

**2004 Mansfield Conference, The University of Montana, Missoula  
April 18-20, 2004**

**Panelist: Richard Harris  
The University of Montana**

*“Market forces in Northwest China: Ecological constraints, government policies, and the concept of wealth”*

Anyone who has spent much time in China over the past 2-3 decades is aware of the rapid pace of change that has characterized the country. I believe it important to start by acknowledging that international trade, opening the country to products and ideas from other countries, and the shift to a market approach has brought tangible benefits to almost all Chinese. True, to some more than to others. But the benefits of globalization in China have not been abstract: real people are leading happier lives because of them. That said, a simple approach is insufficient, and I shall argue below, inappropriate for many of China’s northwestern regions.

As a biologist, I come to the issue of trade and development from a basic premise: wealth ultimately requires the presence and use of some natural resource. Generally, these will either be non-renewable resources from within the earth, or else depend crucially on what ecologists call “primary productivity” (essentially how much plant biomass can be produced in any given area). This, in turn, is largely a function of the availability of water, heat, and nutrients in the soil. Mankind, through wisdom, technology, or other means, can improve the situation a little, but not much. It’s been said many times, but in China remains quite true: geography is destiny.

As a non-economist, what little I know about trade is that it is premised on the concept of “comparative advantage”. By specializing in what is produced efficiently or uniquely in one area, and trading it for what is produced inefficiently locally (but well elsewhere), both sides of the equation can theoretically reap a benefit. And quite often this is the case.

But looking at the situation in Northwestern China, and considering these 2 basic premises, one must ask: Is trade likely to be a good basis for promoting wealth (in its broadest sense)? Two realities seem inescapable:

1) Primary productivity in most of northwestern China is extremely low. Most of the area is very dry and very cold. It’s hard to grow things there. Lots of stuff necessary to provide for human habitation must be imported, making it expensive. It’s hard to get wealthy when you can grow little, and it costs a lot to consume what you can’t grow. That’s probably why relatively few people live there<sup>1</sup>.

2) There aren’t many tradable products in which northwestern China has a comparative advantage. In part this is because of reality number 1. Added to this is simple geography: the costs of moving products between northwestern China and places where more people live will always be relatively high, forming a constant drain on the profitability of anything traded.

Historically of course, local people in the high and dry rangelands and mountains of northwestern China traded locally produced items for products they could only obtain elsewhere. Such items as salt, hides, fiber, and livestock were exported, while such items

as rice, tea and silk were imported<sup>2</sup>. But these pastoralists have primarily been what ecologist Ray Dasmann some years ago called “ecosystem” people, as opposed to “biosphere” people<sup>3</sup>. That is, they have primarily lived by the grace of products offered up by their local ecosystem, rather than primarily through their participation in a vast web of products and services that transcended the local ecosystem.

Pastoralism has been by far the dominant economic activity in northwestern China, and this continues today. In some cases, I argue that over-intensive livestock grazing is threatening the persistence of vulnerable wildlife. Despite this, an amazingly rich and varied fauna has persisted in western China, particularly on the Tibetan plateau<sup>4</sup>. Most westerners have the impression that China has no “natural” or “wild” things left: their image is entirely of either urban areas, or intensive agriculture. This perception is accurate enough for most of China, but in fact, these very areas in the northwest that lack “comparative advantage” are those that contain some of the most beautiful, wildest, and therefore – in some sense – valuable ecosystems on earth.

Given that, the question arises as to how has such a relatively rich native fauna survived in the face of traditional use of the area by people? I’m not sure the answer to that is known with certainty, but I believe much of it has to do with the fact that the economy here has largely been of a subsistence nature rather than of a market nature. Locally, of course, people have altered the environment, and made habitat less hospitable for wildlife. But the ecological constraints that characterize this area, and that ultimately I believe limit trade as a vehicle to increase wealth, have been internalized within a subsistence economy. Livestock depends on a wild product for its existence: native forage. Pastoralists have not traditionally planted higher-yielding grass, or made substantial attempts to “improve” upon native flora. And in a subsistence economy, there is no good reason to keep a great many more livestock than can be sustained by the native forage, under the prevailing average climatic conditions. So most pastoralists understand the concept of “carrying capacity”, that is, limits to what can be produced. This, in addition to the lack of high technology that can in some measure move the natural limits some distance, has allowed for an uneasy truce between the ‘developed’ and the ‘wild’ in northwestern China. That truce may now have been abrogated.

