

Spatial and Social Boundaries and the Paradox of Pastoral Land Tenure: A Case Study From Postsocialist Mongolia

María E. Fernández-Giménez¹

Mobile pastoralists are subject to potentially conflicting needs for secure resource tenure and socially and spatially flexible patterns of resource use. This paradox of pastoral land tenure poses problems for the application of common property theory to the management of pastoral commons. The vagueness, permeability, and overlap of boundaries around pastoral resources and user groups complicate the implementation of formal tenure regimes designed to address insecure pastoral tenures and unsustainable land use patterns. A case-study from postsocialist Mongolia is used to illustrate the problem of spatial and social boundaries for managing pastoral commons. Three solutions to the paradox are evaluated: tenure formalization, rangeland comanagement, and regulation of herders' seasonal movements. An approach that develops and tests institutions to coordinate pastoral movements is recommended over formal tenure for pasturelands, which should be approached with caution in Mongolia.

KEY WORDS: assurance problem; boundaries; comanagement; common property; economic transition; land tenure; Mongolia; nomadic pastoralists; rangelands; resource management.

INTRODUCTION

Pastoralists living in spatially and temporally variable environments have conflicting requirements for resource-use rights. On one hand, they need reliable rights to key resources without which their herds will perish. On the other, they need to be flexible in their patterns of resource use and social

¹School of Renewable Natural Resources, 325 Biosciences East, University of Arizona, Tucson, Arizona 85721; e-mail: gimenez@ag.arizona.edu.

relations to accommodate ecological, climatic, political, and economic uncertainties. Many pastoralists in variable and low productivity environments also require access to a diversity of habitats over a year to sustain their herds. In short, pastoralists need both security and flexibility in resource tenure, and often require diversity as well.

The paradox of pastoral land tenure poses an obstacle for the management of pastoral commons, as well as common property theory: How to define spatial and social boundaries around resources and user groups in situations where spatial and social flexibility are intrinsic and essential characteristics of resource use patterns? This essay explores the implications of spatial and social boundaries for the management of pastoral commons, drawing on fieldwork in Mongolia to illustrate the paradox of pastoral land tenure and consider possible solutions. In the twenty-first century, Mongolian pastoralists struggle to continue a tradition of seminomadic transhumance that spans millennia, while they confront major institutional challenges following the dissolution of the socialist livestock collectives that regulated herd movements and allocated pasture for the past 70 years. In the first section of this paper I review the terminology of common property and elaborate on the paradox of pastoral land tenure and the shortcomings of common property theory in light of this dilemma. After a brief description of the study sites and methods, I describe the historical context of land use and land tenure in Mongolia and summarize the current situation at the case study sites in Bayankhongor Aimag. I then identify specific challenges to defining spatial and social boundaries in this Mongolian context and evaluate three approaches to solving this dilemma. I conclude that institutions that support and regulate specific land use practices—such as seasonal mobility—may be preferable to those that emphasize formalization of property rights and the rigid delineation of the spatial and social boundaries these imply.

COMMON PROPERTY INSTITUTIONS AND THE PARADOX OF PASTORAL LAND TENURE

Well-defined and secure property rights are believed to improve the chances that resource users will regulate their use to provide for the long-term sustainability of the resource. A *property right* is a social relationship between a resource user and other potential users, with respect to a particular object, place, or feature of the land (Ostrom and Schlager, 1996). A property right authorizes use by an individual or group, and simultaneously implies a duty to respect that right on the part of others. Authorized actions can include one or more of the following: access, withdrawal, management, exclusion, and alienation, each in turn implying a greater scope of authority than the

last (Ostrom and Schlager, 1996). Property rights are typically classified as *private property*, in which the right to exclude and regulate use is held by an individual or quasi-individual such as a corporation; *state property*, which is held and regulated by the state; or *common property*, in which a group of users excludes others and regulates use among themselves. *Open access* is defined as the absence of controls over resource access or use (Bromley, 1992; Feeny *et al.*, 1990). Secure rights or secure tenure refers to a situation in which the rights-holder has a justifiable expectation that resources she conserves today will be available for her future use (Ostrom and Schlager, 1996).

Although actual tenure regimes seldom conform to the idealized categories of property defined by scholars (Davidson-Hunt, 1997; Feeny *et al.*, 1990; McCay and Jentoft, 1998), investigation of the conditions under which common property regimes succeed or fail has fed twin streams of empirical and theoretical inquiry. Clear definitions of spatial resource boundaries and of membership in rights-holding groups are thought by many scholars to be essential prerequisites of secure tenure and hence successful common property resource management regimes (Bruce, 1999; Ostrom, 1990, 1992; Shanmugaratnam *et al.*, 1992; Swallow, 1994). The logic of this argument can be summarized as follows: (1) secure and exclusive tenure is essential to the development of successful institutions to manage jointly used resources, (2) tenure security depends upon the ability to exclude outsiders, and (3) delineation of social groups and spatial boundaries determines who is excluded from what/where and is necessary to achieve exclusion. According to this approach, defining and enforcing social and spatial boundaries is an essential prerequisite for the development of effective institutions for self-regulation.

Recently, increasing attention has been given to the problems of defining and specifying rights to resources that are used in spatially and socially flexible ways (Casimir, 1992; Cousins, 1996; Peluso, 1996; Turner, 1999b). The resources present in any given unit of analysis may be multiple, overlapping, and vary across space and time (Bruce *et al.*, 1993; Lane and Moorehead, 1995). Similarly, user groups may vary in size or composition with respect to different resources within an area, and with respect to a single resource over time (Peluso, 1996; Schoonmaker Fruedenberger *et al.*, 1997).

The problem of defining spatial and social boundaries is especially relevant to pastoral peoples living in highly variable arid and semiarid environments. The extreme variability of the environments pastoralists inhabit, coupled with the ever-shifting political-economic landscapes they must negotiate, require that pastoralists maintain the freedom to move rapidly and opportunistically and to draw on social networks to access all types of resources (labor, transportation, state bureaucracy, and markets as well as

essential pasture and water). As a result, pastoralists often exhibit great flexibility in both social organization and patterns of resource use over time and space (Casimir, 1992; Ellis and Swift, 1988; Gilles, 1988; Spencer, 1990; Spooner, 1973; Turner, 1999b).

The hallmarks of pastoral land use and livelihood strategies in these environments are mobility, flexibility, and reciprocity (Fernandez-Gimenez, 2000; Niamir-Fuller and Turner, 1999). Mobility enables herders to access a diverse array of resources during the annual production cycle and to exploit patchy and temporally variable environments. Reciprocal social relationships at different scales (household, locality, region) support mobile and flexible resource management strategies by facilitating access to emergency pastures, transportation, or other key productive resources in exchange for reciprocal resource access privileges, labor, goods, bureaucratic or market access, or other social or political favors.²

The paradox of pastoral land tenure stems from pastoralists' needs for secure use rights that accommodate this flexibility. Security ensures that conserved resources (such as winter or dry-season pastures) will be there when needed, while flexibility ensures that alternative resources can be accessed in emergencies. Security depends on clearly defined territorial boundaries and group membership, and the ability to enforce them, while flexibility tends to require permeable and elastic spatial and social boundaries. These features make the codification of tenure and delineation of spatial and social boundaries within pastoral areas problematic (Lane, 1998; Scoones, 1995; UNSO/UNDP, 1994; Vedeld, 1994) and raise questions about how common property theory applies to arid and environmentally variable rangelands. Are there ways to achieve tenure security that don't require strict social and spatial boundary delineation? Can self-regulation be successful in the absence of defined boundaries?

