

# Grasshoppers, mice and pashminas: ecology, economics and the future of pastoralism in the Gobi Aimags of Mongolia

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‘In the year 1238, the inhabitants of Gothia (Sweden) and Frise were prevented, by their fear of the Tartars, from sending, as usual, their ships to the herring fishery on the coast of England; and as there was no exportation, forty or fifty of these fish were sold for a shilling, It is whimsical enough, that the orders of a Mogul khan, who reigned on the borders of China, should have lowered the price of herrings in the English market.’

Edward Gibbon, drawing on Matthew Paris

## 1. Introduction

Mongolia has been a pastoral society for millennia, but because of its closed status much about the interlocking patterns of its ecology and economy has been unclear until recently. The collapse of Soviet rule in 1990 and the rapid and precipitous liberalisation of the economy has created an almost unprecedented experiment in the consequences of capitalism for a state that is of necessity dominated by pastoralism. The phase of liberalisation immediately following the end of Russian control coincided with a series of years characterised by favourable climatic conditions. This gave a misleading impression that the experiment was a success; numerous donors brought their expertise to the table.

However, the longer-term consequences of giving the IMF a free hand seem to be somewhat different. Mongolia is becoming an aid sink, like so many neighbouring countries, projects and donors come and go without any visible impact except on the number of four-wheel drives and the price of desirable housing. Meanwhile, entrepreneurs, especially from China, have fanned out looking for products to harvest and have found some. For the Chinese traders, it is cashmere and animal products such as skins, for the Russians it is the alluvial gold found in many rivers. Together with a transformation of herding strategies and a collapse of the social protection characteristic of the Soviet era, it has led to a strange world where every second *ger* has satellite television and yet the rangelands are rapidly degrading around the

Another more recent trend has been a staggering rate of urbanisation. Within a decade, some xx% of the population has moved to the cities, principally, the capital, which has received some 200,000 migrants between 2002-2004. This is made possible by extremely high levels of grant aid forthcoming from international donors, especially Japan, and an income from gold-mining, much of which is artisanal, i.e. unrecorded. Mongolians have rapidly become international migrant workers, particularly in Korea and Japan, while North Koreans are brought in to perform undesirable jobs in the capital.

Roger Blench (for ERM) and Bazarragchaa Amarsanaa (for CPR) undertook a field trip of some 2600 km. 5-12<sup>th</sup> August 2004 in four southern *aimags*, representing principally the Gobi desert-steppe. Thirteen in-depth interviews were conducted with a range of herders, representing geographically dispersed households, including rich, poor and one female-headed. Two Herders' Associations (HAs) were contacted and their leaders interviewed. Visits were made to the Gobi Institute of Animal Research and discussions were held with *sum* governors.

## 2. Pastureland management/mapping

Under funding prior to this project, HSLPO/CPR has prepared pasture maps of the *sums* selected for pilot activities, showing summer and winter pastures and movement strategies. Stocking densities are based on the 2002 livestock census and carrying capacities for each pasture established. The intention is to make these available at *sum* level and for corrections and updating to be made by both herders and administrators. The object is to use these as tools for controlling stocking densities and as a backbone for the proposed contracts (Appendix 1) between *sum* governors and herding groups.

Potential problems seem to be four;

- a) Since 1999, Mongolia has undergone a series of catastrophic climatic events, including sequences of *dzuud* (icy blizzard) and *gang* (drought) which are not predictable and which presumably make the actual herds on the relevant lands and the carrying capacity highly variable from one year to another
- b) During the same period and probably related, although also connected to commercial activities, plagues of grasshoppers and rodents which compete with livestock for grass have made the pasture resource unpredictable.
- c) Herders describe the change in grass from nutritious species to less digestible species as well as the spread of toxic grasses. This *cannot* be represented from satellite mapping and only emerges from extensive ground-truthing. There is no evidence this has been undertaken.
- d) There seems to be little or no experience as to whether these maps can be interpreted and used effectively at *sum* level, but herders generally complained that the *sum* was completely unresponsive on all other matters, so it is difficult to see why this should be any different

This discussion document focuses heavily on the scientific aspects of pasture ecology because it is intimately linked with the strategies for pastoral development. In other words, if the science is not incorporated into the strategies, then the social interventions will not work.

Carrying capacity is normalised to the Sheep Unit (SU), a traditional calculation in Mongolia. This is a satisfactory procedure when not subjected to any empirical test, but probably without any scientific validity in the present situation where goats and horses are on the increase and other species massively declining. As is clear from the state of the pastures, different species engage in preferential extraction of herbs and grasses, with the impact of goats particularly marked. Carrying capacity might only be reliably calculated if factors a-c) above could be discounted and the pasture used by herds of known species composition.

### 3. Conflict resolution

After many years of collectivisation, Mongolia has little experience of institutions to manage conflict resolution, either traditional or state. Moreover, stocking densities pre-1990 were such that there was rarely encroachment on pastures by other herders and agriculture (which is the main problem in most pastoral rangelands) has actually been decreasing. There are two main problems;

- a) When a climatic crisis occurs, herders move rapidly with their animals to a place where pasture is available. Their first choice is a zone where they have existing connections, but as economic individualism increases, they are willing to move anywhere, even without seeking permission of resident herders.
- b) As trucks and access to transport increase, richer herders can and do move their animals long distances in search of water and pasture, to gain nutritional advantages for their animals, irrespective of climatic crises

Resident herders' responses were;

- a) Do nothing on the grounds that 'we might need their pasture another time'
- b) Join together and speak to the incoming herders (the results were usually that the incoming herders claimed they were about to move off but didn't)
- c) Complain to the *sum* (which had no result)

Herders said they tried to resolve all issues informally, but increasingly this is unlikely to be effective as wealthier and more aggressive herders seek better pasture to accommodate their increased herd sizes.

There is little doubt that the trend towards much greater mobility will continue, especially as it is difficult to control in Mongolian conditions. This will in turn sabotage the notion of priority access to pasture by resident herders and make establishing ownership even more difficult. Governments in many countries try

and control opportunistic movements of herders with no success at all<sup>1</sup> and Mongolia will probably be no different. The effects of the introduction of trucks on herding economies have been well-documented elsewhere in Asia<sup>2</sup> and the usual consequence is greater social stratification with the rich increasing herd sizes and the poor being marginalised. Poor herders, who cannot afford to move, are at the mercy of bad weather and pasture lose more animals. In this situation the only practical solution is to develop strong sanctions on large herds, for example, punitive taxes and withdrawal of veterinary services. This would undoubtedly be politically very difficult in the Mongolian context, since large herds were the subject of praise and support until recently. Nonetheless, simply hoping herders will reduce herd size will not work. In addition, the incentives to increase goat numbers must be countered, preferably through taxes on cashmere producers. Again, this will be seen as paradoxical in a country where the government appears to encouraging individualistic capitalism in other areas. But this is the nature of common property resources; governments have to take unilateral action to protect them even in capitalist economies. Clearly, a more thoughtful campaign to explain to herders why such actions are necessary would assist in getting across these ideas.

