

Balancing grassland ecosystem services to ensure long-term sustainability of Tibetan nomadic communities in the Sanjiangyuan Region of Western China

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Introduction

The Tibetan plateau is one of the world's most fragile ecosystems and home to nomadic communities which are the poorest and most disadvantaged in China. The plateau also provides a range of ecosystem services important to local livelihoods (food, fibre, soil erosion and culture), millions of people living in downstream communities (flood regulation, silting) and the global community (climate & biodiversity services). However, the ecosystem and the nomadic communities that live there are under increasing stress. Environmental perturbation associated with climate change and large-scale habitat degradation due to more intensive livestock grazing over last 50 years, have led to serious environmental and economic problems characterised by declining per capita agricultural income, grassland degradation, soil erosion which causes downstream silting of rivers and carbon leakage, and increasing human-wildlife conflicts.

Although the environmental, social and economic situation in the region is deteriorating quickly the fundamental drivers are essentially socio-economic in origin where poverty and economic aspirations of local people are difficult to sustain from a shrinking environmental base. Solutions are quickly required or it is possible that the entire grassland ecosystem may be irreversibly altered threatening the future of Tibetan nomads and their distinctive, and the livelihoods of millions of people who depend on the plateau grassland's for ecosystem services.

The aim of this paper is to consider the opportunities and constraints for green business development on the plateau that will help promote and sustain the delicate balance between livelihoods and the environment that is required.

Background

The grassland ecosystem on Qinghai-Tibetan Plateau has supported Tibetan nomads for thousands of years, and nurtured a unique culture of which a fundamental element is Tibetan Buddhism. Dependent largely on sheep and yaks, Tibetan society and culture have developed strong self-disciplinary norms for individual behavior that encourage people to live in harmony with, and respect, the land, water and all living beings. The culture has made significant contributions to conservation and is, perhaps, the primary reason why large herds of wildlife still roam freely on the Plateau.

Being arid and high, Sanjiangyuan is not particularly rich in species, but the flora and fauna form unique assemblages and contain a high proportion of endemics of high economic value including 1500 species of higher plants and 54 species of mammals. The dominant vegetation types in Sanjiangyuan are the alpine meadows (Liu Jiyuan, et al, 2008) dominated by *Kobresia spp* and alpine steppes dominated by *Stipa purpurea* and other graminoids and this ecosystem supports significant populations of globally threatened species such as the wild yak *Bos grunniens*, Tibetan wild Ass *Equus kiang*, Tibetan antelope, *Pantholops hodgsonii*, white-lipped deer, *Cervus albirostris*, brown bear *Ursus arctos*, and the snow leopard *Panthera uncia*. In mountain areas are found wild sheep such as Argali *Ovis ammon* and Blue sheep *Pseudois nayaur*. At least three WWF Global 200 Ecoregions fall inside Sanjiangyuan and it also forms part of the Biodiversity Hotspot “Mountains of Southwest China”.

Key Issues

Traditional modes of living are increasingly untenable, due, in part to degradation of the grasslands upon which they are based, and in part to unprecedented social, economic, and cultural transformations that have occurred in past decades (Harris, 2010). Food production per capita has fallen drastically in last 15 years and a ‘cultural’ and ‘environmental’ tipping point may be approaching Current use of many grasslands is unsustainable: 90% of the grassland is reported degraded and biomass was only 50-70% of that in 1950’s (Liu Jiyuan 2008). Fragmentation and desertification have been observed since 1970s and is continuing (Liu Jiyuan, 2008). Key issues are:

1. Rapid increase in the human and livestock populations over the last 30 years due to dramatic policy changes affecting land use which has encouraged intensification and a switch from nomadic to increasingly sedentary lifestyles Jing Hui (2005, 2006).
2. Climate change is another driver behind grassland degradation. In the past 50 years, the climate is warmer by 1.48°C and wetter by 29mm/10yr increase in precipitation and melting of glaciers and permafrost are clearly visible. How these changes exactly influence the grassland and livelihood is unknown, but add further uncertainty to an already complex situation.
3. Grassland degradation has also caused an increase in wildlife-human conflict in the Sanjiangyuan region. For example, the pikas, the marmots and other small mammals are often considered as pests that “destroy” grasslands and was poisoned extensively (Fan et al, 1999), whereas most researchers believe (Foggin 2000,) that high densities of pikas are more likely a consequence than a cause of degradation.
4. Other conflicts come from carnivores such as the wolf, the brown bear and the snow leopard that kill livestock. Wild ungulates such as the kiang (the Tibetan wild ass), the blue sheep and the white-lipped deer also compete for grass with domestic livestock and because they are protected by both the national law and Buddhism belief, conflicts occur with pastoralists in specific localities.

Concerned by the degradation of Sanjiangyuan, the government initiated significant conservation programs, with an intention to protect and restore the ecosystem (NDRC, 2005) and in 2001, the Sanjiangyuan National Nature Reserve was established, designating a vast area of 152,300 km² under protection. In 2005, the State Council approved the Sanjiangyuan Ecological Program with an investment of 7.5 billion RMB (> 1 billion USD) between 2005 and 2010. The program includes compensation for resettlement, grass planting, desertification control, cloud-seeding, pika poisoning (the animal is officially still viewed as the cause of degradation), livestock reduction, and fencing. In China’s 11th Five-Year-Plan (2005-2010), part of Sanjiangyuan was designated as a ‘No Development Zone’ (inside the nature reserve) or a ‘Restricted Development Zone’ according to the new national land zoning category. Although the monitoring system set up by the conservation program was found to be incapable of reflecting recent trends with precision, both government officials and the local people, believe that degradation has only slowed down in relatively small areas and is “worsening” in much of the area.

This is not surprising because the solutions included in these conservation programs, despite the best of intentions, were designed and implemented in a top-down manner, with neither local participation nor underpinned by reliable science. They also lacked clear objectives in both conservation and development terms and some of the approaches, such as poisoning pika and cloud-seeding may have negative long-term impacts on the ecosystem. Compensation for livestock reduction is also too low to have any beneficial effects. A recent study by Du. F (2010) concluded that the resettlement program, referred to as “ecological-emigration”, which removed 55,774 nomads to nearby townships since 2005, has actually aggravated poverty due to limited compensation and insufficient alternative livelihood support, and damaged the integrity of Tibetan ethnic culture.

Thus we are entering a crucial period on the plateau in environmental, social and cultural terms. The national government considers Sanjiangyuan as an important ecological zone for its national and even global ecosystem service value, but policies to protect these services are in conflict with the 600,000 Tibetan people (at least 300,000 pastoralists) who rely on the same ecosystem for their livelihood. Moreover, the livelihood and traditions of the Tibetans cannot be sustained if the ecosystem continues to degrade and there are few livelihood alternatives in such a remote area.

Although people’s perspectives and expectations toward life and the future, like elsewhere in the world, are changing and globalization and urbanization have an inevitable influence over people, especially the young, traditional culture persists and is still more or less followed by a significant amount of Tibetan people. ‘Green Business’ is one strategy approach that might provide an alternative way forward balancing economic aspiration with environmental protection and management, and respects and encourages the perpetuation of traditional culture and practices.

Leveraging business knowledge for biodiversity conservation

As globalization proceeds apace it is inevitable that market forces will increasingly influence the future of the communities who live on the Plateau. Can scientists, policy makers and local communities learn from free-market business efficiency in order to achieve ecologically-sustainable economic development that benefits people and wildlife?