Experiences from Africa (Sylla, 1995) suggest that attempts to confine pastoralists to small and rigidly defined territories nearly always fail. Scoones (1999) reported that attempts to define strict boundaries and limit membership led to increased conflict and disputes. Ensminger (1996) describes cultural explanations for the failure of land titling systems in Africa, including the mismatch between ecological realities of pastoralism and fixed boundaries, and between the fluid nature of households and the inflexibility of title deeds. In Inner Mongolia, the allocation of grazing lands to individual

²In many cases, including Mongolia, these reciprocal relations are informal and are not balanced exchanges. Rather, there is an expectation, often embedded in an ethic of access, that outsiders granted access to forage will return the favor if circumstances are reversed. This need for social flexibility is not equivalent to open access (Turner, 1999a,b). Usually, outsiders who seek access to another group's resources must offer some form of payment, often nonmaterial, in exchange for access.

households under the 1995 Grassland Law led to increased ecological degradation and conflict among resource users (by concentrating grazing pressure on common-use lands outside individually owned fenced pastures), limited herders' flexibility in response to drought, and disenfranchised secondary rights-holders (Hanstad and Duncan, 2001; Williams, 1996). Interventions that attempt to define group membership rigidly also often fail, as in the case of African pastoral associations cited by Sylla (1995), leading to her recommendation that membership rules allow for some flexibility. Similarly, Cousins (1996) suggested that nonexclusive forms of tenure are most appropriate in so-called nonequilibrium ecosystems.

One way to avoid the problem of boundary delineation is to focus on resource management institutions other than formalized property rights (titles, leases, contracts), such as those that guide seasonal herd movements in many pastoral societies. An institution that regulates mobility may constitute a de facto tenure regime by indicating when, where, and for how long grazing may occur. Like formal property rights, these institutions can foster shared expectations of behavior among resource users. They differ in their emphasis on regulating how a resource is used, rather than on resource allocation. The tenure of the commons argument implies that property rights are a prerequisite to other management institutions. Perhaps if management institutions such as those that regulate mobility are strong, they reduce the necessity for formalized property rights.

My argument rests in part on the "assurance problem" approach to common property proposed by Runge (Runge, 1984, 1992; also see Lane and Moorehead, 1995). Runge argues that the intrinsically interdependent nature of individual resource-use decisions in developing economies makes maximizing (free-riding) behavior unlikely. In these socioeconomic contexts individual decisions are influenced not only by the actual cumulative actions of other group members, but also by expectations about those actions (Runge, 1992). "The key element that determines the success or failure of institutions is therefore the extent to which the institutions foster coordinated expectations in relation to a particular physical and social environment" (Runge, 1992, p. 30). Formal, enforced property rights provide such coordinated expectations. Institutions that regulate mobility can also foster mutual expectations about other herders' behavior.

CASE STUDY SITES AND METHODS

The case study is drawn from fieldwork conducted in two districts or *sum* in Bayankhongor Aimag (province) in west-central Mongolia, approximately 700 km from Mongolia's capital city, Ulaanbaatar (Fig. 1).

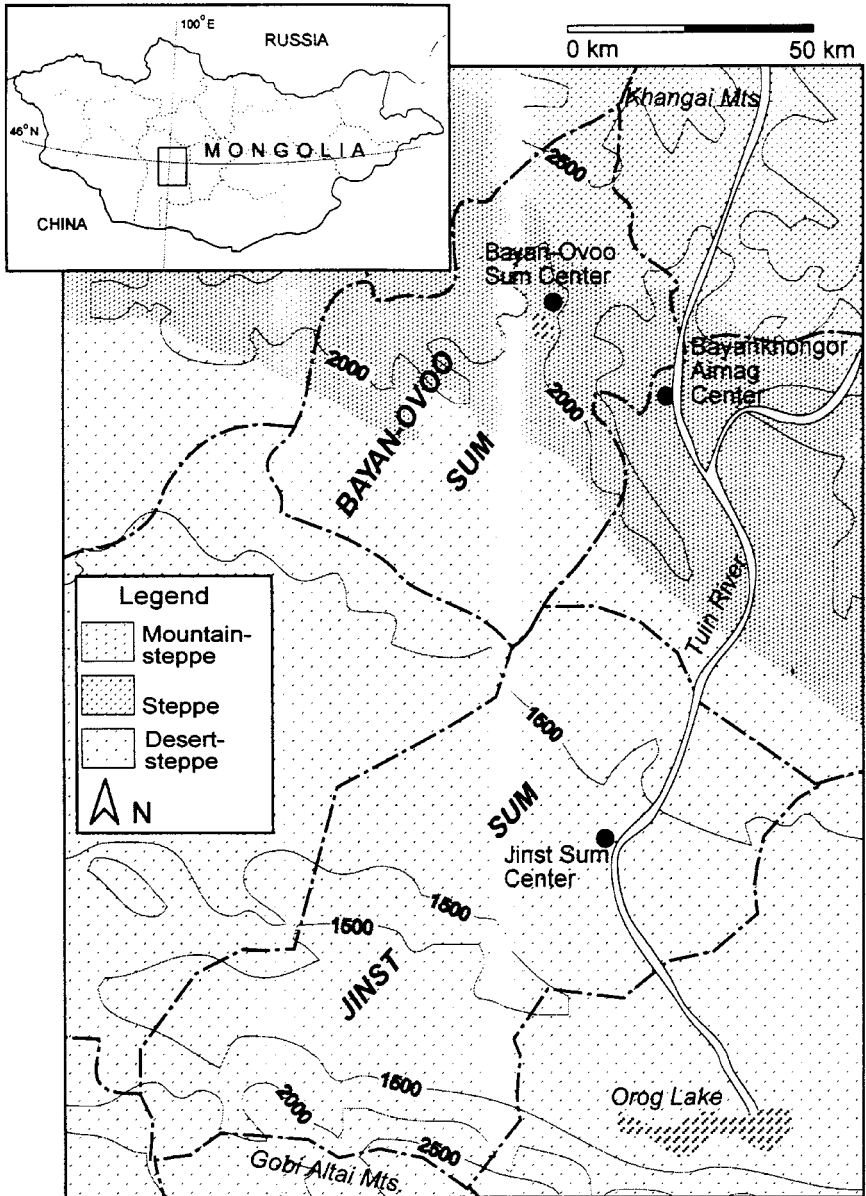


Fig. 1. Map of study areas.

Jinst Sum (5002 km²) is located in the desert-steppe ecological zone some 100 km south of the provincial capital. Bayan-Ovoo Sum (3213 km²) encompasses steppe and mountain-steppe ecosystems and is located about 25 km northwest of the provincial capital. In 1995 livestock densities in Jinst Sum were 3.2 ha per sheep forage unit, and in Bayan-Ovoo Sum 2.8 ha per sheep forage unit. (A sheep forage unit is an animal equivalency unit equal to the amount of forage consumed by one sheep in one year.) In each *sum* one administrative subdistrict or *bag* was selected as a study community.