In short, I argue that government policies in China are so narrowly focused on concepts of trade, markets, and comparative advantage that work in the more productive, eastern portions of the country, that they are ignoring (or even denying) the ecological constraints operating in the arid, western part of the country. As such, they may miss what is truly of global value in this area: it’s inherent “wildness” and the wild flora and fauna that live nowhere else.

## **Examples of policies ignoring ecological constraints**

### **Fine wool vs. local coarse (“Tibetan”) wool.**

This is not entirely an issue of increasing trade, but does have to do crucially with the collision between market economics and local limits. (If there is a macro-economic problem, it probably lays more with distorting subsidies than with free trade – i.e., the reverse problem). As China’s wealth has grown, the demand for meat and hides has grown (as has demand for so many other things, including fiber and textiles). China’s sheep

growers provide meat, hides, and wool, but of late, price signals have encouraged increasing numbers of them to prioritize producing sheep that primarily produce meat and hides, but which produce less valuable wool. (Wool from these sheep is good enough for carpets, but not for high-quality garments). Meanwhile, as China has become more and more willing to trade internationally, the need for high-quality wool has largely been met by importing wool from Australia, the world's largest wool exporter. Currently, Chinese policy is attempting to strengthen its domestic production of high-quality wool, which has manifested itself in a \$60M loan with the World Bank to help develop fine wool sheep production in Xinjiang and Gansu<sup>5</sup>.

Generally, producing these fine-wool (Merino breed) sheep economically requires added inputs: fencing, supplemental forage production, supervised breeding, and careful transport and treatment of wool. In some of the more productive areas of these two provinces, especially where transportation is not too expensive, these inputs can be economic, and production of fine-wool sheep may be successful, both for the individual pastoralist and for the government's desires. However, in the drier, more remote areas, these sheep can't survive without external inputs that are way too expensive, and thus the experiment is bound to fail. In fact, in the highest, driest counties in Gansu's Qilian Mountains, where these sheep have been introduced, it has already failed. After enough poor survival and complaints from pastoralists who prefer their indigenous, hardy (but poor-quality wool-producing) sheep, the government has given up, and abandoned attempts to engineer a fine-wool production industry in these particularly harsh climates. With increased openness, prices may go down further, thus making it even more difficult for pastoralists in these remote regions to make money from fine wool sheep.<sup>6</sup>

Information promulgated by the World Bank project (and, in particular, by the Global Environmental Facility portion of it) emphasizes community development, protection of grasslands, and integrated ecological management. However, in practice, Chinese participants have tended to focus on fine wool, eradicating invasive plants via technical means (i.e., pesticides) and on poisoning pikas (*Ochotona* spp., small rodent-like rabbit relatives that are perceived, probably erroneously, as serious competitors with livestock for forage, and which are generally repressed whenever technically possible). Although reducing herd-size is often stated as a project aim, there seems little in the World Bank project (or other domestic initiatives) that is designed to ensure that the net results are smaller herd sizes and/or less pressure on grasslands. Thus, it seems that the economic benefits will be uneven (some pastoralists will benefit, others will not), while the ecological effects will be at best neutral, and at worst, negative for native flora and fauna.

