

# CONTEXTUAL FACTORS IN THE MANAGEMENT OF COMMON GRAZING LANDS: LESSONS FROM MONGOLIA AND NORTHWESTERN CHINA<sup>1</sup>

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## Introduction

Seen in a global perspective, pastoral development<sup>2</sup> is now increasingly motivated by social and environmental objectives rather than by production- or output-orientated objectives. Attention is shifting towards a broader concern with sustainability, both of grasslands, and of the livelihoods of those who rely on them (de Haan et al, 1997, Fratkin and Mearns forthcoming). Quite how these twin sustainability objectives may be achieved in particular contexts, however, is an empirical question. Drawing on examples from a diverse range of natural grassland-based livestock production systems under economic transition in Mongolia and northwestern China, this summary paper aims to show how an appreciation of context is essential if we are to understand how best to intervene in common grazing systems in order to achieve secure and sustainable livelihoods for livestock producers while at the same time promoting sustainable grassland management.

The assumption that livestock necessarily have adverse impacts on grassland environments often proves to be unfounded, particularly in those pastoral production systems in which livestock mobility remains the central management tool (Mearns 1997a). Under such circumstances, and in many mixed farming systems, the potential for complementarity or even synergy between livestock production and environmental goals can be enhanced through a diverse range of policy instruments (Mearns 1997b). Much recent attention has correctly been focused on the continuing importance of livestock mobility, particularly in the context of sub-Saharan Africa (Niamir-Fuller 1999), but also in Inner Asia (Humphrey and Sneath 1999). The weight of evidence now strongly supports the view that where mobility remains a viable management strategy, even on a more limited seasonal basis rather than year-round, it should be supported to the maximum extent possible. However, there are a growing number of contexts in which mobility within formerly pastoral production systems has become so constrained that other forms of policy and institutional support begin to take precedence in the quest for sustainability. Lessons from Mongolia and northwestern China suggest that both of these types of situation may apply to varying degrees within a single polity (the nation-state or a large sub-national entity), which presents a challenge to policy-makers to determine what approaches make most sense in which contexts.

## Poverty and grassland management

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<sup>2</sup> This paper is primarily concerned with extensive livestock (or true pastoral) production systems, in which most animal nutrition derives from natural pasture. However, given rising human population densities and declining availability of open pasture in many of the areas under consideration, at least in China, a pronounced shift is taking place toward semi-pastoral or mixed farming systems in which an increasing proportion of animal feed comes from fodder crops or crop by-products, and in which animals may be confined for at least part of the year.

A central argument of this paper is that poverty reduction matters for sustainable grassland management. Many of the reasons why extensive livestock production can be harmful to the environment are the same factors that account for persistent poverty among livestock producers. They typically include: lack of access to markets to increase incentives for higher off-take rates of better quality animals and reduce the cost of inputs; lack of access to health and education services to broaden the range of livelihood options open to herders and their children, including possibilities for more extensive off-farm employment and rural-urban linkages; and insufficient attention to risk management through innovative approaches in the delivery of micro-finance services, maintenance of grazing reserves, and fodder and livestock marketing to better permit stocking rates to track available feed supplies.

Poverty reduction is also important in its own right, and pastoral development interventions have a significant role to play in this regard. Livestock play an important role in the livelihoods of poor people throughout the world. It has been estimated that arid and semi-arid lands<sup>3</sup> – including many of the world's grasslands – support the livelihoods of some 87 million poor pastoralists and 336 million poor farmers in mixed, rainfed farming systems that include livestock (LID 1999). In total, taking all agro-ecological zones into account, it is estimated that livestock form a component of the livelihoods of at least 70% of the world's rural poor (*ibid.*). This suggests that options for enhancing the security and sustainability of livelihoods among livestock-keepers, including those listed above, offer great scope for reducing poverty worldwide.