During 1994–1995, I spent 10 months living with herding camps in these two communities as a participant observer, and conducted formal, semistructured, and informal interviews with herders and local officials. My overall research objective was to determine how the transition to a market economy affected herders' livelihoods and pastoral land-use patterns, and what the ecological consequences of these changes might be. Interviews focused on herders' knowledge and perceptions of environmental and land-use change, and their explanations of pasture and water tenure. A survey of a stratified, random sample of herding households ($N = 102$) covering land-use behavior, land tenure, and household production, consumption, and demographics was conducted early in 1995, and a subset of the original sample of households was resurveyed in 1999 ($N = 58$). Households were stratified based on wealth rankings conducted independently with 3–4 herders in each study area (Grandin, 1988). The objectives of the survey were to document patterns of resource access and use, and identify factors directly and indirectly associated with variations in mobility and other resource use behaviors such as reserving winter pastures, trespassing on campsites, and grazing out of season. (A complete discussion of the survey methods and results may be found in Fernandez-Gimenez, 1997).

PASTORAL PRODUCTION AND THE TRANSITION TO A MARKET ECONOMY IN MONGOLIA

The Pastoral Production System

Twenty percent of Mongolia's 2.5 million inhabitants are pastoralists who herd some 30 million head of livestock. Half of the nation's population depends directly or indirectly on the pastoral economy for its livelihood, which accounts for over 30% of Mongolia's gross domestic product (MBDA and Tacis, 1996). Over 70% of Mongolia's 1.56 million square kilometers are perennial grasslands or shrublands, most of them arid to semi-arid (Danida, 1992). The limited and highly variable rainfall, together with frequent droughts in the arid regions and periodic severe winter storms throughout the nation, give rise to the nomadic land-use strategy Mongolian

pastoralists have used for centuries. Herders have traditionally moved their herds with the seasons to obtain the necessary nutrients, water, and shelter for their animals, matching the seasonal resources available to the nutritional and reproductive status of their livestock. Herders describe three main reasons for their mobile style of animal husbandry: animals that stay in one place do not get fat, animals that stay in one place are more prone to disease, and people and animals must move to avoid droughts and deep snows and find forage for their animals so that herds and their keepers can survive. Typically, herders spend the summer months camped near natural water sources (rivers, lakes or springs) and make use of pastures far from water in the winter months, when they can rely on snow for domestic and livestock water. Wells may be used throughout the year, but are used more often in the dry spring, fall, and winter seasons than in the rainy summer season. Within this basic pattern there is great geographic diversity, depending on the productivity of the land, the diversity of local resources and topography, and the species of animals herded. Mongols traditionally keep five types of livestock (camels, cattle, horses, sheep, and goats), although the proportion of each type in a herd varies among geographic regions, and to a lesser extent, with wealth.

Despite a long-term decline in nomadic mobility over the past century, seasonal movement and nomadic flexibility remain essential management strategies of Mongolian pastoralists, who readily articulate the ecological rationales for their mobile lifestyles (Fernandez-Gimenez, 2000). Herders adhere to two basic norms of pasture use. First, they set aside pasture for use in the harsh, nongrowing seasons of winter and spring. Grazing of these reserve pastures out of season, whether by their customary user or by a trespasser, is discouraged, usually through informal social pressure. Second, in case of a climatic disaster such as a drought or severe winter storm, herders in a less affected area allow outsiders from the disaster-struck locale access to their local pastures, including reserves, with the expectation of reciprocal treatment if circumstances are reversed in the future. Herders' need for secure rights to pasture is emphasized by the norm of reserving winter pasture and discouraging out-of-season grazing. The need for flexibility is highlighted by the norm of reciprocity that facilitates cross-boundary use of resources in times of disaster.

Historical Institutions and the Transition to a Market Economy

Before 1924, Mongolia was divided into some 100 hereditary territorial units (*khoshuu*) held by secular or religious nobles. In the study area, the powerful lama (religious leader) who controlled the territory allocated pasture and regulated the seasonal migrations of his subjects. Informal,

customary institutions of pasture use enforced by herders coexisted with this formal regulatory system (Fernandez-Gimenez, 1999b). From 1924 to 1990 Mongolia operated under a Soviet-influenced socialist government with a centrally planned socialist economy. By 1960 all herders had joined livestock collectives where they herded state-owned animals for a regular salary under the close supervision of the collective administration, which took over the role of allocating pasture and regulating pasture use. While the scope of nomadic migrations was curtailed during the collective era, the basic tenets of seasonal mobility were upheld and enforced, supported by subsidized transportation, auxiliary labor, and water developments.

In 1992, following Mongolia's first democratic elections in 1990 and the liberalization of the pastoral economy, herding collectives were dismantled and most state-owned livestock was privatized. Pasture land remained state-owned, to be used in common by the herders of defined *sum* and *bag*. Herders became entirely responsible for their own herd management decisions, as well as all production risks and inputs. Once the collectives were dismantled, there was no longer a formal regulatory entity to govern pasture use. The infrastructure collectives provided, such as transportation for seasonal movements, auxiliary herding labor, veterinary services, and maintenance of water developments, also vanished. The number of herding households increased as economic conditions in settlements declined and town-dwellers acquired livestock and moved to the countryside to become herders.³ The quality and availability of social services to herders declined sharply with the withdrawal of support from the Soviet Union. With the collapse of the state procurement system, herders had few channels through which to market their animals and terms of trade for herders plummeted. As a result of these changes, poverty, virtually unknown in Mongolia during the collective period, rose sharply following privatization, with 27% of the population falling below the official poverty line in 1994 (Griffin, 1995). Although Mongol society is not highly stratified, growing disparities in household well-being among herders are well documented (Cooper, 1995; Mearns and Dulamdary, 2000).

Impacts of Economic Change on Pastoral Land Use

The increase in herding households due to urban–rural migration did not lead to an immediate increase in *sum*-level stocking densities. Existing livestock were redistributed among a greater number of households, rather

³In Bayankhongor Aimag, the number of rural households increased from 8510 in 1989 to 14,903 in 1993. Though some of this increase was due to the creation of “fictitious” households, such as the premature establishment of unmarried children in their own households in order to procure more livestock through privatization, there is little doubt that urban–rural migration contributed significantly to the increase in herding households.

Table I. Differences in Pasture Use Behaviors of New Herders (Recent Entries Into Herding) and Old Herders (Who Herded for the Collective), and Herders From Jinst and Bayan-Ovoo

	New herders (<i>n</i> = 29)		Old herders (<i>n</i> = 70)		Jinst herders (<i>n</i> = 58)		Bayan-Ovoo herders (<i>n</i> = 44)	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Set aside winter, spring, or emergency reserve pasture	24	83	61	87	49	86	36	86
Grazed own winter reserve pasture out of season	12	44	22	31	13	23 ^a	21	53 ^a
Grazed own spring reserve pasture out of season	17	63	50	50	25	44 ^a	27	68 ^a
Camped in a site belonging to another household	14	48*	20	28*	10	17**	24	57**
Own campsite used by others without permission	7	25	17	24	10	17 ^a	14	34 ^a
Customary winter pasture grazed by others without permission	16	57	30	42	16	28**	30	73**

^aFrequencies in the same line with the same superscript differed with significance $p < 0.05$ using Pearson's chi-square.