As competition for pasture increases, there will be more and more conflict and a likely tendency towards violence. The state must consider creation of institutions to respond to this; but the shape of those institutions cannot be prescribed because it depends on the overall policy environment. In principle, the *sum* or *bag* centres should be involved but government should encourage other types of informal institution. For example, where there are Herders' Associations, they should be encouraged to take an active role. In addition, groupings such as the *khot ail*, the informal local household groupings should be assisted to think about these issues more formally. However, in order to pre-empt direct action there must be more confidence in enforcement, which returns to the *sum* and *bag* administration which must be more responsive.

#### 4. Evaluation and monitoring procedures

Evaluation and monitoring presently appears to consist almost entirely of tables of data; so many *sums*, *bags*, HAs, assets. This information is useful in the cycle of project preparation but tells you almost nothing about the reality of HAs on the ground. It is strongly recommended that a more qualitative approach is adopted, trying to find out how the HAs function internally, whether they are gaining or losing members, what enterprises they are thinking of going into etc. This is the only practical way to generate an iterative process of redesign. Otherwise, the whole enterprise will simply become formulaic.

Questioning only officials or leaders of existing groups is likely to produce circular results; as these groups have, or are hoping to receive, cheap credit, they are not going to present a nuanced picture of their operations. I suggest strongly that CPR attempts to follow a few sample HAs over time rather than worrying about data tables. Also, there is probably a need to employ a rural sociologist able to interpret the data.

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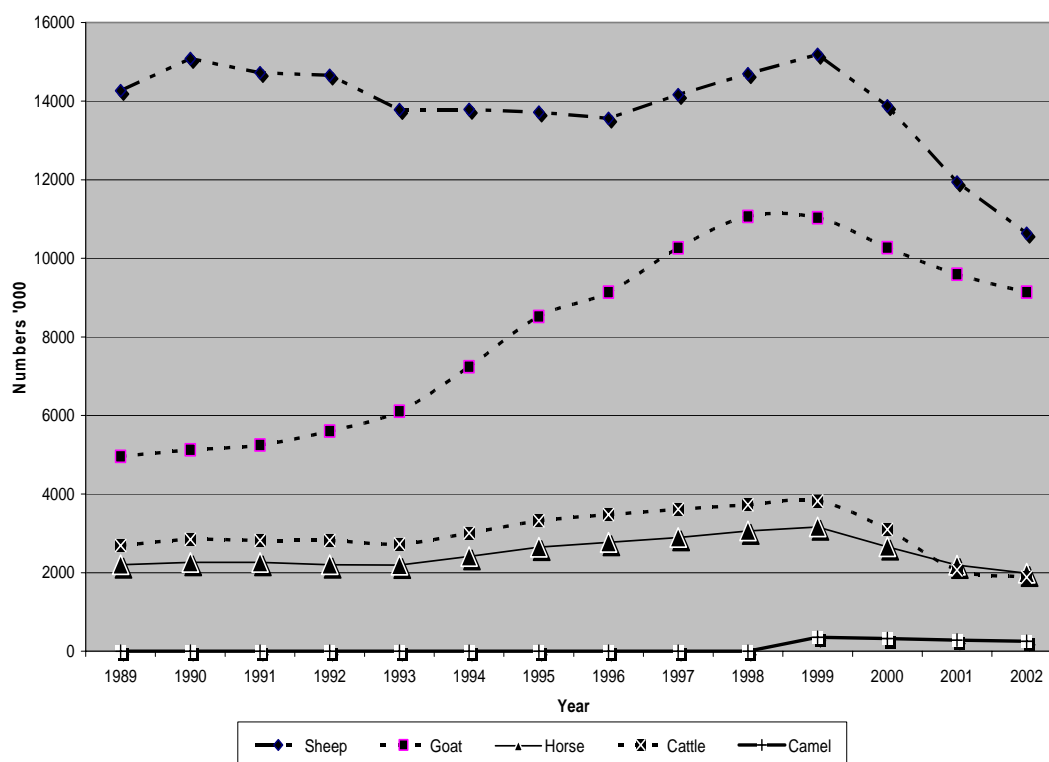
<sup>1</sup> A concrete example is the pastoral Fulbe of West Africa, who have expanded across from Senegambia to Chad over the last millennium. Since the colonial era, governments have attempted to control their movements, both in order to tax them and to prevent conflict with farmers. But the pastoralists have every advantage; they know the countryside and they are intensely motivated to preserve their herds, which requires flexible and opportunistic movement because of the patchy availability of water and pasture. Post-drought studies have shown that in the Sahelian droughts of the early 1970s, nomadic pastoralists survived better than their agropastoralist neighbours by moving their herds long distances (Gallais 1977). Similarly, the pastoral area between Sudan, Ethiopia, Northern Kenya and Somalia is now almost entirely beyond the control of national governments, with heavily armed pastoralists staking their claim to pasture with AK-47s.

<sup>2</sup> In Jordan, for example, the Bedouin herders began to acquire trucks in the 1980s and many now also have water-tankers (Blench 1998). This gives them almost complete freedom of movement in the dry rangelands of the Badia and they have consequently been able to move outside government control. This has led to severe local overgrazing and also an increase in the involvement of Bedouin with smuggling. Rangelands are generally too extensive to be effectively policed and governments shy away from the investment.

## 5. Current situation and proposed next steps on pastureland management and mapping activities

Although 2002 livestock census figures show an increase on 1992, all our interviewees mentioned massive losses in the *dzuuds* of 1999-2001 and claimed herds fell to about half their former size. Even allowing for exaggeration, the livestock population of Mongolia in 1999 was unsustainably high and underwent a major crash in the following years (Figure 1). Importantly, this was responsible for a major re-orientation of herding systems, at least in the south. Almost all herders reported major losses of large species, and horses and cattle/yaks have never recovered. Camels survived better, but are still in overall decline.

**Figure 1. Mongolian livestock populations 1989-2002**



Following this, goat numbers have increased almost everywhere. Many herders claimed this was simply a consequence of the *dzuud* mortality, but undoubtedly the high prices of cashmere and the ready market have driven up goat numbers. Goat numbers have also increased as a consequence of poverty alleviation programmes (PAPs) which allocated funds for restocking without checking which species the money was to be spent on. Many credits went to the purchase of goats for cashmere rather than rebuilding a balanced herd. When the ‘five species’ were more in balance, allocating labour for goatherding was a problem, as goats had to be managed separately. But if the household herd consists largely of sheep and goats these can be herded together with very low labour requirements.

