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## **Co-management of rangelands to avoid the tragedy of the commons : experiences from highland Asia**

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**Key points :** Rangelands in highland Asia are important to livelihoods of livestock keepers and the maintenance of ecosystem integrity . After the failure of socialist collective management of rangelands , there is an urgent need to address rangeland issues in highland Asia to deal with the loss of traditional knowledge and to cope with uncertainties . This paper highlights the option of co-management of rangelands as a promising solution to avoid the tragedy of the commons , based on experiences from the region . Examples of successful co-management initiatives in the region are presented-with a detailed case study from northern Tibetan Autonomous Region (TAR)-to illustrate flexible options for reversing negative trends resulting from the crumbling of traditional systems and open-access grazing , within the prevailing ecological , technical and political contexts .

**Key words :** rangeland co-management , highland Asia , tragedy of the commons , pastoral livelihood , ecosystem service

### **Rangelands in highland Asia**

Highland Asian rangelands are mostly dry and cold , where pastoralism has been and remains the main livelihood . In Mongolia , where 75% of the area is covered by rangelands that support some 30 million livestock , about half of the country's labour force is engaged in producing over one third of the national Gross Domestic Product (Ykhanbai *et al* 2004) . Rangelands in the world's highest plateau , the Hindu Kush-Himalayan (HKH) region , make up more than 60% of the total land area and are home to about 30 million pastoralists . In China , 40% of the land is classified as useable grassland . The western drylands (Thar Desert) and northern mountainous areas (Himalaya) in India are geographically important rangelands that accommodate approximately 6% of the country's population . There are about 250 million ha of natural rangeland in five Central Asia Republics-Kazakhstan , Kyrgyzstan , Tajikistan , Turkmenistan and Uzbekistan-that comprise the largest area of usable agricultural land and support pastoral societies with 15 million cattle , 40 million sheep and 3 million goats (Oram 2000) .

Mobile livestock grazing has long been practised throughout highland Asia . Traditionally , the rangelands were controlled by more or less strict local institutional arrangements through tribes , groups of people with various kinds of relations , or monasteries . A major factor for this mobility has been the search for good pasture and water in highly variable , harsh and extensive environments . Such traditional management practices , however , changed tremendously in the 20<sup>th</sup> century , especially in a number of socialist countries such as China , Mongolia and former Soviet Republics , which centralised the control and exploitation of natural resources , including pastures . Unfortunately , this idealistic centralised approach proved to be a failure . After the breakdown of the communes , use and control of pastures went back into the hands of local users , yet many of the pre-commune indigenous systems of management were lost . The challenge is how to revive indigenous rangeland management systems and mobile livestock grazing to adapt to the changing environment , while still providing modern-day social services and access to a global economy .

In addition to being a livestock-based livelihood source , highland Asian rangelands also provide a wide range of non-grazing products and ecosystem services to people living in and outside the region . These rangelands are the headwaters of numerous major rivers in the Eurasian continent . They are biologically diverse with a large number of endemic animal and plant species , many of which face threat of extinction . They provide local people with wild food , medicinal and aromatic plants for healing and religious purposes , fuel and construction materials , and mineral products . They also offer essential ecosystem services such as water capture and regulation ; soil establishment ; carbon sequestration ; climate stabilisation ; open fresh air and attractive scenic views ; anthropological sites ; and diverse cultural landscapes . Different groups of stakeholders (e.g . various livestock keepers , aromatic and medicinal plant collectors , mining and tourism operators , and conservationists) seek to use/manage rangeland for different purposes and that requires coordinated efforts .

### **The common resources**

Rangelands are generally commonly used resources in highland Asia . Mongolia pursues a post-commune policy of state ownership of pasture with use and management to be regulated by local administrations . In Kazakhstan and Kyrgyzstan , new statutory laws authorise village , prefecture and provincial administrations to take care of rangelands in village , mid-mountain and high-mountain areas , which often contradicts with customary uses . In non-socialist countries of highland Asia , community organisations function to some extent . For example , many rangelands in Pakistan are still locally regarded as common tribal or village property . The tribe or village representatives claim compensation from outsiders for using the land , but the use of rangeland resources by community members is unrestricted and nobody is responsible for sustainability of the resources (Mohammad 1989) . The pressure to share resources is also not uncommon in Indian rangelands , where pastoralists are

becoming poorer because of very limited land ownership and their dependence on shrinking common property resources (Sharma et al 2003) . The sustainability of rangeland resources in the eastern Ladakh of India is also in question because of growing livestock numbers , a rapid increase in tourism , and the conflicts arising between herders , wildlife managers and development agencies in the area ( Rawat and Adhikari 2005) .

