

Sustainable Rangelands, Sustainable Pastoralism in Yak-Herding Areas of the Greater Tibetan Plateau

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Introduction

In the vast high altitude rangelands of the Tibetan plateau, and of the surrounding mountain regions of Central Asia – from Tajikistan and Kyrgyzstan in the far west, to Mongolia and Bhutan in the east – yak husbandry has for millennia contributed to the sustenance and cultures of people living in these challenging, often marginal lands. Today, of the world's estimated 14 million domestic yak, around 90% are found in China, 4% in Mongolia, and the rest are in the Himalayan and Central Asian countries (Wiener et al. 2003).

First domesticated around 10,000 years ago, most likely in the *Changtang* region of Tibet, yak provide many fundamentals necessary for both traditional and modern lifestyles, from meat and milk products, to fiber (for clothing and habitation), yak dung (for heating and cooking) and transportation. The progenitor of this domestic animal is the wild yak, still found in some parts of the Tibetan plateau. Wild yak once numbered in the millions and roamed widely across the plateau. Now, however, only an estimated 15,000 exist in the wild – probably the most at-risk species on the Tibetan plateau today. The presence of wild yak, and its domestication, has been the single most important factor in the adaptation of people in the Tibetan plateau region. Without this unique animal, life would be impossible across vast areas of High Asia.

There is nearly complete overlap of yak husbandry and rangelands in the mountainous areas of Asia. The state of the rangelands, however, is deteriorating. Many different causes are attributed to the observed changes, including both anthropogenic and natural factors. It is also observable that different root causes of land degradation may be assumed or accepted by different people, based on their socio-political ideology or preferred development paradigm! Consequently, there are not only ecological obstacles to the maintenance and development yak-dependent livelihoods, but also ideological threats. These include so-called 'modernization' policies applied to some pastoral areas that seek to advance market-based institutional reforms such as household-level privatization and rangeland transfer mechanisms (Gongbuzeren et al., 2016) as well as the transformation of nomadic pastoralists into settled ranchers or sedentary farmers. Such policies fail to recognize the socio-cultural interactions that have co-evolved between rangeland ecosystems, livestock and herders over generations. Although benefits may be generated for individual herders, such modernization policies all too often lead to socio-cultural loss, such as when the only apparent option for 'development' is for herders to abandon their customary rangeland management systems and livelihood. There is also a loss of time-tested (i.e. proven, and sustainable) natural resource management practices.

Mountain rangelands in Asia constitute the most extensive high altitude pastoral regions worldwide. Other noteworthy zones exist in the Andes of South America, and in smaller isolated ranges or relatively high plateaus in Africa. There are also similarities with extensive rangelands and traditional resource-based livelihoods, such as practiced by Sami reindeer herders in cold northern climates. However, nowhere else in the world are high rangelands and nomadic pastoralism as extensive as on the vast Tibetan plateau and in the surrounding mountainous areas of the Himalayas and Central Asia.

High Mountains and Rangelands of the World

Globally, rangelands (drylands and grasslands) cover around 40% of the Earth's land area. Mountain regions, for their part, cover about 24% of the world (Price 2015). Both these contribute uniquely to human wellbeing, from local to global scales. Biodiversity, including ecosystems with their goods and services, also has both intrinsic and utilitarian values; neither should be overlooked. Non-economic values of biodiversity range from the aesthetic to the philosophical or religious significance of nature. Additionally, inter-generational equity also requires us to consider the value that we place on nature today in light of the needs of tomorrow. Within such a framework the multitude of ecosystem services provided by rangelands (and other habitats) have been extensively studied and are well known; based largely on the Millennium Ecosystem Assessment (MA 2005). However as Yahdjian et al (2015) have elaborated, "the value [that we attribute to] rangelands depends on both their ability to supply ecosystem services *and society's demand for such services*, [and] land-use decisions reflect balances between the supply of ecosystem services and multiple demands by stakeholders, *weighted by their political power*" (emphases added).

Of the world's rangelands, vast areas are found at high altitudes – with the largest aerial extent of high altitude rangeland being situated in Asia, centered on the Tibetan plateau. In total, around 1.3 million km² of the Tibetan plateau is classified as steppe (the entire plateau covers around 2.5 million km², or approximately one-quarter of China's total land area), including alpine meadow (45%), alpine steppe (28%), alpine desert (5%) and other vegetation types (Sheehy et al. 2006).