The increase in goat production may well be the factor responsible for the most salient feature of the survey, the massive degradation of the pasture reported by all interviewees. They dated this as beginning with the *dzuud* of 1999, but probably it was already underway. The main features are the loss of important pasture grasses such as *Stipa glareosa*, *S. gobica* and *Cleistogenes spp.* and the invasion of Alliaceae such as *Allium polyrrhizum* and *A. mongolicum*<sup>3</sup>. There were also reports of the spread of toxic species (unidentified but likely to be *Stellera chamaejasme* and *Thymus serpyllum*). These processes were identified in the rangelands of Inner Mongolia in the early 1990s and seem to be repeated here (Shan 1996).

<sup>3</sup> Interestingly, the herders gave a much more negative view of these plants than presented in Jigjidsuren & Johnson (2003) which says that these are palatable and nutritious for all livestock. The green plants are said to be edible but too much ingestion can lead to a condition where the animal bleeds from the mouth.

Species change is linked to preferential grazing by small ruminants, leading to marked wind erosion in some places and a loss of grazing potential. This seems to be identified with *gang*, drought, and is probably *not* low rainfall but an inability of the soil to retain water. Although the rains have been adequate this year, it was generally reported that this has not led to a return of *Stipa* spp. This is probably due to changing infiltration characteristics of the soil, over-extraction of subsurface water and loss of seed reserves through faunal pressure.

The major problem in many areas is infestations by rodents/lagomorphs and grasshoppers/crickets. Cyclical infestations have begun to appear since about 1999 although reported from Inner Mongolia in 1992 (Shan 1996; Zhang *et al.* 2003). Grasshoppers and crickets are part of the natural fauna of the desert steppe but typically arrive in autumn after the stock have grazed the annual grasses. However, species such as *Calliptamus abbreviatus* are now said to come in great numbers in June and eat the *Stipa* spp. before the livestock can graze it. In some areas, the grasshoppers are so numerous that all stock are prevented from entering.

Rodents, pikas and voles also eat grass seeds, thereby reducing the reproduction of annual grasses. The main species are;

Jird	<i>Meriones meridianus penicilliger</i>
Brandt's vole	<i>Microtus brandti</i>
Daurina pika	<i>Ochotona daurica</i>

Research has shown that these infestations are stimulated by short grass and that numbers are reduced when the grass reaches normal height. This strongly confirms the link with overgrazing and high proportions of goats, which keep the grass permanently short. However, the second reason for rodent epidemics is the disappearance of traditional predators such as the red fox, *uneg* (*Vulpes vulpes*) and the sand fox, *khyars* (*Vulpes corsac*). These have been hunted out in many areas as their skins are bought by Chinese traders for substantial prices.

The loss of predators has created an empty environmental niche which is being filled by wolves. Almost all herders reported wolf numbers as increasing every year and occurring in drier regions outside their normal habitat. Wolf populations are growing in northern Mongolia because of the ending of traditional wolf hunts, but this expansion southwards probably reflects the absence of competition from foxes as well as the increase in goat numbers. Wolves are now seizing young small ruminants as well as attacking adult animals. The cinereous vulture (*tas*) is following the wolves, stripping the carcasses they leave.

Pasture degradation and the low biomass available for their stock is compelling herders to increase their opportunistic movement. Whereas the traditional Mongolian transhumance cycle was regular, short distance and determined by the range of the yak cart, many herders now either own or have access to trucks, especially in the Gobi. They are using these to access long-range pasture every year and not only in a crisis. As a consequence, resident herders now complain of the invasions of their traditional pastures whenever these are attractive.

Water is also a major problem in the rangelands; many formerly perennial streams and rivers are dry and lake levels are falling. Legal and illegal gold-mining are blamed for this, but high levels of extraction may well also be responsible. In addition, herders' land rights have been abrogated in many cases without consultation, which hardly sends an appropriate message concerning land management (Tumenbayar 2002). Many new hand-pumps have been put in, especially by JICA, but as the water table falls, their yield is low. Herders want government to insert new boreholes in presently waterless rangeland; this should be resisted at all costs. Unused rangeland acts as a reserve of faunal and floral biodiversity which repopulates grazed land after *dzuud* or drought. Gold-mining also has negative environmental effects in terms of releasing chemical agents into the ecosystem.

These changes have important implications for the traditional ‘carrying capacity’ approach, which is now based on very outdated science. It is now generally considered that rangelands are ‘disequilibrium’ or ‘dynamic equilibrium’ systems (Behnke & Scoones 1993; Fernandez-Gimenez, & Allen-Diaz 1999) and that any major impact on the pasture and faunal ecology is likely to send the ecological balance into a new state, not inherently predictable from previous states. The faunal infestations and climatic shifts as well as unprecedented pressure on the grasslands fulfil all those conditions. This makes it difficult to understand how the cartography of carrying capacity can be used for planning.

Labour is important, because recruiting young men to work with the herds is more and more difficult. The lure of urban employment, gold-mining and the lamaseries is removing this essential element from the household and younger and younger children now manage the herds. This in turn is linked to falling school rolls; parents withdraw their children from school to manage the stock. National literacy rates are falling which bodes ill for an education programme based on written materials.

Herders’ livelihoods showed great improvements in the 1990s, due to a combination of market liberalisation and climatic conditions. The evidence is the wide variety of consumer goods in the *gers*, as well as the changed composition of herds. However, they have now taken a downturn for the reasons described above and only a major reorientation in government policy (which still officially promotes intensification) can remedy the situation. If thoughtful government policies were to be enforced, especially through the provision of information and more learning from the trajectory of rangelands in neighbouring countries where the situation is much worse than in Mongolia, a more sustainable and conservation oriented approach could take hold. Most particularly, herders must learn to take responsibility for their environment, for keeping down animal numbers, for conserving predators that eat rodents, for keeping goat numbers to reasonable levels and reducing opportunistic migration. HAs are one obvious channel for this information, but it requires co-operation with the *aimags* and *sums*, co-ordination with other development programmes and above all, the use of radio to transmit ideas. Another possibility would be to model information on the paravet programmes that operate in some pastoral societies; to take intervals who have some schooling and give them particular training in understanding and disseminating these issues. They could then return to the pastoral community with the task of developing discussion and ideas. However, this would only work if there is a responsive authority which can reply to questions, explain policy and be willing to hold meetings with herders over matters of particular concern.