### **Subsidies for marginal and destructive grazing**

Livestock grazing is generally compatible with biodiversity, and is one of the main ways to make a living in arid lands. But "generally compatible" does not mean "under any and all circumstances". To balance productivity for people and conservation of valuable yet fragile wild resources, we must ask, in reference to livestock grazing, "how much and where?" Some very high and dry places can support only limited grazing by domestic livestock before damaging impacts to native flora and fauna occur. Yet in Jianshe township of Aksai county, Gansu, where an objective assessment would suggest that grazing is not economic or a wise land use, it is being encouraged via government

subsidy. Some 60% of the cost of newly constructed lambing sheds (which are homes to pastoralists for about 5 months/year) has recently been paid to all resident pastoralists by the township government. This in an area where an international hunting program claims to be creating economic incentive for local people and governments to prioritize conservation of wildlife through providing exclusive hunts of argali (*Ovis ammon*), a highly-prized trophy species<sup>7</sup>.

I believe the problem here is that local governments wish to support their local herders – even if it environmentally destructive and makes no sense on a larger scale – because they are rewarded for what appears to be improving local livelihoods. If they can raise local livelihoods on the backs of some outside appropriation or subsidy, so much the better. There seems to be no larger outlook for saying, “Look, this is a losing proposition, let’s get these people out of grazing here, and spend the subsidy instead on helping them get started on something less damaging”.

### **Irrigation schemes in Gansu**

I know of at least 2 plans to dam rivers emerging from the Qilian Mountains for the purpose of developing irrigation schemes for the lowlands. The first involves the Kharteng River in Aksai, Gansu, for which plans exist to dam, store, and pump water over the Danghe Nanshan range (with peaks > 16,000 ft.) to increase flow in the Dang River, which feeds irrigation in the Dunhuang area. The second involves a dam on the Shule River near the small town of Changma, in preparation for transfer of up to 200,000 people into a currently sparsely populated area<sup>8</sup>.

Clearly, China has population pressures and not very much arable land, so the idea of irrigating currently arid land and encouraging new farming (and new farmers) has its appeal. But I can’t help suspecting that the primary impetus for these projects come from planners in Beijing (perhaps well meaning, probably knowledgeable about agriculture, almost certainly ignorant of local realities), who simply look at a map, and notice that these rivers do not flow into agricultural areas or even into the sea (they drain internally), but rather simply peter out, or into saline lakes. What a waste, these planners must think, surely this water does nobody any good, let’s put it to use.

Perhaps, but there are a number of potentially damaging outcomes from such projects, even if hoped-for benefits can be reaped:

- In many arid areas for which future irrigation is planned, saline soils create problems for agriculture. Salt and other minerals that are currently too deep within the soil to cause problems for crops (and which create no particular problem for native vegetation) quickly rise to the surface when irrigation creates much wetter conditions, and much lush vegetation begins pumping water (along with nutrients) up through the soil into biomass. This can easily result in highly salinized soils, (common in northwestern China) which quickly become inhospitable to agriculture (and even some, albeit not all, native plants).

- Water diverted for crops no longer flows where it formerly did. Some areas may look empty on a map, and indeed may support fewer people than intensive agriculture would (at least until soil becomes salinized), but there often are people depending, directly or indirectly, on this water. In Aksai county, although no agriculture uses this water, the aquifer does support a relatively lush carpet of native vegetation through sub-irrigation (water never actually reaching the surface, but being close enough that plants

can take advantage of it), and a relatively dense pastoral economy exists exactly where the water table is highest. This sub-irrigated area (and its attendant pastoral economy) would obviously be negatively affected should substantial water diversion take place, although exactly how much is not yet clear.

- The construction of dam and aqueduct facilities is a major undertaking, large industrial project, in area currently lacking all basic infrastructure and amenities. Thousands of people need to be moved in (albeit temporarily) to create such projects. Much more of this work is done by hand than in the west, requiring proportionally more bodies. In order to produce permanent structures, one must first produce temporary structures, families must come along, cooks, drivers, mechanics, and all sorts of support people need to be housed, fed, their waste dealt with.