China has been remarkably successful in reducing the incidence of poverty overall since it began to embark on market-orientated reforms, having brought down the number of people living below the official poverty line from 260 million in 1978 to 42 million (5% of the rural population) in 1998 (World Bank 2000a). As a result, rural poverty in China now tends to be concentrated in isolated geographical pockets, many of which coincide with the grasslands of northwestern China, including some of the most degraded grasslands in China. An overlap of around 80% has been observed between ecologically sensitive areas and poverty counties located in the same regions (Zhou et al.), and poverty rates in grassland provinces remain well above the national average of 6.3%<sup>4</sup>. The challenge in reducing poverty still further in rural China depends critically on being able to sustain and enhance the livelihoods of livestock keepers in the grassland provinces of northwestern China, while at the same time ensuring the sustainable management of the grasslands on which they rely for a living. This twin challenge is to be tackled through China's recently announced 'Great Western Development Plan'.

Lying immediately to the North, Mongolia offers a very different context from much of northwestern China, but one in which efforts to reduce poverty and ensure sustainable grasslands management must equally go hand in hand. The share of Mongolia's total population of 2.3 million engaged in livestock production doubled from around 17% in 1989 to around 35% by the mid-1990s. This dramatic increase, which took place mainly over 1992-94 following the privatization of formerly state- and collective-owned animals, can be explained by the lack of alternative employment opportunities for those who lost public-sector jobs in the early stages of economic transition. It was followed by a steady increase in the total number of grazing animals, from around 25 million in 1994 (a figure which had changed little over the previous 70 years or

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<sup>3</sup> Arid and semi-arid areas are defined here as those with an annual growing season of less than 180 days (LID 1999).

<sup>4</sup> Compare poverty rates (share of households below the official poverty line) for the following provinces, which together account for the vast majority of China's natural grasslands: Xinjiang 27%, Gansu 23%, Yunnan 23%, Tibet 10%, Inner Mongolia 9%, and Sichuan 7%.

so) to around 33 million head by the end of 1999<sup>5</sup>. The livestock sector therefore acted as an economy-wide safety net in absorbing many of those who would otherwise have been unemployed. While the incidence of poverty increased sharply over the same period, from virtually no officially recorded poverty at the end of the 1980s to around 36% of the population by 1995, poverty rates would have been much higher had it not been for the critical (yet under-recognized) role performed by the extensive livestock production sector.

Economic transition in Mongolia since the early 1990s has brought new pressures within the pastoral livestock sector, however, many of which are exacerbated by the increase in human and livestock populations in grasslands. Virtually all of these factors are manifested in the form of reduced pastoral mobility, which in turn contributes to instances of localized overgrazing, particularly around settlements and close to major transport routes:

- removal of subsidies in the provision of health and education services has led to a decline in their spatial coverage
- rising asset inequality (e.g. in flock/ herd sizes) among herding households, owing to differences in labor endowments, levels of skill/experience in herding, and extent of social networks (particularly with local officials)
- for poorer herders, particularly newcomers to herding: little access to transport in the form of vehicles or draught animals with which to move camp
- for richer, more established herders: reluctance to move camp for fear that their customary pastures may be grazed by others in their absence
- decline in the observance and effectiveness of customary norms regarding common grazing (e.g. respecting others' customary claims on winter camp sites and associated pastures)
- decline in seasonal separation of pasture use; rise in year-round grazing of particular pastures
- rising congestion, overlapping and contested claims over pastures, leading to endemic conflict in areas of higher population density (e.g. central Khangai mountain-steppe zone)

### **Towards a typology of pastoral contexts in China and Mongolia**

The pressures facing pastoralists in China and (to a lesser extent) Mongolia are similar to those facing their counterparts elsewhere in the world. They range from demographic and socio-economic changes (population increase, in- or out-migration, rising inequality in asset holdings); through various forms of land use change that often reduce the area available for common grazing (loss of grazing land to arable agriculture, environmental protection, urban development, landscape fragmentation); to increasingly destructive forms of conflict. Given these apparent similarities, it is tempting, though impossible, to generalize among widely varying geographical, historical, and political contexts. Policies and interventions that may make sense in one situation could have deleterious consequences in another.

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<sup>5</sup> Total livestock numbers have since declined by up to 3 million head by mid-2000 (a decline of around 8-10%) owing to the severe winter *dzud* (adverse winter weather conditions preventing animals from obtaining forage) of 1999-2000. This episodic event, the effects of which were exacerbated by drought in the preceding summer, affected around a third of the total area of the country.