In China , where the economy is rapidly growing , the government distributed all the collectively owned livestock to individual households based on the number of family members in 1982-84 , along with market reform , to improve livestock productivity , but the rangeland was still used in common within defined administrative boundaries until the mid 1990s . This led to rapid growth of livestock numbers and open-access grazing , the "tragedy of the commons" situation as described by Hardin (1968) . This contradicts with our belief that the "tragedy of the commons" should not happen in areas where the community has well-maintained formal or informal control of land , for they have the tradition of organising themselves in certain ways to ensure the sustainable use of rangeland resources . The reality in highland Asia , as in other rangeland-dependent pastoral regions , is that collective rangeland and livestock management systems had been practised hundreds or even thousands of years before modern political changes , so why did the open-access situation occur ?

In-depth analysis nevertheless reveals that the tragedy of the commons does occur in openly accessible rangelands where local arrangements for efficiently organised resource use are missing . The socialist countries in highland Asia had nationalised/ collectivised all the rangelands and livestock for a planned economy . In the process of practising this centrally planned economy , local patterns for using rangeland resources were replaced for 20-70 years by an idealistic , but unfortunately , in the end , unrealistic and unproductive management system . In the meantime , the global economy has grown rapidly and monetary income has become an important pursuit for many people throughout the world . When the pastoralists were freed from decades of confined collective production , they had largely lost their tradition to organise themselves for cooperatively manage resources . Instead , they sought their own niche in the market-oriented economy by increasing their herd sizes-a perceived "tragedy of the commons" scenario .

The above-mentioned reality of non-responsive management of the commons , according to the authors' experience , is largely relevant to the contradiction between customary regulations and contemporary statutory laws . For instance , Sharma *et al* (2003) reported that customary use of forest resources or common lands is not documented in government records or officially recognised ; thus , Himalayan pastoralists are simply not understood as the stakeholders in use of their own land resources . They tend to leave their land because of agricultural encroachment , urban area expansion or the establishment of protected (nature-conservation) areas . Various groups of pastoralists in Pakistan and India have been organising themselves to defend and secure their land rights in the last few decades , but even the newly promulgated policies in favour of customary land rights are yet to be implemented in many places .

In summary , it appears that many pastoral communities in highland Asia lack sufficient self-organisation to be able to sustain the use of rangeland resources either because of the aftermath of the collapse of the collective production system , the penetration of a market-oriented culture and increased demand for profit from the rangelands , or the increase in other rangeland resource users , including tourists and miners . Under these circumstances , simply trying to revive or maintain mobile livestock grazing and traditional pastoral organisation in highland Asia would be an unrealistic approach to achieve sustainable management of rangeland resources . Alternatives are needed .

### **Co-management : a promising alternative**

Hardin (1968) suggested a solution to the "tragedy of the commons" : to privatise the land by selling it or allocating rights to enter it . Economically and theoretically , this sounds convincing . The reality on the rangelands , however , is that pastoral peoples have long been living with uncertainties and have developed systems of livestock mobility , sometimes over long distances , in order to cope with climate variability and social vulnerability . The privatisation of rangelands in China does not seem to address the current challenges on account of the specificities of different physical conditions and societal systems in the rangelands . Rather , it has had negative effects on the livelihood of pastoral societies in many places and has led to ecosystem fragmentation and uneven use of lands ( Yan *et al* 2005 , Fernandez-Gimenez 2006) .

An alternative promising approach , suggested from research results and practical experience , is co-management of rangeland resources to achieve sustainable pastoral development . Rangeland co-management engages multiple stakeholders for different uses and conservation purposes . It is a continuous and dynamic process that involves all concerned parties-especially government agencies and heterogeneous communities-to negotiate , define and guarantee amongst themselves a fair sharing of rights and benefits with clear responsibilities and entitlements of each group ( Borrini-Feyerabend *et al* 2000) .