- Finally, the resulting structures – dam, reservoir, and aqueduct – can themselves cause environmental destruction. Damage caused by dams is well documented – the biggest example lately being, of course, the Three Gorges Dam (*Sanxia*). In the Aksai example, inundating this area will submerge what appears to be one of the most important wintering areas for the remaining, fragile population of wild yaks (*Bos grunniens*), as well as possibly isolate herds of argali from each other, risking long-term genetic impoverishment<sup>9</sup>.

### **“Greenbelts” in the desert**

Stopping desertification or halting the spread of sand dunes through planting of non-native trees has been a common, and generally accepted practice throughout arid western China. These plantations require irrigation initially, although the concept is that, eventually, deep enough roots can reach what little water exists below ground for them to persist without supplemental irrigation. A recent article that appeared in the semi-popular Chinese publication *Ecological Environment and Protection* questioned the overall wisdom of this policy<sup>10</sup>. The problem is that plantations use so much of the available underground water that they may compete with existing (desert-adapted) vegetation, lower already stressed water tables, and possibly create yet more desertification (albeit adjacent to a green belt). To my knowledge, however, such plantations remain a common policy directive around arid towns in northwestern China.

### **What are the tradable resources in northwestern China?**

Given the constraints and objectives, the usual response, from westerners and sophisticated Chinese alike, is usually “ecotourism”. All indications, however, are that ecotourism in northwestern China will have limited ability to alleviate poverty without causing more problems than it solves. It has been a successful approach in some countries, and deserves serious consideration on the Plateau as well. However, I remain skeptical that ecotourism has a great deal to offer Plateau wildlife. My earlier surveys suggested that the potential market for wildlife-oriented travel on the Plateau was small, and that most foreigners – even those interested in wildlife – would be unable to withstand the difficulties of high-elevation travel necessary to see these species<sup>11</sup>. Nothing I’ve learned since then has changed that conclusion. Certainly, a small number of foreigners would willingly undertake the hardships, but most of these would want to limit their spending as much as possible, under-cutting precisely the objective of offering such tourism in the first place. Chinese are increasingly becoming tourists, but few are interested in enduring

hardships, and infrastructure built to provide amenities will be expensive and damaging. As well, most money spent by tourists goes to support travel, lodging, and food, with very little available to be spent on-site for direct conservation. Providing a standard of services that would produce larger revenues would inevitably require development of roads, lodges, and food establishments, which in my view would be highly undesirable. This type of intensive development would degrade the wild quality of the area, as well as threaten the ability of local people to control the type and pace of change in their own cultures.

One particular kind of “ecotourism” that potentially avoids most of these problems is “hunting tourism”, usually called “trophy hunting”. Although it will always be very limited in its scope because it must by its nature be small-scale and because the number of hunters able to afford the high costs will always be small, it has potential to provide relatively large financial inputs to specific areas with little need for additional infrastructure. The “damage” caused by trophy hunting is, in fact, minimal: although the image of a dead animal may be distressing, well-managed hunts of this sort are almost inconsequential from a biological viewpoint. The bigger question is whether the funding obtained can be put to good use, and in this regard, Chinese programs thus far have failed to deliver.<sup>12</sup>

The one category of tradable resource that northwestern China certainly seems to have is minerals. Although recent reports suggest that fossil fuel deposits may be less than originally hoped<sup>13</sup>, there are still many opportunities for mining. This, in fact, seems to be the underlying rationale for the Great Western Development Strategy (*xibu da kaifa*)<sup>14</sup>. There seems little doubt that mining activity will increase, and that environmental mitigations will be inadequate to the task. But again, how much benefit will accrue to local people (as opposed to more populated regions of China) seems unclear.