In an earlier paper, a typology of pastoral contexts was offered as a guide to identifying the most appropriate forms of intervention for supporting the livelihoods of pastoralists in particular geographical and historical settings (Mearns 1999). This suggested typology draws on information relating to four key parameters: (i) *resource predictability* or ecological dynamics (a measure of the need for mobility and flexibility in resource use, assuming limited external inputs); (ii) *policy context* (the extent to which mobility is permitted or facilitated, where resource constraints demand it); (iii) *livelihood diversification* (availability or otherwise of supplementary or alternative livelihood sources to at least compensate for any loss of livelihood from livestock production); and (iv) *socio-economic differentiation* (a measure of inequality in incomes and/or asset holdings (including livestock) among households within and between pastoral communities).

Pastoral contexts in Mongolia and northwestern China vary widely according to the four parameters identified here. In very broad terms, mobile pastoral production systems remain the norm in Mongolia, in spite of the pressures identified in the preceding section, while they have become much less prevalent in northwestern China. True pastoral systems may still be found in China, such as those in northern Xinjiang or on parts of the Tibetan Plateau, and are usually practiced by ethnic minorities such as Kazakhs, Tibetans, Hui, and Mongols, but the trend over the last 15-20 years has been towards semi-pastoral and mixed farming systems. This has been largely policy induced. In earlier decades, policies were heavily geared towards land 'reclamation', involving the conversion of natural grassland to arable cropland, with the common result that large areas were left salinized or vulnerable to wind erosion (World Bank 2000b). Inevitably the higher quality, better-watered grasslands were the first to be converted, which had a disproportionately adverse effect on the sustainability of pastoral production overall. This policy-induced process was commonly accompanied by substantial in-migration, particularly of Han Chinese agriculturalists, which squeezed and fragmented the area available for open grazing yet further.

More recently, considerable investment is being poured into the promotion of technical packages to intensify livestock production in northwestern China through the 'Four-Way Plan' of building winter shelters, drilling wells, growing fodder crops, and fencing of pastures allocated to individual households, known as the *caokulun* system in Inner Mongolia. In principle this permits higher output per unit area, but the implications for sustainable grassland management — particularly of grassland enclosure — remain far from clear (Williams 1996), and the approach does little to ensure the inclusion of poor livestock keepers who are unable to access capital to make the required investments. The approach is promoted more or less uniformly throughout (formerly) pastoral areas of northwestern China, in spite of the wide diversity in underlying ecological conditions, livelihood opportunities, and socio-cultural systems.

In spite of this uniformity of approach at the national level, significant and often creative forms of local adaptation are often observed in the ways centrally planned policies are implemented within particular provinces. This accounts for greater continuity in grassland management practices than might be imagined from official accounts of management intensification. Banks (1999), for example, comments on this for the case of Xinjiang. It is likely that less local adaptation has been officially permitted in Inner Mongolia (Longworth and Williamson 1993), although detailed empirical research often reveals a disconnect between policy and practice (Dunlop 2000). Box 1 describes one such local institutional innovation in Gansu province, which took place spontaneously rather than by design. Important lessons can be learned from such examples, which suggest that an immediate priority – in Mongolia as well as

in China – is to pilot-test and tailor policies and interventions to encourage sustainable grassland management to local ecological, social, and economic conditions.

**Box 1 Institutional innovation under grassland contracting in Gansu Province, China**

Natural grasslands make up 89% of Maqu County's territory in southwestern Gansu, where average annual precipitation is around 600mm. Following the distribution of livestock to individual households in 1982, the number of animals increased dramatically. In the absence of measures to improve pasture management, grassland degradation had become serious by the early 1990s.

