

Looking Back to Move Ahead: Integrating Indigenous Nomadic Knowledge into the Modern Range Profession in China

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Introduction

Rangelands cover 40 percent (400 million ha) of China's land area making China second only to Australia in the extent of its rangeland resources. About 75 percent of China's rangelands are found in the semi-arid pastoral areas in the north and west, with the Tibetan pastoral area, comprising 140 million ha, the largest. China has some 260 pastoral counties, which accommodate about 39 million people, including some of the poorest people in China. Many of them are nomadic pastoralists who are very susceptible to changes in the health and productivity of the rangelands from which they obtain their livelihood.

China's rangelands have been used for livestock grazing for thousands of years. Yaks, for example, are believed to have been domesticated on the Tibetan Plateau about 4,500 years ago and the construction of the Great Wall, which was built to control nomadic societies, was initiated 2,000 years ago. History among nomadic pastoralists in China is the result of multifaceted interactions among culture, ecology, and personal actions. Over centuries, nomads acquired complex indigenous knowledge of their rangeland environment and the domestic animals they herded.

The future of China's rangelands is of increasing concern, not only in China, but regionally and globally. A number of China's rangeland ecosystems are now recognized as global priority areas for conservation of biodiversity, as they contain highly distinctive species, ecological processes, and evolutionary phenomena. The rangelands of China are also the headwaters for many of Asia's major rivers and what takes place in these grazing lands has important implications for millions of people downstream. Despite their extent and importance, China's rangelands are degrading quite seriously and the country's range managers face many difficult challenges.

The sustainable development of China's rangelands needs to recognize the significance of nomad's indigenous knowledge of the environment and management of rangeland resources. Range and livestock development can no longer ignore local circumstances, local technologies, and local knowledge systems. Traditional pastoral production practices have been tried and tested. In many cases, they are very effective and are based on preserving and building on the patterns and processes of the rangeland ecosystem.

This paper, based on extensive field work among Tibetan nomads in western China, describes indigenous knowledge systems among nomads, outlines the major issues on the rangelands, and provides recommendations for the future of the range profession in China. A case is made that modern range professionals in China need to better acknowledge the accumulated wisdom that nomads possess. The sustainable development of China's rangelands depends on integrating nomads' indigenous knowledge when charting directions for the future.

Indigenous Knowledge

Indigenous knowledge is the unique, traditional, local knowledge that people have of a particular geographic area. The development of indigenous knowledge systems, which covers many aspects of life, including rangeland management and animal husbandry, has been a matter of survival to nomadic pastoralists throughout China, including nomads on the Tibetan Plateau. The indigenous knowledge systems of nomads are cumulative, representing generations of experience herding livestock, careful observations, and trial-and-error experiments. This knowledge enabled nomads on the Tibetan Plateau, for example, to develop sophisticated range-livestock management practices in an environment that posed considerable risks. Indigenous knowledge systems are also dynamic as new information is constantly being added.

Nomads raise native livestock that are adapted to local environmental and production constraints and maintain herds of diverse livestock species composition. For example, Tibetan nomads raise the yak, which is superbly adapted to the high altitude, cold environment of the Tibetan Plateau. In addition to yaks, the native Tibetan sheep and cashmere-producing goats are also important species of livestock for Tibetan nomads. Tibetan nomads usually raise a mix of livestock species; each species has its own specific characteristics and adaptations to the environment. The multi-species grazing system – the raising of yaks, sheep, goats and horses together – maximizes the use of rangeland vegetation. Different animals also have varied uses and provide diversified products for home consumption or sale. Herd structures also evolved as adaptations to the environment and to the production needs of the nomads. For example, large numbers of male yaks were kept as pack animals and male yaks and sheep/goats were kept to provide animals for sale and for nomads' own consumption.

Livestock mobility and flexible use of rangeland were strategic elements of traditional Tibetan pastoralism and the keys to survival. Rangelands are parceled into seasonal pastures and used according to diverse managerial and production objectives. The traditional nomadic pastoral systems that evolved used extensive grazing management strategies adapted to local environmental conditions and were a rational response to the unpredictability of the pastoral ecosystem. Tibetan nomads, like nomads elsewhere in China, did not move

randomly across the rangeland; rather their movements were often well prescribed by complex social organizations and were highly regulated.

Environmental risks on the rangelands were mitigated through livestock and grazing management strategies that enhanced mobility, flexibility and diversity. Livestock mobility, flexible use of rangelands, and diverse herds were key elements of traditional pastoral production systems and contributed to the high ecological stability of the pastoral systems. Tibetan nomads mitigated environmental risks through strategies that enhanced self-sufficiency, linkages to support networks, diversity and flexibility. Diversity was crucial to survival for Tibetan nomads. Nomads maintained a diverse mix of goals for livestock production and survival; they kept a diverse mix of livestock in terms of species and class; and they used a diverse mosaic of rangeland sites, exploiting seasonal and annual variability in rangeland resources.