### **A worrisome echo of failed past policies**

A theme that I sense throughout – more in China than in most other countries, due to the twin cultural legacies of Confucius and Mao – is the tendency, particularly on the part of government leaders, but to a lesser extent among the general populace, to believe that natural limits can always be overcome by people, either through sheer force, sheer effort, or, most recently, sheer technology. In other words, many Chinese simply don’t accept my first premise, that of ultimate ecological limits. To be sure, we are a long way from the Great Leap Forward, during which the ideology of mankind’s supposed ability to circumvent natural limits reached its zenith (and some 30 million people starved to death, partly as a consequence)<sup>15</sup>. Governments at all levels in China are ‘getting out of the way’ more now than at any time in recent history. But the advocacy of development models that are inappropriate to the place still seems to dominate official thinking<sup>16</sup>. And I continue to see a rather ambivalent posture toward free-markets in China, and the result is some very awkward, and I suspect often maladaptive, policy making with regard to development and environment.

### **Conclusion**

In short, I see inescapable limits to the generation of “wealth” in this part of China, at least as that term is usually interpreted. I hasten to add that this does not mean there is

no potential for higher living standards at all – indeed, that is already happening. Rather, I think that ecological constraints place an asymptote on this curve, and at a much lower level than will be true for more other places in China. We certainly need to guard against what I term “enforced primitivism”, i.e., the notion foreigners may have that ‘you local people are fine just the way you are, you are cute and adorable representatives of an idyllic fantasy we have, so we won’t allow you to change, or to wish to be more like us’. But even though, as they say in Montana, “you can’t eat the scenery”, these people are not starving, and in fact, have never starved. Most people living in endemic, traditional communities, although they have their share of hardship and would like additional creature comforts, are not deeply unhappy people. They may have wealth of different sorts already. Pointedly, nobody in power seems to be asking local people what kind of changes they’d ideally like. Some of their aspirations may be unrealistic, but some involvement on their part cannot help but add some ‘reality testing’ to the current trends. I worry that if they have no way of communicating them, or that if cultural (or other) biases on the part of those in power make them view that kind of wealth as unacceptable, market forces may degrade both the environment and local wealth.

## Notes

---

<sup>1</sup> See, for example, J. Banister, 1998, “Population, public health and the environment in China”, pp. 262-291 in R. L. Edmonds, editor, *Managing the Chinese Environment*, Oxford. In using the term ‘northwestern China’, I am speaking primarily of western Inner Mongolia, Gansu, Qinghai, Xinjiang, and Tibet (excepting the south-eastern, low-land portions). Parts of this argument apply elsewhere, of course.

<sup>2</sup> See, for example, H. E. Richardson, 1984, *Tibet and it’s History* (2<sup>nd</sup> edition), Shambhala; R. B. Elkvall, 1968, *Fields on the Hoof: Nexus of Tibetan Nomadic Pastoralism*, Waveland Press; M.C. Goldstein and C. M. Beall, 1990, *Nomads of Western Tibet: The Survival of a Way of Life*, University of California; L. Benson and I. Svanberg, 1998, *China’s Last Nomads: The History and Culture of China’s Kazaks*, M.E. Sharpe, Inc.

<sup>3</sup> Dasmann, R. F. 1974. “Difficult marginal environments and the traditional societies which exploit them: ecosystems”, Symposium on the future of traditional primitive societies, U.K. *Survival International News* 11:11-15.

<sup>4</sup> See, for example, Cai, G. Q., Liu Y.S., & O’Gara, B. W. 1990, “Observations of large mammals in the Qaidam Basin and its peripheral mountainous areas in the People’s Republic of China”, *Canadian Journal of Zoology* 68: 2021-2024; Harris, R. B. & Miller, D. J. 1995, “Overlap in summer habitats and diets of Tibetan plateau ungulates”, *Mammalia* 59:197-212; Schaller, G.B. 1998. *Wildlife of the Tibetan Steppe*, The University of Chicago Press; Harris, R.B., D.H. Pletscher, C.O. Loggers, & D.J. Miller, 1999, “Status and trends of Tibetan plateau mammalian fauna, Yenuigou, China”. *Biological Conservation* 87:13-19.