* $p < 0.10$; ** $p < 0.001$.

than being imported from outside. However, a series of mild winters led to an increase in the livestock populations of both *sum* by 1999. Despite the significant influx of “new” herders, defined as herders who had not herded livestock for the collective prior to 1990, herders overall continued to articulate the basic norms of pasture use. Most herders attempted to set aside reserve pasture and understood the negative ecological consequences of grazing out of season.

Nevertheless, rates of out-of-season grazing and trespassing were high, especially in areas with many new herders, such as Bayan-Ovoo (Table I), suggesting that many new herders were compelled by circumstance to violate pasture use norms. In Bayan-Ovoo, where 47% of the households surveyed in 1995 were new herders, 73% of the surveyed households reported that their customary reserve pasture was grazed by others, and 68% reported grazing their own reserved spring pasture out of season. In addition, mobility declined after privatization and year-round use of certain pastures increased. These key pasture areas—desert riparian pastures in Jinst and winter and spring mountain pastures in Bayan-Ovoo—were formerly grazed during only one or two seasons each year. Lack of access to services and markets and an increase in part-time and town-dwelling livestock owners, coupled with the loss of the regulatory function of the collective, led to high concentrations of livestock near settlements and roads and an underuse of more remote pastures.

The precise causes of these changing patterns of pasture use are difficult to determine. Material and institutional factors both appear to play a role. From 1990 to 1995 livestock populations did not increase significantly in the study sites, making it unlikely that an overall shortage of pasture was a significant cause of behaviors documented in the first survey. However, point resources such as campsites were in short supply in Bayan-Ovoo, where there were many new herders. Survey data, interviews, and observations all indicate that increasing wealth differentiation contributed to declining mobility in poor households, who often lacked access to livestock, transportation, and labor, and whose claims to pasture and campsites were often weaker than those of wealthier households (Fernandez-Gimenez, 1997). Poor and new herders were more likely to gain access to forage resources indirectly, through association with wealthier or well-established kin or acquaintances who held strong hereditary rights to particular campsites and pastures (Table II). This meant that their rights to pasture were more tenuous, they were more reluctant to defend them, and may have been more prone to trespass on the pasture of others. (The nature of pasture rights will be more fully explored in the next section.)

Institutional factors also strongly influenced herders' behavior. With the absence of formal or customary regulation of pasture use, and the presence of significant material constraints to mobility, herders lacked confidence that other herders would respect norms of seasonal pasture use. Herders sometimes lagged behind to protect key resources or left early for the next pasture area to stake a new claim. Often, those who stayed close to their winter pastures far into summer in order to protect them ended up grazing them out of season inadvertently. Without functional institutions to regulate pasture use, herders lacked coordinated expectations of each others' behavior, and

Table II. Sources of Rights to Winter Pasture by Wealth Group for the Pooled Sample of Jinst and Bayan-Ovoo Sum

	Group 1 ^a (n = 26)		Group 2 (n = 26)		Group 3 (n = 23)		Group 4 ^b (n = 24)	
	N	%	N	%	N	%	N	%
Inherited rights from parents	8	31	7	27	4	17	5	21
Spouse inherited rights	0	0	1	4	3	13	3	12.5
Camped with distant kin or friends to gain secondary access rights	1	4	5	19	3	13	8	33
Used area during collective period	3	11.5	4	15	6	26	5	21
Claimed access rights via <i>sum</i> residence or "birthright"	11	42	9	35	5	22	3	12.5
Other sources	3	11.5	0	0	2	9	0	0

Note. Herders differed ($p < 0.10$) in source of rights to pasture among wealth groups.

^aWealthiest.

^bPoorest.

resorted to individualistic strategies to ensure access to key resources, even though this behavior violated local norms and increased their vulnerability to livestock losses in a bad winter or drought.

PASTORAL TENURE AND SPATIAL AND SOCIAL BOUNDARIES

The current pattern of pastoral land-use in Mongolia can be characterized as a downward spiral of decreasing mobility and increasing out-of-season grazing. The absence of strong formal or informal institutions to regulate and allocate pasture contributes to this vicious cycle, forcing us to ask: Can herders reorganize themselves to manage their pasture sustainably? The prevailing wisdom suggests that clearly defined property rights would be a good starting point, and these in turn require defining territorial boundaries and group membership (Ostrom and Schlager, 1996). In Mongolia, there are four major obstacles to defining clear spatial and social boundaries for common property resource management regimes. They are (1) herders' use of multiple, overlapping, and contingent resources with (2) inherently fuzzy or constantly shifting resource boundaries used by (3) multiple and overlapping user groups who subscribe to (4) an ethic of access that makes it difficult to exclude potential users. This section of the paper elaborates on these challenges and illustrates how these factors complicate boundary delineation for common property resource management in Mongolia.

Use of Multiple, Overlapping, and Contingent Resources

Mongolian herders rely on a wide range of resources to sustain their diverse herds over the four seasons with virtually no outside inputs. In addition to each seasonal pasture (winter, spring, summer, and autumn) and the different habitat types within each season's grazing area (e.g., riparian and upland vegetation, north- and south-facing slopes), these resources include: campsites; shelters and corrals; natural water sources (lakes, rivers, and springs); mineral licks; several types of wells (hand, mechanical pump, and diesel-fueled pump); hay-cutting grounds; and dung, fuelwood, berry, and wild food gathering areas. The property rights associated with each type of resource vary, as do the nature of the rights-holders (individuals or groups of various sizes), the basis for the rights, and their enforceability.

Structures

Shelters and corrals have been privately owned by individuals or households since 1992–1993 when collective assets were distributed. Some herders

purchased existing shelters while others built new shelters. Ownership of structures is transferable by sale. Possession rights to structures are relatively easy to enforce as long as owners are present to defend their property. In their absence, shelters are sometimes vandalized. Possession of structures is important to securing rights to a campsite.

Campsites

Rights to campsites may be inherited, claimed by virtue of customary use, use during the collective, or simply by occupancy of a vacant site. In Jinst and especially in Bayan-Ovoo, availability of winter and spring campsites is limited, since a campsite during these seasons requires a sheltered spot, usually a protected nook on a mountainside, in a canyon, or on the lee side of a hill. More importantly, a good campsite is developed over time and has many winters accumulation of dung, which insulates animals and people against the cold, and may be used by herders as fuel. There are not enough campsites for each households to possess its own. However, it is customary for households to camp together in small groups called *khot ail*.⁴ *Khot ail* tend to be larger in the more productive, mountain-steppe zones and smaller in the more arid, desert steppe regions. Rights to the campsite are customarily vested in the senior herder in the camp.