The collapse of collective farms has also created a major information vacuum; herders feel they don’t know about animal breeding or veterinary care, because this information was previously handed down from above. Radio supplies meteorological information and some market prices (through a programme called *Gobi business* –much appreciated) but there was strong pressure to supply more information useful to herders. Although about half our interviewees had satellite television, it was not regarded as a serious source of information –just *hog* (‘rubbish’). On the positive side, herders seem very anxious to learn more about the changes in the environment and how these can be mitigated. Radio should provide more environmental information, more on government policy towards rural areas, more on animal health, more on economic diversification and also present weather and market information in a more accessible style.

## **6. Capacity building activities for local government and herders’ groups**

None of the households selected at random had direct experience of HAs, although most had heard of them. It was surprising that even when there were HAs nearby, they had made no effort to join. Many thought the most important role of HAs was to disseminate information among the members, rather than make joint economic enterprises. The main attraction of HAs is cheap credit, rather than the social and ecological benefits envisaged by the preparatory documents. One of the two HAs contacted was using funds collected to lend to non-members at 3% a month, surely not the intended function of cheap credit. Incidentally, the widespread presence of high-cost consumer goods, such as trucks, motor-bikes, satellite television etc., in many households, as well as reports of buying expensive horses and horse-gear, suggests that credit is not the major problem in rural areas.

More than one interviewee observed sarcastically that the government had broken up all the collective institutions after 1990, which had led to a collapse of trust and now they were coming along saying people should join together again. Almost certainly the push towards HAs is essentially donor-driven, as all the other thrusts of government are to monetarise and increase dependence on cash and to emphasise economic individualism. The rush to cashmere production and the consequent spread of consumer goods in individual households represent the clear economic consequence of this policy.

At present, therefore, herders are receiving very mixed messages. Told to form co-operating groups on the one hand, the entire message from the rest of government is that they should become entrepreneurs in a mixed economy. The operation of trade networks of buying and selling primary products in exchange for manufactured goods, which operate through mobile Chinese traders, can only exacerbate this trend, as will the availability of motorised transport.

The most important aspect of capacity building is not with the HAs (Mongolian herders are well used to cooperation through the *khot ail* institution) but with local officials, who are increasingly disconnected from the needs and requirements of pastoralists. To be fair, this is not their fault; government continues to press a message of economic individualism in other sectors. They also believe that herders should ideally be told to form groups, as part of 'changing their mentality'. This represents a major misunderstanding; unless groups form and function on a voluntary basis, they will break up as soon as cheap credit is not available. There is no point in developing better contacts between HAs and local officials unless those officials have been moved on from their present 'top-down' attitudes. They need to understand that what the herders are doing is perfectly rational in terms of the economic and environmental situation in which they find themselves. This in turn links back to broader Mongolian government policy; unless they think more deeply about squaring the circle when linking the management of CPRs with individual wealth creation, all work with HAs will be in vain.

In addition, the *sum* authorities seem to be acting on very inadequate scientific information. When asked about their information needs, almost all interviewees mentioned the lack of material on the environmental changes they are observing. It is clear that if the local authorities try to press contracts (which are based on fixed assumptions about carrying capacity) on herders, they may sign them with no intention of keeping them. Unless better understanding of the crisis in the rangelands is apparent, much effort will be put into an enterprise unlikely to succeed.

## 7. Specific questions

The consultant was requested to respond to the following specific questions;

1. Give examples of international experience on land use agreements between the government and nomadic herders' groups for sustainable land use.

Globally, land use agreements between government and herders' groups are extremely rare, because in much of Africa, traditional tenure systems still operate. The one exception to this is the 'group ranch' systems of Kenya, where land was demarcated and legally allocated to a group such as a tribe, a clan, section, or family. In 1968, the Kenya government established group ranches in semiarid areas to control environmental degradation and increase herd productivity. The members were jointly to own legal title to the land and elect a management committee to coordinate and implement development projects on the ranch. Individuals retain certain rights, such as residency rights, and the group retains some rights, such as control over grazing rights, tillage, and water resources. This collectivization is widely viewed as a failure, however, as pressure by Maasai pastoralists for subdivision into individual, titled parcels gained momentum in the 1980s (Rutten 1992; Galaty 1999; Mwangi 2003). Among other things, the members wanted to use their land as collateral for loans that could be invested in ranch development.

In the Middle East, the dominant system is the *hema* system, reserved rangeland, whereby pastoral communities evolved a code of laws and customs based on groups and subgroups on family relationship.



Each group maintained grazing rights on resources in a *hema* and negotiated when necessary with other groups for movement of its livestock to areas of more favourable climatic conditions during periods of drought. The chief was considered the first between equals and was unanimously obeyed and respected by members. But these systems began to break down as populations increased, tractors and subsidised feeds were introduced after the Second World War. The Syrian government<sup>4</sup>, through its Steppe Directorate, started establishing co-ops in the hemas in 1970, while maintaining the structure of traditional membership. The cooperative *hemas* were mapped and demarcated on the ground and the borders of co-ops announced in a ministerial decree. The boards of cooperatives were elected from among traditional dispute settlers and the programme of cooperatives assisted internationally by UNDP, FAO, WFP and World Bank. Sheep fattening cooperatives have been established to absorb feeders from the steppe during drought periods and a network of warehouses for storing feed reserves and fattening centres are scattered through the steppe. However, the adaptation of traditional *hema* systems for cooperative management failed because the boundaries of the areas allocated to cooperatives and membership composition did not always coincide with tribal grazing areas and membership (Masri 1991). This situation prevented many cooperatives to improve their pastures and reduced their effectiveness as an instrument for managing rangeland resources. Rather as in Kenya, contacts were signed with larger ethnic groupings, except that the persistence of a command economy in Syria has meant that there has been no shift to individual land ownership.

Within Central Asia, experience is somewhat limited since the collapse of the collective farm system is still quite recent and decollectivisation has taken place at different rates in different countries. However, most countries have gone down the road of privatisation of herds and some also towards individual land ownership. The situation of herders in Inner Mongolia is well-documented; increased fragmentation of both herds and lands has led to extremely high levels of degradation (Williams 1997; Sneath 2000). In Kazakhstan, a similar break-up has led to a major contraction of the agricultural sector (Behnke 2003). In Kyrgyzstan, herds were sold off, but pastureland has not been privatised but is controlled by the authorities and used on a leasehold fee-paying basis (Bloch & Rasmussen 1997).

2. What are access rights to safe areas for migrating groups during bad weather conditions (blizzards, droughts). How does this work in other countries?