While most of this high altitude region has been isolated for centuries due to enormous distances, and also political decisions (often with insular policies), now nearly everywhere 'resource users' live in a truly globalized world, especially with new communication technologies. In such a world, though, all too often development approaches or political decisions are conceived for lowlands, farmlands or urban centers, and do not serve the best interests of mountain peoples – largely because different frames of reference are used, or scales of analysis employed. Yet for pastoralists and agro-pastoralists, livestock such as yak are so much more than economic assets. Therefore the basis of our assessments of human wellbeing needs to be *richer* than pure economics – and should incorporate *much more of the social dimensions* of rangeland ecosystems (see Hodges et al. 2014).

Rangelands Are Social-Ecological Systems

Living for centuries in isolation from the rest of the world, Tibetan herders' customs and practices in relation to rangeland resources have developed mostly under the influence of the land itself – and less by influence of other communities' experiences, transmitted through cultural exchanges. Conversely, the land has changed not only through ecological processes – it equally has been greatly impacted by people through their land management practices. People and land, or society and ecology, are tightly inter-related. Indeed, most rangelands of the world have developed over millennia under the influence of grazing, whether by livestock or wildlife. On the Tibetan plateau, it also is postulated that a significant portion of present-day grazing land was created long ago through the clearing (burning) of forests to improve grazing opportunities for herders and their domesticated animals, becoming rangeland subsequently maintained through grazing management (Miehe et al. 2009, Ryavec 2015).

The bottom line is simply this: There is interdependence between people and the land, and the world's vast rangelands are perhaps best regarded as *coupled social-ecological systems*. And in light of this, the conservation of rangelands must be premised not only on biodiversity and ecological issues *per se*, but also – fundamentally – by ensuring that *sustainable pastoralism* is both supported and practiced.



Figure 1. Tibetan herding family moving to summer pastures. Providing not only meat, milk, fiber and fuel (dung), but also transportation, they have long been an indispensable part of Tibetan pastoralism.

Pastoralism Is a Sustainable Food System

Traditionally, pastoralism has been the primary means by which communities have transformed rangeland and its resources into basic sustenance. Even today, pastoralism is *de facto* one of the most sustainable food systems on the planet; as it has proven itself through its very existence despite long-standing, entrenched prejudices and pressures (and opposition) over centuries from agricultural and urban populations (Krätli and Schareika 2010). The adaptive capacities of pastoralists have led them, through trial and error, to choose more flexible and responsive decision-making processes and more seasonally mobile land use patterns, allowing them to respond pragmatically to variable and often unpredictable climatic conditions. This does not mean that misuse (including overuse) of natural resources and ensuing environmental degradation does not ever occur in rangelands, mediated at least in part by pastoral communities. However, where such land degradation occurs, it tends to have been influenced significantly by *changing patterns* of natural resource use, often due to an imposition (whether active or passive) of new socio-political structures and/or to a delinking of resource and resource user boundaries and other features (or ‘design principles’) that are commonly associated with the sustainable management of common pool resources (Anderies et al. 2004, Ostrom 2009, 2011). Adopting integrated perspectives of rangeland systems to better understand their inter-connected social, economic and ecological realities is increasingly recognized as being of paramount importance to achieve sustainability (TEEB 2008, McGahey et al. 2014). Under management that properly links these complementary dimensions, this food production system can yet continue to serve the interests of both humanity and global biodiversity.

The UNEP and IUCN also highlight the role of pastoralists as stewards of more than a quarter of the world’s land area. Pastoralism is practiced by between 200 and 500 million people, including nomadic communities, transhumant herders and agro-pastoralists. Yet despite the large numbers, four important facts about pastoralism are widely overlooked (Davies & Hagelberg 2014):

- 1) Mobility of livestock (and wildlife) is essential to maintain the health of dryland ecosystems – for carbon sequestration, watershed protection, and biodiversity conservation.
- 2) Intensive livestock systems can degrade the environment by producing high levels of carbon dioxide and methane, polluting watercourses, and causing land degradation.

- 3) Sustainable pastoral systems are more efficient, productive and resilient than more sedentary agricultural systems in rangelands, when all factors and environmental benefits are counted.
- 4) Pastoralism is a universal issue, as pastoralists in both the developing and developed countries share many environmental and economic challenges and opportunities.