Historically, the enforceability of rights to campsites was greatest when herders had used the same campsite for years or generations, and it was widely recognized as the property of a given *khot ail*. Following privatization in 1992, herders increasingly relied on ownership of shelters to claim de facto rights to the underlying campsites and surrounding pasture. While shelter ownership strengthened claims to these other resources, a shelter could also be a liability, vulnerable to vandalism and theft, and a disincentive to mobility as some herders preferred to remain near their shelter year-round to discourage vandalism. In 1998, the government began to issue formal certificates of possession for campsites. Investment in shelters may indeed have been wise, since herders who can show tangible evidence of past use and occupation of a campsite appear more likely to receive a certificate than those who cannot. A potentially troubling aspect of certificate allocation is that often only one name (typically that of the senior herder in the camp) appears on a certificate issued to a herding camp composed of multiple households. Since herding camps are highly variable in composition

⁴The households in *khot ail* are often, but not always, related through kinship. Within a *khot ail* households pool their livestock into same species herds (sheep and goats, cattle, horses, and camels) achieving economies of scale in herding labor. Households within a *khot ail* also usually share tasks such as hay-cutting and making nomadic moves. However, the composition of *khot ail* is seldom stable and often shifts from season to season and year to year.

from year to year and season to season, herders whose names do not appear on formal certificates may have far weaker claims to campsites, even if they were members of the *khot ail* when the certificate was issued.

Pasture

Rights to graze winter and spring pasture usually adhere to a *khot ail* or sometimes to a loosely constituted “neighborhood”⁵ of *khot ail* occupying the same valley (*neg nutgiinkhan*) or camped around a single water source (*neg usniikhan*). The sphere of influence over the pasture is greatest close to the campsite and diminishes with distance, pasture boundaries are inherently fuzzy, and the pasture used by several nearby *khot ail* often overlap.

Rights to pasture acquired through direct inheritance hold the greatest force, in part because lineal inheritance is a longstanding basis for pasture rights in Mongolian society (Potkanski and Szykiewicz, 1993; Vreeland, 1957). A pattern of continuous use by one household or *khot ail* dating back to the collective period also is broadly respected. Wealthy herders often claim access rights based on a “birthright,” and effectively assert exclusive use rights through the status and power they wield among other local herders. In the 1995 survey, this was the most common basis for claims overall and among the wealthiest herders. Poorer and newer herders often camped with kin or acquaintances and gained temporary access privileges, but not secure or exclusive use rights, through negotiations and exchanges of labor. Such secondary access rights often must be renegotiated each year. These herders are unable or do not feel empowered to exclude potential trespassers from the winter pastures they use. Their status as secondary rights holders coupled with the transient nature of their access arrangements, preclude reserving winter pastures as custom dictates. In contrast, secure use rights increase the chances that a household will effectively control access to winter and spring pastures, making it easier to set aside customary winter and spring reserves.

In summer pastures, water and forage are plentiful and there is no need for a well-developed campsite in a sheltered area. In consequence summer pastures are essentially open access resources for all the herders in a particular *sum*, and often for others from outside *sum* boundaries, particularly those with kinship ties. The status of autumn pastures varies, but they generally are considered similar to summer pastures and open to all.

⁵*Neg nutgiinkhan* (people of one place) and *neg usniikhan* (people of one water), have been identified by some Mongolian and foreign researchers as social groupings that could play an important role in pasture management in Mongolia (Mearns, 1993, 1996). Others dispute the existence of such groups as a construct imposed by social scientists (Sneath, 1993). In my experience, there are at least some areas where herders self-identify as members of *neg nutgiinkhan*.

Water

Rights to vital water resources likewise vary from quasi-private property rights in hand-dug wells where the digger or his descendants use the well exclusively, to common property rights to hand-dug wells used by a small, self-regulating group, to leased state property for wells equipped with diesel pumps. Many mechanical wells developed by the state during the collective era have fallen in disrepair and been converted to hand-drawn wells. These wells are usually the common property of small, self-limiting groups of herders, where new herders must negotiate use rights with the existing users. For shared hand and mechanical wells, users generally set an informal watering schedule, primarily to prevent herds from inadvertently mixing at the well.

Leases to diesel pump wells are granted by local government to individuals who take responsibility for well maintenance. In some cases, individual herders with large flocks will use the leased well exclusively. More commonly, the lease holders allows other herders access in exchange for payment of part of the diesel fuel and maintenance costs. A formal watering schedule is set by the lease holder-manager.

Lakes, rivers, and natural mineral licks are open access resources according to the Land Law, while small springs and streams are often managed as common property by small groups of households, which informally organize water use among members, setting a schedule for watering herds.

The rights described above are overlapping and contingent. While the inhabitants of an entire *bag* (50–200 households) may have the right to graze and seek a campsite within a given territory, smaller subgroups (*khot ail* or households) hold exclusive rights to wells and campsites within the area. Shelters and campsites provide examples of contingent use rights. Ownership of a shelter secures rights to a campsite, and secure rights to a campsite (through a shelter or possession certificate) ensure access to surrounding winter or spring pastures. A herder without his own campsite who is unable to join an established *khot ail* may not be able to make use of nearby pastures. Similarly, even if a campsite is available, if a herder is unable to negotiate access to a well or spring with the well-using group, he may not be able to use the surrounding pasture unless an alternative, open access, water source is available.

Inherently Fuzzy and Shifting Resource Boundaries

The boundaries of point resources such as wells and campsites are relatively easy to delineate. However, the spatial boundaries of pasture lands are much more difficult to define, and constitute a blurry sphere of influence

which inevitably overlaps with others' territories at its edges if not throughout. Furthermore, since the productivity of pasture varies unpredictably from year to year and season to season, the spatial boundaries of pastoral territories are constantly shifting as herders migrate to the best grass and water, and cannot be strictly delineated at any but the broadest scales. The contingent nature of pasture rights and the spatial and temporal variability of forage leads to a pattern of pasture use that is point-centered and unbounded, not unlike that observed by Turner (1999b) among Fulani pastoralists.

Multiple and Overlapping User Groups

The multiple and overlapping resources described above are associated with multiple and overlapping groups of users. Social groupings in Mongolia tend to be either residence-based (such as the *khot ail*, *neg nutgiinkhan* and *bag*) or kinship-based, or both. Membership in both types of groups is fluid, as kinship relationships are subject to elastic definitions, fictitious kinship is common (e.g., adoption and “blood” brother or sisterhood), and place of residence varies between seasons and years. For example, a household may use the same four seasonal pastures repeatedly year after year, or it may predictably use the same winter camp but vary other seasonal pastures. Or it may move to a new *bag* or *sum* territory temporarily for ecological, social or economic reasons. Similarly, a *khot ail* may shift compositions each season as extended families disperse and reorganize themselves into new configurations with changing resource or economic conditions. Even at larger scales, such as the *sum* or the *bag*, there is a constant flow of households to and from the countryside and settlements, and between neighboring *bag* or *sum*. This ebb and flow of households to and from the countryside became quite evident when I attempted in 1999 to resurvey the households in the original 1995 sample, only to find that many had moved to town, to Ulaanbaatar, or to another *sum* or *bag*.