The form and content of the process of co-managing rangeland resources in highland Asia vary significantly from one county or even locality to another . It can encompass spontaneous organisation by a pastoral community to cope with physical and political limitations to continue collective mobile livestock grazing , as we found in Zoige County of Sichuan Province of China , where individualisation of rangeland took place theoretically but was not possible in practice . It may be facilitated by a national

government ministry with the support of international aid programs to halt rangeland degradation, as was attempted in the Altai Mountains of Mongolia (Ykhanbai *et al* 2004). It could also emerge from the initiatives of non-governmental organisations in balancing pastoral livelihood improvement and sustainable use of rangeland resources (Banks *et al* 2003). In the community-based co-management process supported by a project of the International Centre for Integrated Mountain Development (ICIMOD), villagers in Upper Mustang of Nepal are using three-dimensional maps developed in a participatory way as physical aids to help them in negotiating boundaries of various groups and of seasonal pastures and reaching agreements for their use. In Kazakhstan and Kyrgyzstan, the World Bank and UNDP-GEF projects are trying to help herders form their own associations or cooperatives so that they can jointly manage their livestock and available rangeland resources for rational use.

Among many co-management initiatives and practices in highland Asia, we would like to highlight the models of co-management by local governments and communities that are flourishing in northern Tibet Autonomous Region (TAR). These models were studied during fieldwork in Naqu Prefecture in northern TAR in autumn 2007, with the technical and financial support of the World Initiative for Sustainable Pastoralism (WISP), an IUCN-executed UNDP-GEF project. More information about WISP is available at website: [www.iucn.org/wisp](http://www.iucn.org/wisp).

### **A case example of co-management**

In sparsely populated northern TAR on the Changtang Plateau, the elevation is over 4600 metres above sea level and the livelihoods of local people depend entirely or largely on livestock production on the dry, and still quite pristine, rangelands. Local dwellers in northern TAR are far away from high-level government headquarters and the markets. Many of the administrative and technical officials in the local government are locally recruited and still have family members and relatives herding livestock in their hometowns. For this reason, the local officials are more flexible than outsiders may be in implementing national policies according to their own assessment of the local situation. A co-management system has perhaps developed so successfully in northern TAR because of this mixture of socio-political and environmental demands.

Co-management of livestock in Nima County in northern TAR was initiated by the Nima County government shortly after the county was established in 1993, with the intention of reducing the emerging and widely spreading poverty. After the dismantling of the collective production system in northern TAR and after the formerly communally-owned animals were allocated to individual households in the early 1980s, a large number of pastoral families had lost their livestock, thus their means of livelihood. They became poor mainly because of a lack of livestock-managing skills after two generations of designated work in specialised commune groups, unsuccessful trade and/or natural disasters. Co-management of livestock was first tried in Jiagu Township by gathering 39 poor households, of which 38 subsisted as beggars, from three villages to form a special production group (equivalent to sub-village). The government subsidised the purchase of 16 sheep units per person, and the richer families also lent livestock to the poor families, who could return the same class and number of livestock five years later. Each household in the special production group then pooled their livestock and labour force, as "shares" in the co-management system. Some rich families with more livestock but insufficient labour force were also keen to join the co-management group. Such voluntary co-managed types of organisation at production group or village level were soon formed in other places throughout Nima County and the neighbouring counties of Shenzha and Shuanghu with encouragement from the county governments.

The variety of labour demands and specialities were discussed within the co-management groups and tasks assigned accordingly to individuals to best achieve improved production. Resilience in response to natural disasters and other risks was also enhanced in the collective production mode through the sharing of costs and labour. The livestock products from the same group were collectively sold to the markets for a good price. This newly tried collective production system differs from the former socialist collective production mode because the livestock are privately owned and returns are more fairly allocated according to family shares and labour contribution, in which more incentives are given to individuals for improvement. After several years of local initiation of co-management in Nima County, the rangeland has been legally leased to individual households in the county since 2000, based on long-term contracts with the government. Those communities practising co-management discussed within their groups and indeed welcomed rangeland privatisation so that they could creatively use their contracted rangeland as shares in the collective economy. These groups generally have written agreements on production, responsibilities, benefit-sharing, security, sanitation and some other common concerns. Although this group had started a co-management system for livestock production, sustainable rangeland management came under stronger focus once the pastures were privatised. Surplus labour force is organised to pursue non-grazing activities and income generation according to jointly agreed terms.