Between 1995 and 1998, grassland 'contracting' took place in 17 administrative villages of four townships, providing over 2,000 families with individuated pasture land-use rights. In the interests of equitable land distribution, each household's pasture land share was determined on the basis of the size of their family in 1995 and the number of animals they received in 1982. This protected poorer families and single female-headed households, whose ability to increase their herds and flocks was constrained by the availability of labor. Land use rights were allocated through a participatory process at village level. Working groups that formulated the initial proposals for land allocation included locally respected farmers as members. Proposals were presented to village meetings for discussion, revision, and eventual ratification by vote. By 1998, a number of consequences of grassland contracting were observed:

- Around 13% of the total grassland area contracted to households was fenced. The total cost of fencing amounted to around RMB 8,000 per family, including a government subsidy of around 15%. An additional 7% subsidy was set aside to meet the fencing costs of 225 poor households
- Incentives to invest in housing increased. Virtually all families built new houses at their winter pastures, and many also constructed winter livestock shelters
- Poor and middle households with small herds and flocks gained a new source of regular income from leasing their spare pastures to better-off households with larger herds and flocks
- Richer households made investments in livestock shelters and drilling new wells, and adjusted herd composition to increase market off-take rates
- Some households were able to invest outside the livestock sector, in trading, transportation, and product processing. A few moved to the county seat to start new businesses, leaving their livestock to be herded by hired laborers
- Fencing reduced labor demands in grazing, particularly for women, which made it possible for more households to establish *caokulun* (a cut-and-carry livestock feeding system) and engage in a local pest control program

During the process of land allocation a new institution emerged, known as the *lianhu*: a self-governing association of individual (usually related) households that shared common pastures and resided together. A major motivating factor behind the formation of *lianhu* groups was to economize on the cost of fencing, as each *lianhu* needed only to fence the outer boundary of their joint land-share, leaving land use decisions within their joint territory to be negotiated among

themselves. The *lianhu* groups have also emerged as embryonic farmers' associations, capable of performing a wider role in addition to the coordination of pasture use and management. One *lianhu*, for example, was formed by nine households who shared the use of a single well on their winter pastures. Since it would have been practically impossible to arrange access to the well with fencing of individual land shares, the group fenced their contiguous land shares as a common winter pasture. Within this commons, pasture use rules were set by the *lianhu* members themselves. At their first annual meeting, they agreed on maximum stocking rates for each type of animal (e.g. 10 and 20 sheep per family member). Animals in excess of these ceilings would have to be sold, kept on pastures rented from other households, or left in the care of hired herders. Subsequent annual meetings provided an opportunity to monitor each household's herd size, and decide on measures to protect and improve grasslands. A wide range of issues were resolved through the *lianhu*, including deciding when to move animals between pastures, and collective action in the repair of fences, shearing, and purchase and administration of animal vaccines. The *lianhu* also served as a marketing cooperative: since visiting buyers were scarce, and the cost of transport to market was high for a single family, the *lianhu* members pooled their animals and rented a vehicle to take them to the county seat. Their leader, a respected herder with veterinary knowledge, was entrusted with the job of negotiating prices on their behalf.

Source: Tang and Yangchun (2000)

Figure 1 is an attempt diagrammatically to characterize selected pastoral contexts in China and Mongolia according to this rough typology<sup>6</sup>. Four broad examples are shown: the semi-pastoral Mongolian steppe zone, the pastoral Mongolian Gobi zone, the increasingly mixed farming systems of Inner Mongolia (China), and the remaining true pastoral systems of northern Xinjiang and the Gannan Highlands of Gansu (both also in China).

The parameter of resource predictability is closely related to the equilibrial-nonequilibrial continuum in grazing ecosystems (see Box 2). Other things being equal, drier areas (such as Mongolia's Gobi desert-steppe zone or parts of northern Xinjiang) have less predictable resource dynamics, with the result that in the absence of external feed inputs, a higher degree of mobility is called for in livestock and grassland management in order to 'track' available forage. In areas of higher and less variable precipitation (e.g. Mongolia's steppe zone, or eastern Inner Mongolia), sustainable grassland management is possible with a much lower degree of mobility (Mearns 1993). Recent work in Mongolia tested the applicability of such models in distinct grassland ecosystems (desert-steppe, steppe, and mountain-steppe), and found that neither the conventional range condition ('equilibrial') nor the 'non-equilibrium persistent' model unequivocally explained vegetation dynamics in any of the ecological zones, suggesting that ecosystem response to precipitation and grazing is more complex and interactive (Fernandez-Gimenez and Allen-Diaz 1999). From the standpoint of grassland management alone, both mobility and total livestock numbers/ density therefore remain important concerns.