Additionally, the benefits derived from sustainable use and preservation of rangelands have a regional or even global component, in particular through upstream-downstream water related linkages. Pastoralism may also be recognized not only as a means to harvest resources, but – in the language of the Millennium Assessment – it is itself a significant *cultural asset* of mountain and rangeland social-ecological systems, and also a *provider* of ecosystem services. As summed up in the UN Convention on Biological Diversity (CBD) document *Good Practice Guide: Pastoralism, Nature Conservation and Development*, pastoralism contributes “to the production and stability of ecosystem services. [...] The vegetation maintained through grazing activities...captures carbon, reduces erosion, maintains soils, facilitates water holding capacity and provides [wildlife] habitat. Most pastoral systems [also] are steeped in cultural practices and indigenous knowledge, ‘cultural services’ which are highly valued and often irreplaceable.” Thus, even beyond the provision of direct goods and services such as meat, milk and fibers, pastoralism in the high altitude rangelands of the world can be a livelihood option that benefits both the resource users themselves and the global community through climate change mitigation, disaster risk reduction, water resource availability, and biodiversity conservation.

Experiences from the Tibetan Plateau

Based on nearly two decades working in the Tibetan plateau region, and more recently in the mountains and rangelands of Kyrgyzstan and Tajikistan in Central Asia, I now wish to turn our attention to two special topics related to resource governance in rangelands, illustrated with two case studies from the headwaters of the Yangtze River near the center of the Tibetan plateau in China. These are two governance models that *overlay* older, traditional pastoral practices and social dynamics as well as an array of government policies that have been introduced in recent years (Miller 2002, Foggin 2008, Li et al. 2014, Kreutzman 2015). Out of such a layering of understandings, interactions, relationships, and mindsets—a new synthesis emerges, the living realities of today! It is such realities that I wish to introduce and summarize here. One is the outworking of community-level engagement and partnership with a recently established *nature reserve*, the other the result of new forms of *community association* (through the establishment of a community cooperative) for mutual support, empowerment, and socio-economic benefit.

I offer the following observations from a combination of roles and identities: as conservation biologist, development practitioner, research scientist, and also as colleague and friend of the many local herders as well as government authorities who welcomed us when, together with my family, we lived in the Yangtze River headwaters over a period of several years. As such, these observations will include both ‘external analysis’ as well as ‘insider perspectives’ – yet through such a synthesis, it is my hope that ‘mountain voices’ may be better heard, as they are essential ingredients for sustainability.

Case Study #1: Community engagement and partnerships with Protected Areas

The term ‘protected area’ covers a broad suite of landscapes with special natural, ecological and/or cultural significance. The IUCN defines a protected area as a “clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve long-term conservation of nature with associated ecosystem services and cultural values.” The best-known form of protected areas is probably the ‘national park’ system – such as was developed in Canada, starting with the establishment of Banff National Park in 1885. Problematic with national parks, however, has been the erroneous view that humankind exists apart from nature; which has led to enormous injustice for many indigenous communities around the world, many of which have been excluded from their own lands in the name of conservation (Dowie 2009). Costs of enforcement are also extremely high in these cases.

On the other hand, less formal but effective conservation by local and indigenous peoples occurs in very large territories and areas – estimated to cover 13% of the world’s land surface (ICCA 2016). Generally referred to as *indigenous and community conserved areas*, or ICCAs, this model includes both the active or strict protection by local communities of an area in its so-called natural state, and more passive shaping and/or maintenance of landscapes and the sustainable and biodiversity-friendly use of natural resources (Borrini-Feyerabend et al. 2007).

In today’s world, many formally recognized protected areas – in rangelands and elsewhere – overlap significantly with (often much larger) ICCAs. The latter form of governance generally includes widely agreed regulations and sanctions, and generally allows for the sustainable use of rangeland resources and their conservation as well as a flourishing of nomadic pastoralist culture. In China, vast areas of the Tibetan plateau are now included within the national PA network. One of the largest PAs is the Sanjiangyuan National Nature Reserve, yet even before this was conceived, local conservation action was underway – both through traditional practices and mindsets, and the community-led development of conservation initiatives (Foggin 2005, 2014).