Absentee herd owners create another difficulty in defining membership. Town and city dwellers commonly place animals with their rural relatives (Fernandez-Gimenez, 1999a). Absentee herding has been implicated in some instances of conflict and degradation in Mongolia (Agriteam, 1997). Lane and Moorehead (1995) posit that absentee herd owners who lack customary or formal rights to pasture may be better served by an open access situation than an enforced common property regime. I have argued elsewhere (Fernandez-Gimenez, 1999a) that absentee herding in Mongolia appears to be environmentally and socially benign when absentee-owned animals are used primarily for subsistence, but may contribute to environmental degradation and social disintegration where absentee owners are commercial interests or speculative investors. Certainly, these urban–rural exchanges are

part of the social networks that have helped sustain both herders and city folk during the economic transition period.

The Ethic of Access and Challenge of Exclusivity

These overlapping, nested and shifting groups make defining membership criteria for a common property regime difficult. The ethic of access associated with Mongolian nomadic culture makes exclusivity problematic. There is a strong belief that a herding livelihood is the birthright of any Mongol, and during the rocky transition to a free market, herding has been the social safety net of first resort. It is on the basis of this birthright that many new herders claimed campsite or grazing rights following privatization. By the same token, the ethic of access makes it morally difficult for groups to exclude potential users from pasture or water sources, regardless of the de jure tenure regime. In interviews with Jinst and Bayan-Ovoo herders, access to a diverse array of seasonal forage resources, and the flexibility to access forage reserves outside a herder's customary use area, were more important to herders than exclusive, formal rights to pasture, which they perceived as threatening access and flexibility.

RESOLVING THE PARADOX: ALTERNATIVES FOR RANGELAND MANAGEMENT IN TEMPORALLY AND SPATIALLY VARIABLE ECOSYSTEMS

In Jinst and Bayan-Ovoo, tenure security has been undermined by the increase in trespassing and decrease in seasonal mobility. These patterns of behavior are due in part to shortages of campsites and possibly of seasonal pastures, but also in large measure to the lack of coordinating institutions. Increasing poverty and lack of access to transportation needed to make seasonal moves are also contributing factors. This final section examines the ramifications of three approaches to addressing this situation: tenure formalization through land registration and leasing, pastureland comanagement, and regulation of seasonal movements. These approaches are not mutually exclusive, and may be mutually reinforcing, provided they are implemented in a coordinated fashion.

Tenure Formalization: Land Registration and Pasture Leasing

Land registration is a system of identifying parcels of land and their owners or users, making it possible to issue formal title and transfer rights.

Land registration is usually accompanied by a cadastral survey, an official mapping process that identifies and records the physical boundaries of each land parcel. The primary direct benefit of formalizing tenure through land registration is the security it provides to the legally designated rights-holder(s). Expected indirect benefits are the anticipated increase in the productivity and efficiency of land use stemming from the creation of a land market, incentives for individual investment, and the possibility of using formalized property rights as collateral for improvement loans. In addition, land registration facilitates the collection of real estate and land transfer taxes for the state.

In Mongolia, the privatization of pastureland remains unconstitutional for the time being. However, land registration and tenure formalization, including privatization, have been under discussion for all land types since the inception of Mongolia's democracy. The allocation of possession rights over pasture (via certificates of possession), commonly interpreted as pasture leasing, may be allowed by Mongolia's 1994 Law on Land. As described earlier, possession certificates over campsites have already been allocated in many *sum*. Whether pasture is leased or privatized, a system of land registration for pastureland will likely be required. Land registration calls for clear and unambiguous identification of rights-holders and the land (or other resources) over which they hold rights.

The feasibility of land registration and tenure formalization in Mongolia may depend on the spatial scale and scope of resources encompassed by these new institutions. Monitoring and enforcement of exclusive use rights over intermediate sized territories (such as the customary winter pasture of a single *khot ail*) may pose significant challenges, particularly if the state is responsible for enforcement (the presumption under formalized tenure). Monitoring in this context would focus on detecting encroachment by non-rights-holders on the spatial boundaries of land held by others. The number of holdings and the indistinct boundaries around resources such as winter and spring pasture would make formal monitoring extremely difficult. Point resources, such as wells and campsites, could be monitored by rights-holders on an ad hoc basis. However, rights-holders may only be present to monitor during certain seasons. At the other extreme, if exclusive rights were granted over large areas, such as the territory of an entire *sum* or *bag*, formal monitoring of an area covering as much as several thousand square kilometers would also be difficult. Ad hoc monitoring of broad territorial boundaries would be challenging since at this scale, local herders may not know who is a bona fide *sum* resident and who is an outsider.

A further disadvantage of formalized tenure in Mongolia is the cost and time needed to complete a cadastral survey and implement land

registration.⁶ In addition, the expected indirect benefits of increased productivity and efficiency are unlikely to apply to Mongolia's extensive and semiarid rangelands, since investments in improvements are not likely to be cost effective even under exclusive tenure, and the potential for intensifying livestock production is severely limited by environmental constraints. Further, the Mongolian countryside suffers an acute shortage of credit from all sources (Mearns and Dulamdary, 2000). Perhaps most importantly, formalization of individually held, exclusive rights to pasture is nearly universally opposed by Mongolian herders, who perceive that it would limit their flexibility and access to diverse resources. Many herders view formalization of group rights as equally untenable.

The two major dangers inherent in a formalized tenure system are the likelihood of subdividing and allocating pasture areas that are too small to encompass the diversity of resources and to allow for sufficient flexibility to mitigate the risk of climatic disasters, and the potential for solidifying existing inequities in resource access. The potential for inequity depends in part on how formal rights to pasture are initially allocated. If allocation of pasture rights follows the precedent established with campsite possession certificates (on which only the name of the senior herder was recorded), there is a danger that poorer or otherwise marginalized households may be excluded.

Formalization of tenure cannot be entirely dismissed as an option for Mongolian rangelands. Indeed, granting secure, exclusive and formally legitimized pasture rights to herding associations may help facilitate comanagement. However, care must be taken (1) that leases be granted at the appropriate spatial scale, (2) that supporting institutions allow for sufficient flexibility in the definition of spatial and social boundaries, (3) arrangements exist for cross-boundary use among adjacent territories, and (4) that the poor and secondary rights-holders not be excluded.

Rangeland Comanagement

Comanagement encompasses a broad range of institutional arrangements characterized by some degree of shared authority and decision-making power between resource users and local, regional or national government. Comanagement is thought to lead to improved effectiveness and efficiency in resource management by involving resource users in management decisions and thereby increasing the incentives for cooperative behavior. Comanagement is also looked to as an avenue for community development and a

⁶Hanstad and Duncan (2001) suggest that land registration can proceed without a cadastral survey, which would significantly reduce the cost.

mechanism for dispute resolution (Pinkerton, 1989). By involving resource users directly in management decisions, comanagement also offers greater opportunities for incorporating local and indigenous ecological knowledge into decisions, in theory leading to more culturally and ecologically appropriate decisions.