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<sup>6</sup> It is important to note that this diagram is not based on hard data for any of the selected parameters. The notional values indicated for each parameter are relative values only, and are intended simply to illustrate broad differences between the selected contexts shown. The relative values may be disputed, but the typology at least offers a basis for discussion of differences between pastoral contexts.

**Box 2                    The equilibrial — non-equibrial continuum in grazing ecosystems**

The ‘new’ thinking on range ecology highlights the distinction between equilibrial and non-equibrial ecological systems (Behnke, Scoones and Kerven 1993). This is not an either/or distinction, but rather a continuum. At one extreme, relatively equilibrial systems are those in which the density of grazing livestock explains a significant amount of the variation in vegetation dynamics over time, and in which conventional range management techniques such as maintaining appropriate average stocking rates are thought to remain most suitable for sustainable grassland management. At the other extreme, relatively disequilibrial systems are those in which livestock populations and vegetation dynamics are only loosely coupled, and density-independent factors such as precipitation explain a higher amount of variation in vegetation dynamics. Opportunistic means of ‘tracking’ available nutrition from natural grazing and browse, usually through mobility, are typical pastoral management adaptations to such spatial and temporal variability. Annual rainfall totals and/or the coefficient of variation in annual precipitation is often taken to be a proxy for this continuum, given that more arid areas tend to experience greater inter-annual variability in precipitation.

A marked distinction can be observed between the Mongolian and the Chinese examples shown in Figure 1 in terms of the second parameter (policy context). At the risk of oversimplifying: livestock mobility is permitted or even encouraged in the Mongolian context, where resource constraints demand it, while in the Chinese examples (particularly Inner Mongolia) it is either actively discouraged in policy or is becoming less and less viable as a management strategy through loss of pasture land to arable agriculture. There is perhaps less variation in the third (livelihood diversification) and fourth (socio-economic differentiation) parameters, and less evidence on which to base judgements for these. It is likely that options for livelihood diversification are greater in Inner Mongolia compared with Xinjiang/Gansu or the Mongolian examples, particularly through crop-livestock integration, while socio-economic differentiation is on the rise in all of these examples.

The chief differences in policy context between the Chinese and Mongolian cases relate to pasture land tenure. In Mongolia, pasture privatization is prohibited in the 1992 Constitution, and the 1995 Land Law upholds the principle that all pasture land should continue to remain public or held in ‘common’, while customary patterns of seasonal pasture rotation should be observed. Although the legislative framework is highly supportive in principle of continued mobility, the major weaknesses relate to its lax practical implementation (Fernandez-Gimenez and Batbuyan 2000). In part this is owed to ambiguities in the law itself (e.g. it is not clear whether designation of pasture land as ‘commons’ is intended to suggest open access or true, controlled-access commons held by particular herding communities), and in part to the new pressures within the pastoral livestock sector identified earlier in this paper.

In the Chinese case, by contrast, pasture privatization and enclosure is encouraged through the 1985 Grassland Law. A gradual approach was envisaged under this law, beginning with the allocation of pastures to individual households under the Household Responsibility System, then the assignment of pasture carrying capacities, and finally the introduction of incentives and sanctions to enforce compliance with these assessed stocking limits. Grassland use contracts have a term of 50 years, and fees are assessed according to estimated grassland productivity. It is

reported that 80% of natural pastures were contracted to households in Inner Mongolia by 1990, and 95% in Xinjiang by 1998, although in practice group tenure remained the norm in many areas (Banks and Sheehy 2000, cf. Box 1). Where individuated grassland allocation with enclosures has been strictly implemented on the ground, particularly in drier areas, it has typically increased conflict within communities over grazing rights, and reduced the possibility of responding to risk through mobility and flexibility of access to grazing resources, with considerable cost to long-term sustainability (Williams 1996).