The incidence, severity and geographical location of climatic disasters varies from one year and one ecology to another, so it is often very difficult for the authorities to assign refuge locations until the situation is well advanced. In much of Africa, the USAID-sponsored FEWS (famine early warning system) has attempted the prediction of climatic problems, through a variety of strategies, most notably the use of satellite imagery and livestock prices. Its success can best be described as limited, partly because of unpredictability of the climate and partly because even where drought is predicted, the authorities are often slow to respond. In most parts of Africa, herders respond by moving their animals rapidly to safer areas, often disguising this movement from government (e.g. in Sudan after the droughts of the early 1980s). Herders also move animals across international frontiers; their knowledge of the terrain and mobility makes this difficult to control. In Kenya, the 'group ranch' system has no explicit provision for drought and epizootics<sup>5</sup> and as a consequence, the moving out of herds during droughts has been a source of continuing friction, especially with the Protected Areas authorities, since Maasai wish to exploit the grazing within National Parks and the authorities wish to maintain these for tourism. In the heavily controlled systems in the Near East, such as Syria and Saudi Arabia, the usual response to drought is to bring in commercial fodder from outside (as in the former Negdel period in Mongolia and elsewhere in Central Asia in the case of blizzards). At present in much of Central Asia, open-access grazing is still practised as well as the use of cross-border refuges.

3. How are the contracts set up? Does the government make the contracts with herder groups or with individual nomadic families?

<sup>4</sup> <http://www.fao.org/WAICENT/FAOINFO/AGRICULT/AGP/AGPC/doc/Counprof/syria.htm>

<sup>5</sup> [http://www.conservationafrica.org/Conservation\\_reports/SocioecoImb.pdf](http://www.conservationafrica.org/Conservation_reports/SocioecoImb.pdf)

As noted above in the case of Kenya and Syria, the contracts are always with groups. Also, these contracts are not really negotiated agreements, but rather fiats from central government, where the land is gazetted and demarcated. In Kenya, although there have been many informal efforts to encourage herders to reduce herd size this is not part of the contract. In Syria (and indeed Israel) herd sizes are specified, although these agreements have proved difficult to enforce. The Afar of northeast Ethiopia and Djibouti have traditional grazer associations based on clan membership, each with distinct pasture boundaries. The associations have a general assembly, an association committee, elders of each community who mediate between the association and an individual, and a traditional association chief. The Government of Ethiopia incorporated these associations as local administrative units. The association committee is the main link between the association and the Government. All major decisions, such as range improvement plans, are passed by the Government to the committee who then decide on their merits and pass them on to the general assembly for approval. When a study of these associations was done in 1986, it appeared that the Government had successfully adapted a traditional institution to modern needs. However, a series of droughts and growing economic individualism in the 1990s, caused this 'traditional' management to break down. The growth of individual boreholes created an overload on fragile rangelands and severe degradation initiated a cycle of herd loss and famine.

The conclusion for Mongolian Government policy is that there is only really any chance for this type of written contract to succeed if;

- a. A cohesive group with a recognised leader is contracted. The most likely basis for such a group is the *khot ail*
  - b. The likely threat from wealthy migrant herders from other areas is established and a comprehensive strategy for negotiating access in times of climatic stress
  - c. The sum governor is willing to fulfil a policing role in the case of infractions
4. Do these agreements help mitigate conflict amongst the groups, especially during emergencies? What are the main principles that should be applied?

Inner Asia so far sees only very low levels of the violent conflict that is unfortunately typical of pastoral peoples in Africa. No system of pastoral management in Africa has been effective in reducing conflict, especially because of the spread of sophisticated weapons in recent years (Hussein 1998; Blench 2004). In the Middle East, conflict is at low levels, in part because the pastoral sector is both heavily subsidised and tightly controlled; government has a very effective threat, the withdrawal of subsidies, which would make the pastoral lifestyle unviable. The decline in the pastoral sector in Central Asia has actually reduced competition for resources, so conflict is not an issue in many regions (see review in Kerven 2003). The incidence of conflict reflects two factors;

- a. the degree of competition for natural resources especially pasture and water
- b. the effectiveness of policing

In Inner Mongolia, for example, there is now a high level of competition for land, but the control exercised by the Chinese authorities keeps the incidence of conflict low (Sneath 2000).

Given the demography of Mongolia and its generally laissez-faire policies, it is unlikely that policing is the solution. Therefore only reduced pressure on natural resources will minimise levels of conflict. This in turn will depend on making the contracts envisaged effective on the ground.

## 8. Conclusions and recommendations

Mongolia is currently being transformed by the change from a command economy to one based on individual capital accumulation. Despite many positive aspects, the consequence for a common property resource such as the rangelands are becoming increasingly deleterious. The preferred method of developing a more sustainable approach to rangeland management is the Herders' Association (HA) and the development of contracts with individual herding households based on satellite-based maps of rangeland.

The study indicated that the temptation is to form HAs based on access to cheap credit which produces rapid results in terms of registered groups, but is not likely to be sustainable in the long term. The following recommendations are therefore put forward on the basis of the fieldwork;

- a) Less emphasis is placed on numbers and assets in evaluating HAs and more on discussion about whether they are functioning in a desirable manner. More effective use must be made of existing community organisations such as the *khot ail*.
- b) Less emphasis is placed on printed materials distributed and more on the development of accessible radio programmes that will reach herders. The satellite maps of pasture are no doubt a valuable teaching tool, but given the dynamic nature of the pasture, they will need to be very regularly updated to be of value in discussions with herders. Given that at least some radio programmes are widely listened to by herders, an attempt should be made to follow the model of these programmes
- c) A wider range of potential activities could be suggested to HAs than vegetable production. Little attempt so far has been made to capitalise on Mongolia's burgeoning ecotourism sector. Credit is also unrealistically cheap; levels must be brought closer to those obtaining locally, otherwise HAs will simply loan on the money instead of using it for the purpose intended.
- d) There is at present a real mismatch by perceptions of grassland dynamics and carrying capacity within Mongolia and in the international scientific community. Few, if any, of the environmental issues described in this paper are taken into account in the notion of fixed territories that can be specified by a contract with a herding household. Unless policy is science-driven, there is little prospect of long-term success.
- e) The highest priority should be accorded to changing the mentality of local officials, who largely persist with a 'top-down' approach. Only when they are able to interact with herders in an atmosphere of mutual learning is it likely that the two groups will co-operate. This should be linked to a more thoughtful effort by government to explain its policies. Government policy still officially supports intensification despite a complete lack of environmental and economic logic.
- f) Attempts to control the movement of richer, more powerful herders with access to trucks in times of environmental crisis will not work. The only strategy that has a chance of success is preferential taxation on large herds, excessive numbers of goats and unsustainable water extraction. Reduced access to state resources such as veterinary service may also be a management tool in some areas, but herders are increasingly used to sourcing their own supplies.
- g) Government needs to develop a more consistent policy on water extraction both in terms of donor insertion of boreholes and extraction for gold-mining. At present the absence of control is making the value of individual pastures highly unpredictable

