Tibet: holy place, not "Western Storehouse"!

In his letter (Write Back, *Front Ecol Environ* 2007; **5[1]**: 10), Paul Keddy brings up the status of Tibet, a political issue inappropriate for discussion in a scientific forum. We are disappointed to see such biased views being expressed by a scientist in a professional journal.

The Tibetan Plateau is indeed known as the Qinghai-Xizang Plateau in China. Xizang is composed of the two words *xi* (west) and *zang* (a religious word relating to the teachings of Buddhism and Daoism). The word *zang* is used to reference "holy places", or temples where the scriptures of Buddhism and Daoism are stored. So "Xizang" literally means "Western Holy Places" or "Western Spiritual Troves" – "storehouses" of sacred texts, but not of natural resources, as Keddy implies.

Keddy relies almost exclusively on the websites of the Tibetan Government in exile and the International Campaign for Tibet, which show that forest cover declined in Tibet between 1949 and 1985. As in other parts of China, the environment and natural resources of Tibet have been, to a certain extent, overexploited and degraded in the past several decades. However, this situation has been recognized by the Chinese Government in recent years and, in response, many policies have been enacted to protect and restore Tibet's natural resources, with some positive outcomes. For example, with the implementation of forest protection and reforestation policy in the 1980s, total forested area in Tibet has increased from 5.27% in 1981 to 9.84% in 2005 (Wang 1997; China Internet Information Center 2005). One of us (J-G Huang) worked on dendrochronology and forest ecology in Tibet between 2001 and 2003 and observed many well-protected natural forests and planted forests of increasing extent.

The total human population of Tibet was about 2.74 million in 2004 (China Internet Information Center 2005), with 80–85% living by pasturage. Due to the high elevation of the plateau (4000 m above sea level on average), and its long, snowy winters, the growing season is confined between mid-May and the end of August. There are many weather-related disasters recorded in historical documents, climatic observations, and paleo-climatic proxy data such as tree rings (Huang and Zhang 2007). Consequently, crop production has been low. Livestock such as yak, cattle, sheep, and horses are the main food sources in the extremely cold and long winter. Some grasslands are fenced for livestock by local Tibetans, not by the Chinese army, as Keddy claims.

Tibet is a remote, isolated, and largely underdeveloped region. In the past, there were only two highways through the mountains and along the rivers and lakes, often blocked by landslides in the rainy summers and by heavy snow in the winters. The opening of the costly Qinghai–Tibet railway (about 6% of the total budget of which was allocated to ecosystem restoration and environmental protection; State Council Information Office 2003) provides more convenient and efficient transportation between Tibet and the outside world. Let us hope that it will stimulate local economic growth and improve Tibet's living conditions in the future.

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Conservation research in India

Dinesh Sharma (Dispatches, *Front Ecol Environ* 2006; **4[10]**: 511) draws attention to the obstruction from government authorities faced by many wildlife researchers in India. While this is a serious issue, I would like to point out that, happily, some Indian conservation researchers and government agencies have maintained excellent and productive relationships.

In January 2007, I met with representatives of Aaranyak (www.aaranyak.org), a leading non-governmental biodiversity conservation organization in the state of Assam in northeast India. There, Bibhab Talukdar informed me that, unlike groups in other parts of India, his organization's efforts have been very well received by the state forest department, largely due to Aaranyak's policy of working closely with government authorities on conservation needs and priorities. According to Talukdar, animosity from government wildlife departments toward conservation researchers can sometimes arise from the government perception, warranted or not, that researchers' agendas fail to overlap with their own. In particular, the departments sometimes see researchers as contributing little to on-site conservation, instead focusing on the pursuit of publications and other forms of individual recognition. Talukdar claims that Aaran-yak and the Assam Forest Department have been able to establish an atmosphere of mutual faith and understanding in which they have combined efforts to conserve Assam's biodiversity.