Significant ambiguities also exist in China's Grasslands Law, notably in defining state versus collective ownership (as in the Mongolia case). The law also conflicts with other statutes on the question of the sub-contracting or sale of grassland use rights, which the Grassland Law prohibits but the 1983 Agriculture Law and 1991 Land Management Law both allow. The example from Gansu (Box 1) demonstrates that sub-contracting or leasing of grazing rights can be an important means of ensuring equity under grassland contracting, allowing poorer, labor-scarce households to lease out spare pasture to households with larger herds/ flocks, and thereby offering livelihood options to a wider range of households while maintaining sustainable stocking rates on natural grassland.

### **Implications for policy**

We conclude with some brief reflections on what these findings mean for policy. It is clear that pasture land tenure should not be treated as an issue independent of other contextual factors, such as the underlying ecology (relative productivity and variability of natural grasslands); the availability or otherwise of livelihood options other than animal husbandry; or broader socio-economic trends. It is important that land tenure options be tailored to local ecological conditions, but equally important that policy-makers be open to a potentially wide range of interventions to support poverty-reduction and environmental goals in diverse pastoral contexts. The approach should offer a menu of options for intervention including but not limited to:

- investments to increase accessibility of health and education services, so as to increase returns to labor and enhance opportunities for voluntary out-migration from grasslands, while ensuring that services are provided in such a way as to allow continued mobility wherever possible
- investments in roads, telecommunications and other infrastructure to increase access to outside markets and improve herders' terms of trade, thus allowing them to benefit from higher output prices and lower input prices, while also investing in water supply and other forms of infrastructure on more remote pastures to permit continued mobility
- investments in pastoral risk management, including micro-finance services to allow complementary forms of capital mobilization, savings and protection through livestock insurance; and improved marketing systems such as the use of mobile abattoirs to allow rapid destocking at supported prices during the onset of drought or a severe winter
- alternative forms of conflict management, for example involving respected herders or farmers as lay specialists in resolving disputes over grazing land, or para-legal services
- pastoral associations and federations to lobby for the rights of livestock producers

Unless lessons from experience of earlier, failed pastoral development initiatives in Africa and other parts of the world are learned, the danger is that the same mistakes will be repeated in China and Mongolia, at the cost of local livelihoods and grassland sustainability. A strong focus on narrowly defined technical packages in order to promote a universal high input/high output livestock production model, as in the Chinese case, may work in some contexts but will not work everywhere. Above all, it is vital to begin from a detailed understanding of the livelihood needs and aspirations of livestock producers themselves, and to design interventions that are appropriate in terms of the constraints and opportunities they face in their daily lives.

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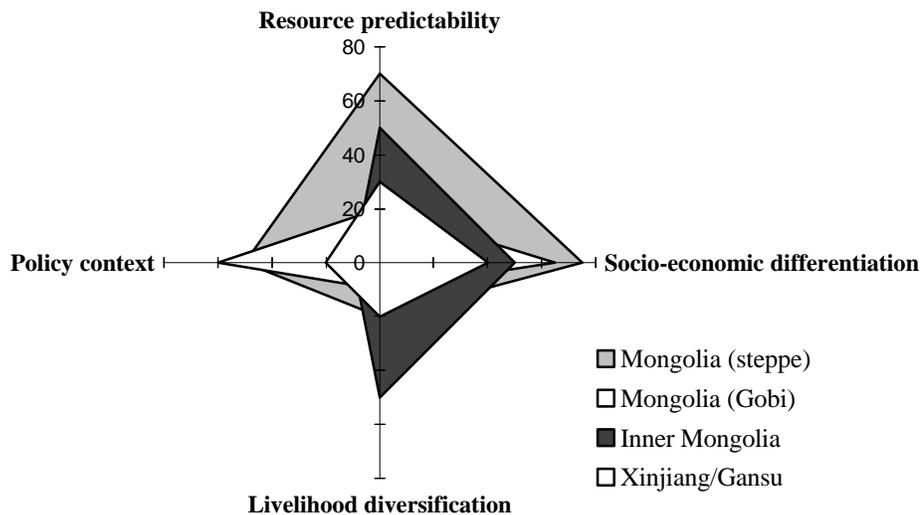
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**Figure 1** - Selected Chinese and Mongolian pastoral contexts compared