## References

- Bedunah, D. and S. Schmidt 2000. Rangelands of Gobi Gurvan Saikhan National Conservation Park, Mongolia. *Rangelands* 22(4): 18–24.
- Bedunah, Donald J. and Sabine M. Schmidt n.d. *Pastoralism and Protected Area Management in Mongolia's Gobi Gurvan Saikhan National Park*. [http://www.iucn.org/themes/ceesp/Wkg\\_grp/SL/Pastoralism%20and%20PA-Mongolia.pdf](http://www.iucn.org/themes/ceesp/Wkg_grp/SL/Pastoralism%20and%20PA-Mongolia.pdf)
- Behnke, R. H. and I. Scoones 1993. Rethinking Range Ecology. In: Behnke, R. H., I. Scoones and C. Kerven (eds) *Range Ecology at disequilibrium: New models of natural variability and pastoral adaptation in African savannas*. 1–30. London: Overseas Development Institute.
- Blench, R.M. 1998. Rangeland degradation and socio-economic changes among the Bedu of Jordan: results of the 1995 IFAD survey. In: *Drylands: sustainable use of rangelands in the twenty-first century*. V.R. Squires and A.E. Sidahmed (eds.) 397–423. Rome: IFAD.
- Blench, R.M. 2004. *Natural Resource Conflicts in North-Central Nigeria*. London/Abuja: Mandarins Press/DFID. With integrated CD-ROM.
- Bloch, P. C. 1993. An Egalitarian Project in a Stratified Society: Who Ends Up with the Land? In: *Land in African Agrarian Systems*, ed. T. J. Bassett and D. E. Crummey. Madison: University of Wisconsin Press, 222–243.

- Cooper, L. & Narangerel, G. 1993. *Liberalisation in the Mongolian pastoral economy and its impact within the household: a case study of Arkhangai and Dornogobi provinces*. PALD Research Report, 8. IDS, Sussex.
- Cooper, L. 1993. Patterns of mutual assistance in the Mongolian pastoral economy. *Nomadic Peoples*, 33:153-162.
- Cooper, L. 1995. *Wealth and poverty in the Mongolian Pastoral Economy*. PALD Research Report, 11. IDS, Sussex.
- DANIDA 1992. *Mongolia: Livestock Sector Study, Phase II*. DanAgro, Copenhagen.
- Dmitney, P. P. 1985. The relationship between some shrubs of the Mongolian steppes and colonies of mammals. *Zh. Obshch Biol.* 46: 661-669.
- Edstrom, J. 1993. *Veterinary Services in Mongolia: Issues and Options in the context of the liberalisation of the Economy*. PALD Research Report, 5. IDS, Sussex.
- Erdenebaatar, B. 1996. Socio-Economic Aspects of the Pastoral Movement Patterns of Mongolian Herders. In: C. Humphrey and D. Sneath (eds) *Culture and Environment in Inner Asia. Vol. 1. The Pastoral Economy and The Environment*, pp. 58–110. Cambridge: The White Horse Press.
- Fernandez-Gimenez, M. E. 1997. *Landscapes, Livestock, and Livelihoods: Social, Ecological, and Land-Use Change Among the Nomadic Pastoralists of Mongolia*. Ph.D. Dissertation, University of California, Berkeley.
- Fernandez-Gimenez, M. E. 1999. Reconsidering the Role of Absentee Herd Owners: A View from Mongolia. *Human Ecology* 27(3): 1–27.
- Fernandez-Gimenez, M. E. and B. Allen-Diaz 1999. Testing a Non-Equilibrium Model of Rangeland Vegetation Dynamics in Mongolia. *Journal of Applied Ecology*, 36(6): 871–85.
- Fernandez-Gimenez, M. E. B. Batbuyan n.d. *Law and Disorder in Mongolia: Local Implementation Of Mongolia's Land Law*. <http://dlc.dlib.indiana.edu/archive/00000254/00/gimenezm040800.pdf>
- Galaty, J. G. 1999. *Property in the Strict Sense of the Term: The Theory and Practical Rhetoric of Land Tenure in East Africa*. ALARM Working Paper No. 4. Kampala, Uganda: Centre for Basic Research, August.
- Grubov, V.I. 1969. Flora and Vegetation. In: *The Physical Geography of China*. 265-364. New York: Praeger.
- Guiming Wang, Qingqiang Zhou, Wenqin Zhong, and Dehua Wang. 2001. Comparative food preference of *Microtus brandti* and *Ochotana daurica* in grasslands of Inner Mongolia, China. *Zeitschrift fur Säugetierkunde (Mammalian Biology)*, 66: 312-316.
- Guiming Wang, Qingqiang Zhou, Wenqin Zhong, and Zuwang Wang. 2003. Spatial overlap of sympatric *Microtus brandti* and *Ochotona daurica* in the steppes of Inner Mongolia. *Mammalia*, 67(2): XXX-XXX.
- Guiming Wang, Qingqiang Zhou, Wenqin Zhong, Chonglu Sun, and Zuozhong Chen. 2001. Species richness-primary productivity relationship of plants and small mammals in Inner Mongolian steppes, China. *Journal of Arid Environments*, 49: 477-484.
- Guiming Wang, W. Daniel Edge, and Jerry O. Wolff. 2001. Demographic uncertainty in ecological risk assessments. *Ecological Modelling*, 136(1): 95-102.
- Guiming Wang, Wenqin Zhong, Qingqiang Zhou, and Zuwang Wang 2003. Soil water condition and small mammal spatial distribution in Inner Mongolian Steppes, China. *Journal of Arid Environments*, 54(4): 729-737.
- Guiming Wang, Zuwang Wang, Qingqiang Zhou, and Wenqin Zhong. 1999. Relationship between species richness of small mammals and primary productivity of arid and semi-arid grasslands in north China. *Journal of Arid Environments*, 43: 467-475.
- Hilbig, W. 1995. *The vegetation of Mongolia*. SPB Academic Publishing, Amsterdam.
- Honhold, N. 1995. *Livestock Population and Productivity and the Human Population of Mongolia 1930-1994*. ms. Ministry of Food and Agriculture, Ulaan Baatar.
- Humphrey, C. and D. Sneath 1999. *The End of Nomadism? Society, State and the Environment in Inner Asia*. Durham, NC: Duke University Press.
- Hussein, Karim 1998. *Conflicts between farmers and herders in the semi-arid Sahel and East Africa: a review*. London: IIED.
- IFAD 1994. *Arhangai Livestock Development Project*. Formulation Report. Asia Division, IFAD, Rome.
- Jagchid, S. and P. Hyer 1979. *Mongolia's Culture and Society*. Boulder, CO: Westview Press.