For instance, Aaranyak has collaborated with the state government on elephant conservation and human–elephant conflict mitigation projects. The organization has also aided governmental efforts to protect the Indian one-horned rhinoceros (*Rhinoceros unicornis*) by sponsoring wireless network service and equipment for forest personnel in protected areas. For cash-strapped government departments, such overtures can go a long way toward generating goodwill for conservation researchers and their activities. The organization's Wildlife Crime Monitoring Project has collected data on poaching and made it available to wildlife managers and law enforcement officials. Frequently, criminal cases in India involving wildlife go unprosecuted, or are lost in court due to a lack of legal knowledge among enforcement staff. Here, Aaranyak has taken the lead by offering free legal workshops and consulting services to Forest Department officials. For their efforts in combating wildlife crime, two members of Aaranyak's staff have been appointed honorary wildlife wardens by the Assam Forest Department.

Apart from being involved in conservation planning, management, and advocacy, Aaranyak has an extensive and well-regarded research program. Research areas include conservation biology of key species, biodiversity inventories, watershed and climate studies, and geospatial technology application. The positive relationship Aaranyak enjoys with the government has helped create conditions conducive to its research activities, while allowing the organization to be effective in its applied conservation programs.

I agree that serious problems exist for government–conservation researcher relations across India. However, there are encouraging exceptions to this trend. It might be instructive to study how conservation organizations like Aaranyak have forged productive ties with government authorities, so that such successes can be replicated more widely.

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Invasions as spatially explicit processes: contributions to ecology

In a recent article, Callaway and Maron (2006) review with great clarity and depth the major areas where scientific advances made in the field of biological invasions have shed light on fundamental ecological questions of the past 20 years. Although they explicitly note that their discussion is biased by their own perspectives, I feel that they have missed a major component of invasion ecology: its contribution to the understanding of the spatial dimension of ecological processes and, consequently, to biogeography.

Invasions have served for decades as natural experiments for the study of spatially explicit phenomena such as dispersal, colonization, range expansion, and population dynamics. Invasions have provided "cleaner" natural experiments (Richardson *et al.* 2004), which in many cases have been documented since their beginnings, resulting in much better records than for any other type of colonization process. Data on invasions that are extensive in both temporal and spatial scales are available from a variety of

sources, such as herbariums and quarantine office records. The use of these datasets has helped to develop the "big picture" about invasions, and has provided fundamental evidence to document general principles in ecology and biogeography. For example, the spatial modeling of zebra mussel (*Dreissena polymorpha*) invasions in the Great Lakes has shown that invasion processes, particularly dispersal mechanisms, are scale-dependant (Johnson *et al.* 2006). At finer scales, there are abundant data regarding invasive species' spatial patterns, due to their economic and social importance (eg agricultural weeds; Maxwell *et al.* 2005). Spatially explicit data at these local scales have helped us to better understand local dispersal processes and the spatial dimension of population dynamics.

By studying invasions, we have not only gained crucial knowledge about spatially explicit ecological processes, but, more importantly, we have faced the challenge of integrating this knowledge across multiple scales (Pauchard and Shea 2006). The great range of scales at which invasions occur, in addition to their substantial impacts both locally and globally, requires integration across scales. By using a multiscale approach, we are adding evidence of how changes in scale not only mean changes in the magnitude of processes, but also signify changes in the nature of fundamental ecological processes and mechanisms.

Invasions and their intrinsically spatial character have also served to promote interaction among scientists from different, and sometimes distant, disciplines. An increasing number of papers are tackling issues in landscape ecology and biogeography by focusing on invasive species. However, I believe there is still a great deal to be done in the way of crossing discipline boundaries to understand invasions as spatially explicit processes. To move forward, we need to incorporate theory and data from other disciplines. For example, epidemiologists have developed a remarkable body of evidence on biological invasions that has rarely been used in ecology.

Invasions will continue to help us understand nature, and I hope we will be able to take advantage of this opportunity, especially in the area of spatial analysis. I hope that in the next 20 years, what we have learned from the spatial phenomena of invasions will have a much wider application in the understanding and conservation of natural systems, and will be one of the major contributions of invasion ecology in the search for generalities.

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