Comanagement of Mongolia's rangelands has been proposed as a solution to current trends in unsustainable grazing practices as well as increasing conflicts over pasture use and access in some areas (Agriteam, 1997; Buzzard, 1998; Danida, 1996). In Mongolia, discussions of comanagement have been closely tied to proposals for pasture leasing to groups of herders formally organized as grazing associations. Under this scenario, herders in a locality would form a grazing association and obtain exclusive use rights over pasture within their domain. The grazing association would organize, monitor, and enforce pasture use among its members within its territory. These tasks could be accomplished by a comanagement committee, composed of representatives elected⁷ from among association herders, together with *bag*, *sum*, and possibly *aimag* officials. In some instances it may be appropriate to include other stakeholders on the committee. The comanagement committee would provide an institutional mechanism for resource users to have greater formal authority over management of local resources, while lending legitimacy to monitoring and enforcement actions. In interviews, herders recommended that a *bag*-scale comanagement committee consist of five to nine herders, including the elected *bag* leader, and that a *sum*-scale committee include three to five herder representatives from each *bag*.

As with tenure formalization, the size and scope of territorial jurisdiction and the appropriate social scale for a rangeland comanagement institution are crucial decisions, bringing us back to the question of spatial and social boundaries. Territories that are too small may not encompass sufficiently diverse resources for the annual pastoral subsistence cycle and ones that are too large are unwieldy to manage due to the area encompassed and because they are associated with larger groups of users. A comanagement regime must also recognize the multiplicity of distinct and overlapping or nested resources herders use and decide whether to incorporate all the resources into a single, territorially defined comanagement regime, or to develop a number of distinct, resource-specific comanagement regimes. These options are not mutually exclusive, and may be complementary. Smaller, nested, management regimes, formal or informal, may exist

⁷Herders appear comfortable with a democratically elected group of representatives. The concept of representation is not unfamiliar in Mongolian culture, at least over the past century. Herders in Jinst Sum in 1995 objected to the installation of a *bag* leader who was not, in their view, chosen by popular vote. They successfully called for a new and open election, resulting in the selection of a different *bag* leader.

within the framework of a broader comanagement institution. For example, a small group of herders may jointly use and manage a well within the territory of a larger grazing association, to which they also belong. The broader institutions may provide a valuable coordinating function as well as potentially serving as a dispute resolution mechanism of first resort for the management regimes nested within it.

There are also trade-offs associated with determining the size and composition of group membership in a grazing association or other comanagement group. A large group is more inclusive and stable in composition, but incorporates a greater diversity of potentially conflicting interests. Members of a large group are less likely to know each other well or to interact or cooperate frequently, increasing transaction costs associated with rule-setting, monitoring, and enforcement of management decisions. A small group is easier to control, has greater social cohesion, and identifies more closely with a specific area of land, but may wield little influence on policy or management decisions that affect it and have difficulty defending its resources (Sylla, 1995). Whatever its size, group membership will represent a diversity of interests and social strata. Sources of within-group heterogeneity that may influence pasture management include differences in wealth, herding experience, place of origin, herd composition, and absentee ownership of livestock.

What “natural” social groups or organizations might logically form the basis for grazing associations in Mongolia? Most attention has focused on residence-based social groups such as *khot ail*, *neg nutgiinkhan*, *bag*, *sum*, or *khoshuu*.⁸ Residence-based groups fit well with the concept of territorially-based comanagement, since membership and spatial extent of the residence group maps onto administratively defined territories at broader spatial scales (*bag*, *sum*, *khoshuu*) and de facto grazing territories at smaller scales (*khot ail*, *neg nutgiinkhan*). The main problem with using these existing groupings as the basis for a comanagement organization is that all of them are fluid in composition, creating difficulties in defining membership. The smallest (household) and largest (*bag*, *sum*, *khoshuu*) are the most stable in membership, while medium-sized groups (*khot ail*, *neg nutgiinkhan*) are the most dynamic in composition. However, *khot ail* and *neg nutgiinkhan* are the most concerned with pasture, water, and livestock management decisions on a daily basis, and herders in these groupings interact most often over issues of pasture and campsite use, and seasonal movements.

The appropriate social and spatial scale for any particular rangeland comanagement regime should be selected on the basis of existing and historical

⁸A *khoshuu* was the pre-Revolutionary territorial-administrative unit in Mongolia. Most *khoshuu* were several times larger than today's *sum*, encompassing a greater diversity of habitats.

patterns of use; local herd compositions; available resources and their spatio-temporal distributions; and herders' own identification of appropriate groups and territorial scales for possession and management. In this process, self-identification of groups must be balanced with the aims of social equity and inclusion so that potentially marginalized herders are able to participate in the benefits of comanagement and do not, through their exclusion, undermine the objective of sustainable grazing management.

One possible way to achieve a balance between exclusivity and flexibility in group membership is to stipulate a hierarchy of access rights and costs associated with them. As Niamir points out (Niamir, 1995), usually there is an informal norm for priority of use already, even in systems of porous social boundaries. Those for whom the area is home territory have priority. In Jinst and Bayan-Ovoo, a hierarchy of access rights might work as follows. *Bag* residents receive full access rights at no cost, while kin from neighboring territories are permitted access in exchange for a contribution (cash, labor, or in-kind) to a community project, and outsiders with no kin ties are required to make more substantial contributions. This mechanism provides built-in porosity of group membership and thus avoids the potentially demoralizing sense that any and all use by outsiders constitutes a failure of exclusion and, by implication, a failure of the common property regime. It also provides rules specifying the circumstances under which the group is open, and allocates a cost to use by those outside the core membership. However, even in this more flexible approach to delineating group membership there is the potential for formal prescriptions of outsider contributions to undermine preexisting informal exchanges of labor or social or political favors, leading to increased social vulnerability for some pastoralists.

Under comanagement, monitoring and enforcement responsibilities would be allocated among the grazing association, comanagement committee, and local government. Monitoring in a comanagement context includes monitoring of territorial boundaries and monitoring of resource use activities. Both boundary and resource use monitoring may be ad hoc or formal. Enforcement of a management regime may take place through informal social pressure, or formal sanctions or penalties. In interviews many herders expressed a desire for local government to take a greater role in regulating pasture use. A comanagement institution would provide a means for herders to help define resource-use rules, while empowering local government to enforce them, and enhancing the legitimacy of government actions through herder participation in decision-making. If the regime is successful, monitoring and enforcement costs should diminish with time as comanagement becomes institutionalized, and informal social enforcement mechanisms evolve.

Comanagement is a promising approach to rangeland management in Mongolia, in part because many herders desire a greater government role in organizing and regulating pasture use at the local level as long as herders are able to participate in developing rules. Comanagement institutions also have the potential to perform additional functions, such as development of transportation or livestock marketing cooperatives to help herders overcome recent economic constraints to sustainable pasture use. Comanagement is not a cure-all however, and care must be taken that new comanagement institutions not be co-opted and manipulated by elites to the detriment of more marginal herding households.

Regulation of Seasonal Movements

Regulation of seasonal movements refers to control of the timing and location of grazing, and potentially the number and kind of livestock. The primary emphasis, however, is on regulating the spatial and temporal distributions of livestock, rather than herd numbers or composition. Regulation may occur with or without exclusive possession contracts over pasture and with or without a comanagement regime, although an approach that combines comanagement and seasonal movement regulation would seem most promising.