- Jigjidsuren, Sodnomdarjaa & Douglas A. Johnson 2003. МОНГОЛ ОРНЫ МАЛЫН ТЭЖЭЭЛИЙН УРГАМАЛ. Ulaan Bataar: [no publisher].
- Kennett, G. 2000. *Land Use-Range Management Report. Gobi Regional Economic Growth Initiative*. Ulaanbaatar, Mongolia: US Agency for International Development.
- Kenya, Republic of. 1968. *The Land Adjudication Act*. Chapter 284 of the Laws of Kenya. Nairobi: Government Printer.
- Masri, A. 1991. *The tradition of Hema as a land tenure institution in arid land management: The Syrian Arab Republic*. Rome: FAO.
- Mearns, R. 1991. *Transformation of a pastoral economy: a local view from Arhangai and Dornogobi provinces*. PALD Working Paper, 2. IDS, Sussex.
- Mearns, R. 1993. Territoriality and land tenure among Mongolian pastoralists: variation, continuity and change. *Nomadic Peoples*, 33:73-104.
- Mearns, R. 1993. Territoriality and Land Tenure among Mongolian Pastoralists: Variation, Continuity, and Change', *Nomadic Peoples* 33: 73–103.
- Mearns, R. 1996. Community, Collective Action and Common Grazing: The Case of Post- Socialist Mongolia', *Journal of Development Studies* 32(3): 297–339.
- Miehe, Sabine 1996. *Vegetationskundlich-ökologische Untersuchungen, Auswahl und Einrichtung von Dauerprobestellen für Vegetationsmonitoring im Nationalpark Gobi-Gurvan-Saikhhan*. Ulanbaatar, GTZ.
- Mwangi, Esther. 2003. *Institutional Change and Politics: The Transformation of Property Rights in Kenya's Maasailand*. Ph.D. dissertation, Indiana University.
- Naeem, S., Lawlor, S.P., Thompson, L.J. & Woodfin, R.M. 1994. Declining biodiversity can alter the performance of ecosystem. *Nature*, 368: 734-736.
- Owen, J.G. 1988. On productivity as a predictor of rodent and carnivore diversity. *Ecology*, 69: 1161-1165.
- PALD. 1993. *Improved Livestock Feed Production, management and use in Mongolia: Socio-economic potentials and constraints*. (2 vols.) Report to ADB.
- Potkanski, T. and Szykiewicz, S. 1993. *The social context of liberalisation of the Mongolian pastoral economy*. PALD Research Report, 4. IDS, Sussex.
- Rae, J., Arab, G., Nordblom, T., Jani, K., and Gintzburger, G. 2001. *Tribes, state, and technology adoption in arid land management, Syria*. International Food Policy Research Institute. CAPRI WORKING PAPER NO. 15. Available at <http://www.capri.cgiar.org/pdf/capriwp15.pdf>
- Rutten, M. E. M. 1992. *Selling Wealth to Buy Poverty: The Process of the Individualization of Landownership Among the Maasai Pastoralists of Kajiado District, Kenya, 1890-1990*. Nijmegen Studies in Development and Cultural Change, vol.10. Saarbrücken, Germany: Verlag Breitenbach.
- Schmidt, S. 1995. *Mongolia in Transition: The Impact of Privatization on Rural Life*. Saarbrücken: Verlag für Entwicklungspolitik.
- Schmidt, S., G. Gongor, K. Kar and K. Swenson 2002. Community Organizing – A Key Step Towards Sustainable Livelihoods and Co-Management of Natural Resources in Mongolia. *Policy Matters*, 10: 71–4.
- Shan, Chen 1996. Inner Asian grassland degradation and plant transformation. In: *Culture and environment in Inner Asia I: the pastoral economy and the environment*. C. Humphrey & D. Sneath eds. 111-123. Cambridge: White Horse Press.
- Sheehy, D. 1996. Sustainable Livestock Use of Pastoral Resources. In: *Mongolia in Transition*. Ole Bruun and Ole Odgaard (eds) 42–64. Surrey, UK: Curzon Press.
- Sneath, David 1998. State Policy and Pasture Degradation in Inner Asia. *Science*, 281: 1147-1148.
- Sneath, David 2000. *Changing Inner Mongolia*. Oxford: Oxford University Press.
- Temple, G., Swift, J. & Payne, P. 1993. The changing significance of risk in the Mongolian pastoral economy. *Nomadic Peoples*, 33:105-122.
- Tumenbayar, N. 2002. *Herders' Property Rights Vs. Mining In Mongolia*. <http://www.uvm.edu/~shali/Mining%20Mongolia%20paper.pdf>
- Upton Caroline 2002. *Local Institutions, Land Reform And Globalisation In Mongolia*. Paper Presented at 9<sup>th</sup> Biennial Conference of the International Association for the Study of Common Property, Zimbabwe, 17-21 June, 2002. <http://dlc.dlib.indiana.edu/archive/00000936/00/uptonc030402.pdf>

- Wang, G., Wang, Z., Zhou, Q. & Zhong, W. 1999. Relationship between species richness of small mammals and primary productivity of arid and semi-arid grasslands in north China. *Journal of Arid Environments*, **43**: 467-475.
- Xiao, X., Wang, Y., Jiang, S., Ojima, D.O. & Bonham, C.D. 1995. Interannual variation in the climate and above-ground biomass of *Leymus chinense* steppe and *Stipa grandis* steppe in the Xilin River basin, Inner Mongolia, China. *Journal of Arid Environments*, **31**: 283-299.
- Zhang, Z., Pech, R., Davis, S., Shi, D., Wan, X. and Zhong, W. 2003. Extrinsic and intrinsic factors determine the eruptive dynamics of Brandt's voles (*Microtus brandti*) in Inner Mongolia, China. *Oikos* 100: 299-310.
- Zhong, H., Q. Zhou, and C. Sun. 1985. The basic characteristics of the rodent pests on the pasture in Inner Mongolia and the ecological strategies of controlling. *Acta Theriologica Sinica* 5: 241-249.
- Zhou, Q., Zhong, W. & Sun, C. 1982. Study on species diversity of rodent communities in Baiyinxile typical steppe, Inner Mongolia. *Acta Theriologica Sinica*, **2**: 89-94.