Unfortunately there is no strong track record of achievement to draw upon. New initiatives such as the World Bank’s IDBPs and ICDPs had low success rates - in Africa, only around 50% of development

projects were successful (Kremen et al., 1999). Many such projects look good on paper but often fail in the 'implementation' stage. The success of IDBPs, like purely commercial ventures, depends on continual development and investment in 'new products and services' in line with changing consumer demand and this requires (among other things) strong local business (especially marketing) skills and financial investment. This is often overlooked/ underestimated/ unavailable in community-based ICDPs.

What type of ecologically sustainable business ventures might be possible on the plateau?

1. Consumptive use such as hunting is inconsistent with traditional Tibetan culture but other activities such as farming for trade in animals or animal parts may be possible.
2. Non-Consumptive: observation and adventure holidays (eg, rock climbing, trekking, scuba diving); touring (eg destination mountain biking tourism in countries without large predators) have considerable promise, but must overcome difficulties around accessibility and altitude and will only ever be a specialist niche. Benefit sharing remains a difficult issue as often only a minority of households are directly involved in and contribute to the business.

Classic business issues that would need to be addressed:

- (i) What sustainable competitive advantage does the location possess? ie what resources (eg unique scenery, ecosystems, flora, fauna) and competences (eg, skills, knowledge, training) do they have that other countries/locations cannot match? Developing nations especially tend to lack the latter.
- (ii) Who are the potential consumers of tourism products and services (eg market segmentation, targeting, profiling).
- (iii) What do they want to buy, ie what do consumers perceive as 'value' (eg in the product offer and supply chain).
- (iv) Why do they want to buy it (e.g. consumer behaviour, motivation)?
- (v) Where are they located (e.g. source country[ies])?
- (vi) How many are they? (e.g. market sizing)?
- (vii) How and where do they want to buy it? (Home vs destination consumption)?
- (viii) When and how often do they want to buy? (e.g. customer retention/repurchase/recommendation)?

- (ix) What is the most profitable, ecologically sustainable use of a natural resource
- (x) What level and type of investment (\$, time, knowledge, skills) is required to realise identified potential?

There are some wider issues. Improved education is widely recognised to lead to increased prosperity in communities. In business, 'technology transfer' especially of knowledge and expertise via training, is highly valuable but also requires cultural awareness and understanding of what constitutes 'value' on both sides of the knowledge exchange. Technology transfer projects also require political awareness. Who are the various human stakeholders in achieving sustainable livelihoods and incentive-driven biodiversity conservation that benefits people? E.g local people, local/regional/national governments, local entrepreneurs, international entrepreneurs. What are the needs, motivations and relative power of each? What influences their (non)alignment in promotion of conservation initiatives? Answering such questions requires multidisciplinary skills overlapping the natural and social sciences (eg strategic management, business development, marketing, ecology, biology). For example, is there a need/potential for some sort of 'micro-marketing' assistance for local communities/eco-entrepreneurs, similar to the 'micro-finance' projects used in many developing countries? If so, how best could such programmes be packaged and delivered?

DICE has undertaken several projects regarding capacity building in local communities for conservation and business management (e.g., human-wildlife conflict resolution in Masai Mara; axolotl monitoring-conflict resolution in Mexico; human-elephant conflict resolution in Masai Mara; monitoring of black rhino populations/tourism in Namibia). It has also, as part of the above initiatives and others, brought local people (e.g., safari guides) to the UK for education to MSc level in conservation. We await our first MSc student from Tibet.

I also recognize a need to develop a more multidisciplinary approach towards biodiversity conservation assessment and/or training in developing countries, that involves educating local agencies/communities/individuals in business skills in addition to conservation skills. This would include identifying, assessing, planning and implementing new local/national initiatives in environmental and economic sustainability, i.e., activities that benefit both local people and wildlife. Although such an approach could include services (e.g. ecotourism) it would not be limited to this and could include (possibly) the farming and/or manufacture of animals/animal parts for human consumption in export markets. This may require legalising trade in such products which would be controversial! Such training

could be delivered either on the ground in target countries or by bringing candidates to the UK for business training.

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