Earlier I showed that unsustainable grazing patterns in Jinst and Bayan-Ovoo arise in part from uncertainty as to whether all herders will move among seasonal pastures in a coordinated, synchronous fashion. If the entire community abided by a coordinating norm relating to the timing and location of pasture use, uncertainty about trespass of smaller-scale resources would be eliminated without the need to delineate exact boundaries of individual (household/herding camp) customary pasture areas. If rules about movement were revived and enforced, these would create coordinated expectations about resource use behavior within the community, providing an institutional mechanism to overcome current unstable and unsustainable grazing patterns. The historical record indicates that this type of coordinating norm coupled with informal and formal enforcement mechanisms existed in some parts of Mongolia, including the study areas, in both pre-Revolutionary and collective times (Batnasan, 1972; Simukov, 1935). For example, in the *khoshuu* that once encompassed the area now occupied by Jinst and Bayan-Ovoo, a high-ranking and wealthy lama of the Tibetan Buddhist hierarchy controlled grazing over most of the territory by placing his herds with lay herdsmen under the command of designated local leaders who directed the seasonal movements of herding groups segregated by livestock species (cattle, sheep, horses, and camels). Guards patrolled

certain reserve pastures to prevent out-of-season grazing (see Fernández-Giménez, 1999b, for a more complete account of historical pasture use institutions). During the collective era collectives directed seasonal movements, provided the necessary transportation, and imposed penalties for out-of-season grazing. Today, political institutions and territorial boundaries are significantly different from those of pre-Revolutionary Mongolia. However, there is a strong interest on the part of some *sum* in merging to form territories closer in size to *khoshuu*. Territorial expansion could facilitate implementation of mobility regulation by making more habitats and resources available, but would also expand the size of the group to be regulated. Territorial expansion also would not solve overall resource shortages where they exist.

Others have documented self-regulation of seasonal movements by pastoralists in several societies (Artz *et al.*, 1986; Gilles, 1988; Gilles *et al.*, 1992; Sheddick, 1954). Some of these systems regulated access to dry season pastures only (Little, 1985), while others govern an entire transhumance cycle. Some systems are more highly articulated and formalized, and others are a product of more informal norms and rules-in-use (Niamir, 1990, 1995; Niamir-Fuller and Turner, 1999). While there are a number of examples of historic and indigenous mobility management regimes, the “mobility paradigm” for pastoral development is as yet relatively untested and viewed even by its proponents as complex to implement (Niamir-Fuller and Turner, 1999).

In Mongolia, regulation of seasonal movements makes the most sense at intermediate to broad spatial scales. The recommended approach is to delineate within a *bag* or *sum*, distinct areas or zones suitable for grazing in each season, and to provide guidelines to herders on when to move from one seasonal use zone to another. Such a system would prevent out-of-season and year-round grazing, and facilitate conservation of reserve forage for winter and spring. The timing of movements and even the boundaries of zones could be adjusted annually in response to the current year's conditions.

Monitoring of seasonal use is relatively easy under this scenario, as it is readily apparent to herders if one of their number has moved too early or stayed too late on a particular seasonal use area. Although there are still boundaries—between seasonal use areas—these should be easier to monitor than many boundaries among smaller pasture areas as would be required to enforce formal rights to household or *khot ail* pasture areas. Both monitoring and enforcement in a revived regulatory system would require some formal institutional mechanism in addition to informal social pressures. A comanagement body would be an appropriate institution to carry out these functions, possibly with the support of local government. Sanctions could be graduated, such as an initial official warning, followed by graduated fines, and

potential expulsion from the grazing association or other severe penalty for extreme infractions. An extra-local dispute resolution forum is recommended for conflicts that cannot be settled locally.

There are three major assumptions embedded in the regulation of seasonal movements approach. First, sufficient and appropriate resources must be available within the implementation area to designate four workable seasonal use zones. In some places two zones, summer/fall and winter/spring, may be more appropriate. Second, herders must be willing and able to alter current use patterns, if necessary, to conform with the seasonal use zones. The delineation of seasonal use zones is the most difficult task presented by this approach, and should take into account historic and current use patterns, suitability of different landscape features and ecological resources for different seasons and species of livestock, and constraints to optimal use patterns such as water supply. Third, herders must accept regulation of the timing of movement by a local authority (an elected group of herders, a co-management committee, or local government). Herders' strong allegiance to a mobile lifestyle and identity as nomads, and their clear understanding of the ecological rationale for mobility, increase the likelihood that they would support regulation of movement. The latter two assumptions point to the importance of a regulatory body that is both flexible and participatory, and responds to herders, highlighting the complementarity of co-management and seasonal movement regulation. Delineation of use zones in particular should be a participatory process with input from herders as well as technical experts.

Regulation of seasonal movement is an alternative that preserves social and spatial flexibility in resource use to a greater degree than tenure formalization. Although spatial boundaries between seasonal use zones must be delineated, these can be adjusted to meet the conditions of any given year through a participatory management regime such as a co-management committee or grazing association. While this approach does not directly address the problem of resource shortages that exists in some areas, it can indirectly increase tenure security in winter pastures and campsites by ensuring that all herders vacate these areas during summer and fall to allow for regrowth and conservation of reserves.

CONCLUSION

Evidence is mounting on mobile pastoralists in general (Ellis and Swift, 1988) and on Mongolian pastoralists specifically (Sneath, 1998), to suggest that mobility is one key to ensuring the sustainability of livestock production systems in semiarid and arid landscapes. Experiences from other pastoral societies suggest that rigid definition of social and spatial boundaries is almost

certainly a mistake in systems that rely on spatial and social mobility for survival. Tenure formalization through land registration and titling or leasing is costly, relatively inflexible, potentially inequitable, difficult to monitor and enforce, and Mongolian herders generally oppose the concept. In contrast, regulation of seasonal movement represents a revitalization of an historical institution in Mongolia, and when coupled with comanagement allows for a high degree of local involvement and preserves the social and spatial flexibility essential to the success of a nomadic lifestyle in a highly variable natural and ever-shifting political–economic environment. Formal tenure arrangements are not always incompatible with this approach, and would be most appropriate for point resources and to secure rights over large territories encompassing all four seasonal pasture areas. The concept of regulated seasonal movement could be incorporated into a staged or nested approach to institutional design, wherein regulation of seasonal movement is the first step taken prior to establishment of fixed entry and exit rules within a comanagement regime.

In a context where unsustainable grazing patterns have complex and interlinked social, economic, and ecological causes, no solution is simple and any approach must allow for flexibility and adaptability from site to site. Community-based resource management holds promise but is not a panacea for social and environmental ills in the developing world, and to date has failed as often as it has succeeded (Kellert *et al.*, 2000). Managing variable rangelands by imposing rigid spatial and social boundary definitions has an even more dismal record. A more fruitful approach to resolving the paradox of pastoral land tenure is to focus on the features that have characterized sustainable pastoral management institutions for centuries: mobility, flexibility, and reciprocity. For many pastoralists resource access is more important than tenure security. Security may be better understood as reliable mutual expectations about resource use behavior among users rather than inflexible boundaries around physical resources or rights holders. In the Mongolian context the regulation of seasonal movements in a comanagement context is a strategy worth testing, while a rigid formal tenure system for rangelands should be approached with extreme caution.

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