Finding themselves living within a newly-established nature reserve, yet having had nil or very little involvement in its planning and establishment, with initially no provision for the involvement of local communities in its management, herders residing in the Yangtze River headwaters became deeply concerned about their future. Yet through a process of multi-stakeholder dialogue in the first years of the nature reserve’s existence, the management authorities came to recognize both the potential roles and multiple benefits that could be derived from developing partnerships with local communities. Thus was initiated what has become the Reserve’s primary *modus operandus*, ‘community co-management’. The strategic decision to adopt a *co-management approach* was for four reasons: (i) to compensate for shortage of field staff, (ii) to capitalize on herders’ knowledge and abilities, (iii) to increase environmental awareness, and (iv) to reduce illegal poaching. Additionally, our own purposes (as Canadian non-profit organization) included (v) the less tangible but no-less-real value of community empowerment, along with capacity development, and (vi) a desire to demonstrate to higher-level policy makers how communities could be partners in conservation, i.e. seen as part of the solution, rather than assumed to be detrimental in areas of high biodiversity value.

In one herding community with whom I have partnered since 1998 (together with the grassroots NGO, *Upper Yangtze Conservation and Development Organization*), the snow leopard was selected as focal species for conservation, around which we concentrated our collaboration. Camera traps were used, supplemented by seasonal wildlife surveys by community rangers. Through this project, a rugged mountain range with one of the highest densities of snow leopard in the world was identified. Government authorities were able to see community co-management worked out in practice – and as a viable option for protected area management, with a variety of community development co-benefits.

Another community environmental activity undertaken in this area has been the trial development of solar-powered electric fences, to help protect herders’ homes from break-ins by brown bear. Human-wildlife conflict with bears has increased in recent years, to the point where 9 out of 10 winter homes are damaged annually in some regions when herders move to their summer pastures. After initial trials undertaken by our non-profit NGO, the nature reserve managers have further extended this deterrence approach as part of their community partnership.



Figure 2. Snow leopard was selected as a focal species for trial use of community co-management in the Sanjiangyuan National Nature Reserve, with support from the NGO, Plateau Perspectives Canada.

In yet another herding community near the source of the Yangtze River, local regulations were agreed as early as 1998 to limit illegal poaching by local and external hunters – well before the creation of the Sanjiangyuan National Nature Reserve. Over time this led to the establishment of a local organization focused on wild yak preservation and other related grassland management and conservation measures. Such community ventures were subsequently incorporated into the ‘contract conservation’ approach also trialed by the nature reserve, within the broader ‘community co-management’ framework. Under this approach a contract is drawn up between the community and nature reserve authorities whereby community rangers monitor wildlife populations (in this instance, wild yak) in exchange for payments to be made into a local development fund managed by a committee with community representation.

These early experiences with co-management in pastoral areas have been endorsed at high level, with integration into protected area planning and management under the auspices of the Qinghai Forestry Department. There has been financial and technical support provided by a GEF/UNDP project, which aims to scale-up such lessons learned. Several aspects of this community-oriented approach to conservation in pastoral areas have also been extended to other Chinese provinces, through the suite of State Forestry Administration (SFA) and UNDP projects under the Main Streams of Life program, with their focus on strengthening the effectiveness of PA systems.

In such ways, protected areas have potential to strengthen community participation in natural resource management, and more fundamentally in resource governance (i.e., decision-making). At global scale, IUCN and other international bodies are now increasingly endorsing more community-oriented forms of resource governance, most notably since the World Parks Congress 2014 held in Sydney, Australia. The reach of ‘local voices’ into development policy is increasing too, particularly through *mountain agenda* dialogues facilitated by the UN Food & Agriculture Organization (FAO), Swiss Development Corporation (SDC) and others, which recognize the value of respecting and listening to local resource users as well as the enormous benefit thus derived from mountains for downstream populations. In the Tibetan plateau region, which constitutes around half of China’s vast rangeland resources and where several large national protected areas have already been established in recent decades, co-management is a tool that may be leveraged, if thoughtfully applied, in support of conservation outcomes, community empowerment and socio-economic development.

Case Study #2: Establishment of community cooperatives and associations

Just beyond the boundary of the aforementioned nature reserve, another herding community mobilized under the encouragement of two young colleagues from our non-profit organization, leading to the development of the Kegawa Herders Cooperative (named after a local sacred mountain) and also of a community association that has successfully trialed the management of a revolving development fund. County and prefecture governments have provided enabling policy environments, but the development of these community efforts have been largely endogenous, with support from Plateau Perspectives and several national academic institutions and development organizations.