<sup>5</sup> Information in this section comes a short consultancy I conducted for World Bank Project PO 77615, “Gansu and Xinjiang Pastoral Development Project” in 2002. The project appraisal document is available at <http://www-wds.worldbank.org/servlet/>. See also Brown, N.A., J. P. Wu, Y. Z. Luo and S. Soderstrom. 2002. “Sheep genetic resources in Northwest China”, *J. Animal Science*, Vol. 80 Supplement.

<sup>6</sup> The WTO accession agreement maintains quotas and tariffs on imported wool, but the trend of both seems downward through 2004 (2005 numbers have yet to be developed), so it appears that as a price for admission, China is agreeing to accept more imports of wool. See Lohmar, B., J. Hansen, H. H. Hsu, and R. Seeley, 2002, “WTO accession will increase agricultural imports”, *Agricultural Outlook*, April 2002:17-20.

---

<sup>7</sup> International hunters currently pay \$21,500 per argali trophy. See also Harris, R.B. and D.H. Pletscher, 2002, "Incentives toward conservation of argali (*Ovis ammon*): a case study of trophy hunting in western China", *Oryx* 36: 373-381; Bedunah, D.J., and R.B. Harris, 2002, "Past, present & future: rangelands in China", *Rangelands* 24: 17-22.

<sup>8</sup> World Bank Project CNPA3594, <http://www.worldbank.org.cn/English/content/946m1172112.shtml>

<sup>9</sup> Harris, R.B. and A. Ali. 2002. "Survey report: Aksai International Hunting Area, Winter 2002", Unpublished progress report, Montana Cooperative Wildlife Research Unit, University of Montana, Missoula 59812. Also available in Chinese. For a recent example of increasing concern in the popular Chinese press on the effects of large dams, see 2 articles in China National Geography (*Zhongguo guojia dili*), October 2003, "Dams stir up trouble: Build dams – allow flowing water to benefit people; Tear down dams – not willing to enslave the waters" (*Shui ba re shi fei: jian ba: rang heliu we renlei zaofu; Chai ba: buyuan zuo nuking de heliu*).

<sup>10</sup> Zhao, M.W. 2003. "Zai xibu geng duo ti zhizao wuren qu: guanyu xibu shengtai huanjing wenti de duihua" (Make even more places in which there are no people: a dialogue concerning the Western ecological environment), *Shengtai huanjing yu baohu* (Ecological Environment and Protection), May 2003: 27-29.

<sup>11</sup> Harris, R. B. 1995, "Ecotourism versus trophy-hunting; incentives toward conservation in Yeniugou, Tibetan Plateau, China". pp. 228-234 in J.A. Bissonette and P.R. Krausman, eds., *Integrating people and wildlife for a sustainable future. Proc. 1st International Wildlife Management Congress*, The Wildlife Society.

<sup>12</sup> Harris and Pletscher 2002, *ibid*.

<sup>13</sup> See V. Smil, 1998, "China's Energy and Resource Use: Continuity and Change", pp. 211-227 in R. L. Edmonds, editor, *Managing the Chinese Environment*, Oxford.

<sup>14</sup> *China's Great Leap West*, published in 2000 by the Tibet Information Network (London), offers some useful background on this, although readers must keep in mind the political advocacy implied throughout.

<sup>15</sup> See, for example, J. Becker, 1996, *Hungry Ghosts: Mao's Secret Famine*, Henry Holt and Company; J. Shapiro, 2001, *Mao's War Against Nature: Politics and the Environment in Revolutionary China*. Cambridge University Press.

<sup>16</sup> On need not rely on the overly-politicized material produced by the Tibetan exile community or its supporters to see this trend. See, for example, Luona Lingzhiduojie (editor), 1996, *Qingzang Gaoyuan Huanjing yu Fazhan Gailun* (An Introduction to Environment and Development of the Qinghai-Tibet Plateau), Tibetan Studies Publishers, a work sponsored by the Chinese Academy of Sciences Technical Committee and the Socio-Economic Research Institute of the Chinese Tibetan Studies Center.