The initial purpose of reducing poverty has been achieved through the co-management arrangements, as identified during the primary author's visit to seven voluntarily formed co-management groups in October 2007. For example, the Darea Village co-management group established in 1994 was composed of 18 extremely poor families in Daguo Township. The annual per capita income of those families at the time of formation was 415 RMB Yuan (equivalent to about 65 USD at the exchange rate of that time) and their average per capita livestock holding was 5.7 sheep units. They did not receive government subsidies other than a mainland Chinese aid project in building winter houses for each family. The group remained open, and later on some families with big herds but insufficient labour force also joined. There was a total of 25 families in the group in October 2007. The per

capita income and livestock of the group in 2006 were 1717 Yuan (equivalent to about 245 USD) and 47 sheep units, respectively. Many other co-management groups in Nima County received government subsidies and/or richer herders helped in the form of livestock, and their per capita income was generally more than 1 USD a day in 2007.

In the meantime, these communities have also innovatively incorporated sustainable use of rangeland resources into the approach. Recognising that their rangeland resources are finite they have developed their own ways to limit livestock numbers kept by individual households in the cooperative model of management, based on the estimate of carrying capacity suggested by county technical officials. They collect grazing fees per sheep unit—roughly 1 USD per year. If a family's herd exceeds the number allowed in their rangeland contract, they pay 5 USD per sheep unit. Such practices are also encouraged by local governments in counties of adjacent Naqu and Ali Prefectures of TAR.

Although herders in northern TAR have generally welcomed the long-term contractual allocation of rangelands, interestingly enough, most herders in the organised co-management groups do not actually remember how much land their families have contracted or where their exact boundaries are. Nonetheless, most of the villages have fenced their collective boundaries and reserved winter pastures for collectively agreed use during critical feeding periods. This practice has largely avoided conflicts between individual households regarding boundary disputes, but brought the community together for rational use of forage and water resources with increased resilience to physical, economical and social vulnerabilities. The County Animal Husbandry Bureau and the Village Councils practising the co-management approach in Nima and Shenzha Counties have detailed records and maps of the land locations at household levels.

### Conclusions

For thousands of years, pastoralists in highland Asia were able to graze their livestock under local institutional arrangements to use and manage grass and water on extensive rangelands. However, this situation has changed tremendously in the last century because of technological and social transformation as well as economic and population growth. Moreover, the dismantling of the socialist system of collective production generally altered traditional arrangements and the increase in the population of people and livestock in highland Asia means that, in many places, going back to past practices is not likely to be effective for sustainable resource use.

While some common-pool resources may still be effectively managed by community institutions and conventions, we have focused here on rangelands that have fallen into the category of "open access" as a result of changes in the political, demographic, institutional and technological context. Privatisation of common-pool rangeland resources or use rights can hardly be regarded as a solution under the conditions in highland Asia. Instead, this has created conflicts and led to over-utilisation of certain resources (Banks *et al* 2003). The great ecological variability and uncertainty on the rangelands require that pastoral production is able to track available forage with mobility and flexibility in order to have access to resources in large areas encompassing diverse landscape niches (Bruce & Mearns 2001).

Dry rangelands are non-equilibrium systems in which vegetation productivity and thus animal numbers fluctuate in response to variable environments. In such a system, there must be dialogue between the natural and social sciences, as well as between scientists and policymakers in order to influence the latter to integrate the views of multiple stakeholders with different value systems and concerns in decision-making regarding natural resource policies (Gillson & Hoffman 2007). Beyond the co-management initiatives in China and Mongolia mentioned here, Ngaido and Kirk (2001) have also explored the different instruments used by states to enhance the capacity of local institutions and communities to manage resources and sustain pastoralists' livelihoods in Africa and other parts of Asia. These initiatives and instruments deserve more attention in Asian research and development, as well as in the curricula of Asian universities, so that policies and development activities will be based on a sound understanding of rangeland use and management in the dry highlands.

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