The launch of the Herders Cooperative in 2010 marked the beginning of what has become the most empowering of all development activities that Plateau Perspectives has supported – financially and technically – since it began projects in 1998. Starting with around 40 families, now approximately 92 households regularly participate in the projects and activities organized by the Cooperative. These activities include a regular monitoring of local grassland conditions, the development of handicrafts, the setup and operating of a small shop, and on-going development of a community-based tourism venture. A long-term partnership has also developed with an international sports clothing company, kora, which produces thermal underwear from fine yak wool. Through the latter project, all cooperative members have the option to sell their yak wool at guaranteed upper fair market value, supplemented annually with a donation to the community's social development fund. The Cooperative makes major decisions at annual general meetings and operates activities through working groups.

More specifically, membership in the Cooperative is voluntary, but requires some level of financial contribution. Payment of dividends (from profits generated through the year) is proportional to each member's contribution, whether financial or in-kind in the form of livestock, but voting rights are based on a principle of one person, one vote. General meetings are held to ensure that every member has a voice. The working groups established to oversee operations and to facilitate on-going communication amongst members include ecological husbandry, grassland monitoring, environmental awareness, garbage collection, tourism development, and other topics. Most recently, in late 2015, the Cooperative decided to develop its own yak herd, together with designated pastureland. Milk, butter and cheese sales are planned, targeting the expanding urban population in the county capital. Some of the profit generated from these activities is reinvested into the core fund, and some is earmarked for social needs. Most of the profit, though, is shared amongst shareholders as dividends, in proportion to each member's cumulative investment.

The 'community development revolving fund' established in a neighboring village with support from Ford Foundation, through our non-profit and with the indispensable assistance of Prof Du Fachun and his colleagues, provided yet another way to strengthen the engagement of herding communities in resource governance, business development, management and community negotiations. Through provision of short duration micro loans, several rounds of business ventures have been successfully trialed. Beyond the individual activities funded, however, the primary success of this revolving fund project has been the mobilization of community members to discuss, agree and implement joint action. For the government, this also has demonstrated the viability of community-level management of resources, including financial resources. This may become even more important in the future as various options for transfer payments are considered, in exchange for pastoral communities' protection and maintenance of critical 'ecosystems services' in the rangelands.

Through such community-operated, rangeland-based business operations, many herding families have gained access to valuable opportunities, providing not only some level of economic benefit but also a framework for resource aggregation and strengthened local governance. This empowerment is leading to greater socio-economic wellbeing, a sense of ownership of resource conditions, and a pride in local pastoralist livelihoods and culture. In the context of a world increasingly 'flattened' by globalization,

which tends to advance homogeneity over diversity, *pastoralist empowerment* and a sense of identity are important ingredients for socio-economic development, for contentment, and for regional stability.



Figure 3. Kegawa Herders Cooperative ‘tourism development working group’ members in the field.

Concluding Remarks

Both the collaborative management of protected areas and the development of community-owned and -operated businesses with joint management of common pool resources (cf. cooperatives) bring multiple benefits for conservation and community development. In both instances, monitoring of grassland ecosystems and biodiversity is a fundamental feature of the resource management approach. Diversification of income and development opportunities also is at the heart of these endeavors. In short, sustainable pastoralism and the conservation of rangelands are complementary and reinforcing elements in a single development equation.

With ever-changing socio-political and climatic environments, resource users in rangelands need to remain constantly aware of new realities. *They always will need to adapt* – which indeed has always been amongst the strengths of pastoral peoples: flexible, mobile, and responsive to change. Through development of new social arrangements with neighbors and government, and with internal mobilization and strengthened capacities as primary resource users, pastoral communities should play a central role in decision-making for the development and conservation of the world’s rangelands. On the Tibetan plateau, this has been advanced in a small way through new partnerships developed with protected areas and the empowerment of several communities to diversify their economic strategies. Decreasing local communities’ dependence on narrow production systems will strengthen resilience, particularly in the face of future climate shocks (Wang et al. 2014), anticipated to be especially severe in mountain regions. Most significantly, partnering with pastoralists to conserve one of the world’s greatest grazing land ecosystems – the Tibetan plateau – is already demonstrably an excellent option.

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