicate that, in fact, both sides reported no marital connections.

The Pashtuns and Shugnis do not share *Mazars* (sacred places). "We do not say bad things about their [Shugni] *Jamat Khanas* (places of prayer) and we do not visit them, and they do not say bad things about our holy places and they do not visit them. Moses had his religion and Jesus had his religion." The Ismaili Muslims, in their places of worship, pray with both sexes present, men on one side and women on the other. There is no physical barrier, and both sexes are given equal preference of space as both equally occupy the space of the prayer hall from front to back. During the summer, while the Pashtuns were visiting the village of Pul-i-Zirebon, women did not attend the *Jamat Khana* for prayer. The Shugni men explained that they were absent to protect themselves from persecution by followers of the more extreme interpretations of Islam, in other words some of the Pashtun tribesmen. The Pashtun women reported that they feared these extreme elements when they were asked if they would let their photographs to be taken. The first victims of the Pashtun-supported Taliban are the Pashtuns themselves, before their violent and intolerant religious dogma affects others ethnic and religious groups. The perpetrators are the victims of their own ideology.

4.4.5 Discussion

The relationship between the Pashtuns and Shugnis is not a mere narrative of economic comparative advantage. It is not based on a simplistic economic calculus. The ecological context and diversity in ethnicity as well as professions provides a sociocultural mechanism for food and livelihood security under tremendous stress. Table 4.4 summarizes the relationship between the Pashtuns and the Shugnis.

The primary difference begins with the ecological niche and professions of the Pashtuns and Shugnis. This sets the stage for a relationship that includes both ecological context and sociocultural distinctiveness. Between the Pashtuns and the Shugnis there is religious distinctiveness that is most visible in their treatment of women and susceptibility to fanatical interpretations of Islam. Yet there is an attempt at mutual respect under very unstable conditions driven by religious rhetoric. There is a linguistic difference that is driven by cultural heritage, but they have learned to communicate with each other to overcome this boundary. The Sunni Muslim Pashtuns are pastoralists who have agricultural land, whereas the Ismaili Muslim Shugnis are sedentary farmers who keep some animals. There is a difference in ecological professions and yet understanding of the role of each other's ability and expertise because some Shugnis go to the lowlands to work on Pashtun lands and Pashtuns bring weak animals to be tended to by the Shugnis as the Shugnis give their animals to be tended by the Pashtuns. There is an appreciation of the practical knowledge that each ecological profession brings to the complementary relationship.

What insights does this case study reveal? Despite the rhetoric of religions and ethnic conflict in Afghanistan, farmers and herders with different ethnicities are not only able to get along but also ensure each other's mutual well-being. Policymakers concerned about food and livelihood security should take note that multiple professions ensure mutual survival. Instead of a homogenous policy response, taking into account the ecological context and sociocultural differences can produce a complex

Table 4.4 Summary of differences in Pashtun and Shugni relations

	Arab Pashtuns	Shugnis	Comparison
Elevation	500–4000 m	2500–4000 m	The Pashtun pastoralists are at lower elevations, migrating upland to the Shugnis
Ecological niche	Lowlands to highlands: valleys and villages in Baghlan, Kunduz, and Takhar with seasonal use of high mountain pastures	Highlands: valleys and village region of Pul-i-Zirabon with seasonal use of high mountain pastures	Seasonal overlap in ecological niche between the Pashtuns and Shugnis. This overlap is used to retain longer-term relations by pastoralists, who store goods for the next season, or farmers requesting items from the next migration, or through seeking seasonal employment
Religion	Sunni	Shia Ismaili	Demonstrate diversity in religious distinctiveness and attempt to respect each other's faith
Language	Dari	Shugni	Cultural distinctiveness
Profession	Nomadic pastoralists with some agricultural land	Sedentary farmers with some livestock	Sunni Muslims are pastoralists who have agricultural land, whereas Ismaili Muslims are sedentary farmers who keep some animals
Trade items	Livestock, kitchenware, ironware, salt, and other items from southern markets, cash	Wheat, animals, dried yogurt	The Pashtun pastoralists bring items from southern markets to trade them for agricultural items in the highlands with the Shugnis
Employment	Employer	Employee	Pastoralists employ farmers. Farmers also give their animals for care to the pastoralists

and yet sustainable outcome. This case study illustrates that the sociocultural aspects of pastoralism are embedded within the ecological and both need to be taken into account in policy formulation. The war in Afghanistan has been very long and is an effective test because it is a system under constant anthropogenic perturbation from international, regional, and local sources. Nonetheless, the Pashtuns and Shugnis demonstrate agency under these unstable conditions by ensuring that their differences through ecological and sociocultural contexts are a practical asset.

4.5 Conclusion: Reflection on the Three Case Studies

The first case study illustrates an effort by the central government in China to homogenize and transform livelihood strategy by sedentarizing ethnic communities that have historically practiced pastoralism. The net effect is removal of

sociocultural and ecological diversity from the system. It is an example of the core trying to assert administrative authority in the name of ecological restoration while pursuing strictly an instrumental agenda of economic extraction of key renewable and nonrenewable resources. After sedentarization of the Kazakh population, a variety of town-based livelihood practices such as crop production, wage income, and small businesses fail in these indigenous societies in comparison with the practice of pastoralism. The Kazakhs lack the knowledge as well as the sociocultural and ecological context to make such livelihood activities a success, which has been the hallmark of Chinese development. Chinese policymakers are trying to "civilize" the Kazakh pastoralists in their own image. The objective of their policy is to eliminate differences in ecological and economic profession, and the net effect is livelihood insecurity concentrated among former pastoralists with Kazakh identity. Chinese government policy is in fact fueling unsustainability of Kazakh pastoralism.

The second case study, from Inner Mongolia, China, reiterates the first case study, where government policy in the form of the LGDCRS and GEPP increased ecological and economic vulnerability through institutional change. Nonetheless, pastoralists are developing adaptive capacity by drawing on their historical human ecological relations to sustain pastoral livelihoods, again illustrating indigenous approaches to common pool resources is key to survival. This case study also illustrates that diversity as presented through the history of indigenous rangeland management and pastoralism is a necessary livelihood strategy in Inner Mongolia.

The final case study illustrates that weak central government is also adding to regional instability in Badakhshan, Afghanistan, but in contrast, its relative weakness is making posible the existence of diversity to contribute to the food and livelihood security of both farmers and herders alike. Here difference in an ecological context, religious interpretation, ethnicity, and ecological profession is clearly an asset for survival. Although the Pashtun pastoralists are wealthier than the Shugni farmers, when their ecological zone overlaps with that of the Shugnis in the highlands, the Pashtuns are dependent on the Shugnis. This recognition and retention of difference facilitates mutual dependence and contributes to survival of both communities.

Choice by different ethnic human societies to engage in pastoralism is a time-tested practice that has historically proven itself under conditions of stress in both China and Afghanistan. An important insight that these three case studies illustrates is that policy intervention without recognition of sociocultural and ecological context can prove to be a source of instability for livelihood and food security of marginalized ethnic populations under the modern nation state.

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