## Appendix 1: Invasive species in the Gobi desert-steppe

Mongolia's desert-steppe or semi-desert is characterized by a dry climate with mean annual precipitation of 100-125 mm and vegetation dominated by low grasses and shrubs such as *Cleistogenes songorica* and the Taana onion (*Allium polyrrhizum*). Many of Central Asia's endemic plants occur in this zone, which stretches from the Great Lakes Depression in the west through the northern Gobi-Altai to Domogobi in the east. Frequent high winds and dust storms hinder the growth of plants. Characteristic mammals include the wild ass, the goitered gazelle (*Gazella subgutturosa*) and the long-eared hedgehog (*Erinaceus dauuricus*). Birds such as the Mongolian trumpeter finch (*Rhodopechys mongolicus*), the chukar (*Alectoris chukar*) and the houbara bustard (*Chlamydotis undulata*) occur in this zone.

The Steppe zone extends from the western Great Lakes Depression past Khangai and the middle Khalkha highlands to the steppes of Khentii, Domogobi and Domod. It is characterized by flat plains and rolling hills covered in feather grass and shrubs. Typical species of grass include *Stipa krylovii* and *Agropyron cristatum*, and unpalatable shrubs such as Caragana species and Artemisia species are abundant. Large mammals of the steppe include saiga (*Saiga tatarica*), Mongolian gazelle (*Procapra gutturosa*) and corsac fox (*Vulpes corsac*); birds include the steppe eagle (*Aquila nipalensis*), the rough-legged buzzard (*Buteo lagopus*) and the pied wheatear (*Oenanthe pleschanka*). Smaller mammals such as the Daurian pika (*Ochotona dauurica*), the Siberian marmot (*Marmota sibirica*) and Brandt's vole (*Lasiopodomys brandtii*) are common in places.

### A. Rodents and lagomorphs

#### 1. Jird (*Meriones meridianus penicilliger*).

Jirds inhabit clay and sandy deserts, bush country, arid steppes, low plains, cultivated fields, grasslands, and mountain valleys. They are terrestrial and construct burrows in soft soil. The diet consists of green vegetation, roots, bulbs, seeds, cereals, fruits and insects.



Figure 2. Jird (*Meriones meridianus penicilliger*)

#### 2. Brandt's Vole (*Microtus brandtii*)

Brandt's voles (*Microtus brandtii*) are small native mammals that inhabit the grasslands of Inner Mongolia, China. The species is considered a pest, particularly during population outbreaks, which have increased in frequency since 1970 from 1 every 7 years to 1 every 3 to 5 years. Using historical records taken between 1948 and 1998, we found that there was significant correlation between years for which the monthly averages of the Southern Oscillation Index (SOI) were consistently high, and years in which outbreaks occurred. Also there was a tendency for outbreaks not to occur in years with precipitation above or below average. For some years at some sites, annual or biannual estimates are available for the density of Brandt's vole populations. We found that the seasonal rate of increase over the non-breeding season from autumn to spring was negatively correlated with the density in autumn. The rate of increase over the breeding season from spring to autumn was independent of the density in spring but instead reflects the species' preference for habitat with short, sparse grass; populations do not persist in highly degraded grasslands or in tall, dense grassland. The link between outbreaks and climatic indices, and the numerical response of Brandt's voles to particular habitat characteristics, suggest that current grazing intensity tends to maintain grass at low height in years with

Figure 3. Brandt's Vole (*Microtus brandtii*)





average precipitation. The substantial increase in livestock numbers over the last 50 years appears to have increased the number of years when the balance of grazing and plant growth favours high rates of increase in Brandt's vole populations, and hence there has been an increase in the frequency of outbreaks.

### 3. Daurian Pika, *Ochotona dauurica*

There is also an apparent relationship between grazing of domestic animals and pika population density. When the combined grazing of yaks, sheep and horses lower the degree of cover and the height of vegetation, Plateau Pikas may be found at greater densities than on natural meadows (Shi 1983). Similarly, Daurian Pikas are more likely to contribute to the deterioration of rangelands that are already overgrazed (Zhong et al. 1985). The *zokor*, another species that is often held responsible for soil and vegetation disturbances in alpine plant communities on the Plateau, reportedly has a higher survival rate in heavily grazed sites (Cincotta et al. 1992). Apparently under conditions initiated by pikas and other small mammals on the Plateau are in a position to do greater harm to the grassland environment. The question can be raised as to whether the high densities of pikas (and *zokors*) are causal of rangeland degradation, or merely symptomatic of overgrazing by livestock (see also Cincotta et al. 1992). Shi (1983) concluded that the most effective way to control damage by pikas would be to improve the condition of the range, which would presumably mean to reduce the intensity of grazing by domestic livestock.

Competition between Plateau Pikas and livestock is dependent on the density of pikas and the quality of the rangeland. The foraging of pikas at low and moderate densities (such as found in normal situations) is selective and overlaps little with the diet of domestic grazing animals, thus the pikas may play an important role in the stabilization of the alpine meadow vegetation community. However, the diet of pikas may overlap extensively with livestock when pika density is extremely high (such as found in situations where rangelands are already heavily grazed, see above, Jiang and Xia 1985, 1987).

**Figure 4. Daurian pika**





## B. Predators

### 1. Red fox (*Vulpes vulpes*)

**Figure 6. Red fox (*Vulpes vulpes*)**



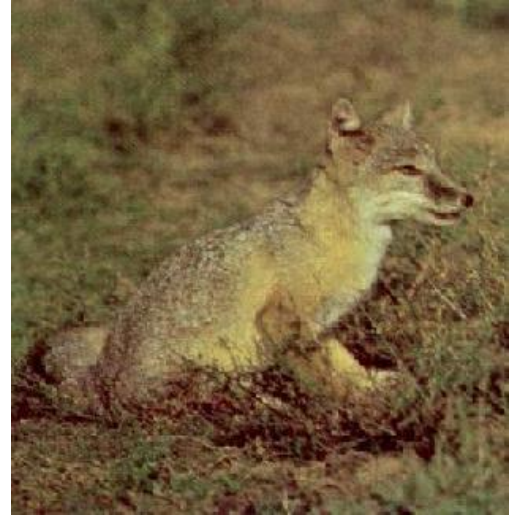
### 2. Sand fox (*Vulpes corsac*)

### 3. Wolf (*Canis lupus*)

**Figure 8. Wolf (winter)**



**Figure 5. Sand fox (*Vulpes corsac*)**



**Figure 7. Wolf (summer)**



C. Birds

**Figure 9. Cinereous vulture**



D. Invasive and toxic herbs

**Figure 10. *Thymus serpyllum***



**Figure 11.** *Stella chamaejasme*



**Figure 12.** Taana onion, *Allium mongolicum*