The organizational flexibility of traditional Tibetan nomadic pastoralism, which emphasized multi-species herds, complex herd structures, regular movement of livestock, and linkages with agricultural communities developed as a rational response to the unpredictability of the ecosystem. The survival yet today of numerous, prosperous groups of Tibetan nomads bears witness to their extraordinary indigenous knowledge, resourcefulness, and animal husbandry skills. Tibetan nomadic pastoralism evolved through long-term adaptation and persistence in a harsh environment and the grazing and livestock management systems that developed were intelligent, aggregate behavioral responses by Tibetan nomads to the resources and risks of one of the most inhospitable rangeland environments on earth. Tibetan nomads, like nomads throughout China, despite being illiterate, are still, “professional” range managers¹.

Rangeland and Pastoral Development Issues

Traditional livestock production and grazing management strategies throughout much of the pastoral areas of China have been greatly altered in the past several decades as the nomadic pastoral way of life has been transformed to one more oriented toward a market economy. In recent years, the goal of livestock production in most pastoral areas has been to increase livestock off-take, which has been promoted through privatization of herds and rangeland, sedentarization of the nomads, intensive grazing management strategies, and introduction of rain-fed farming techniques for growing forage and fodder. Large areas of rangeland have also been converted to cropland, which is one of the primary causes of rangeland degradation. Many of these interventions have been responses to political or economic objectives but, in many instances, they have conflicted with the goal of maintaining rangeland ecosystem health and stability. The promotion of “improved” and “scientific” animal husbandry systems has also jeopardized many worthy aspects of traditional nomadic pastoral systems. Both

¹ A quick look at the thesaurus feature on Microsoft Word lists the following synonyms for the word “professional”: skilled, experienced, proficient, expert, learned, trained, able, adept, and masterful. Many of these terms can apply today to nomads in China who can not read or write.

the rangeland environment and the indigenous nomadic pastoral cultures are under threat in areas where the culture of mobile pastoralism has been eliminated or substantially reduced.

Large tracts of China's rangelands are now degraded. It has been estimated that about 34 percent of all rangelands in China are moderately to severely degraded and about 90 percent are degraded to some degree. Inner Mongolia, Xinjiang and Gansu are experiencing degradation levels well above the national average. Current livestock production systems in many of the pastoral areas of China now appear to be unsustainable and the development of intensive livestock production systems as a means to increase production of livestock products and alleviate poverty in pastoral areas will place additional pressure on rangeland ecosystems.

In China, many attitudes towards rangeland ecosystems appear to be influenced by the notion that sedentary agriculture, particularly crop-based agriculture, is the superior development option. Rangelands are viewed as systems to be controlled and modified, much like cropland, rather than to be managed as natural ecosystems. This view is reflected in many of the terms that are used in discussion of pastoral development such as "grassland construction" and "grassland ecological-engineering". Development is focused on agronomic and production aspects instead of ecological sustainability. There appears to be little acceptance of the fact that most of the rangelands in China are of low productivity or that this situation is unalterable, either for ecological, technical and/or economic reasons.

There is a similarly narrow-minded view of the validity of traditional nomadic pastoral production practices. The purposeful movement of nomads' herds is often viewed as 'wandering' and an unsound type of use of the rangeland, instead of an efficient utilization of forage. Traditional herd structures, perfected over centuries, are seen as 'irrational' and 'uneconomic'. Nomads themselves are often perceived as 'backward' and 'ignorant'. These views are not supported by research findings which suggest that nomads possess considerable indigenous knowledge and that many of the traditional nomadic pastoral strategies and practices are rational and ecologically and economically sound, given the environmental and socio-economic constraints under which nomads operate. These findings suggest that fresh, objective assessments of nomads and nomadic pastoral systems in China need to be made before completely discarding them.

The issue is compounded by the rather narrow approach taken to rangeland ecosystem research in China. Researches have generally neglected such topics as the effects of traditional pastoral systems on rangeland ecology, the dynamics of herd growth and traditional risk management strategies among nomads, and the impact of large numbers of farmers into pastoral areas to convert rangeland to cropland. Other problems include a general lack of applied, interdisciplinary

ecosystem-level research, which would provide a better basis for developing more integrated and sustainable rangeland and pastoral development programs. A disproportionate amount of rangeland research is directed towards livestock production rather than understanding how livestock fit into the wider ecological system and how to optimize production in an environmentally and socially sustainable way.

Nomads have played an important role in the rangelands of China for thousands of years. As such, the social dimension of rangeland ecosystems should be an important aspect of research and development in the pastoral areas but, unfortunately, it is not. In China, both organizational divisions between academic disciplines and the intellectual assumption that views human beings as separate from their natural environment have impeded the integration of social and natural scientific research in rangeland environments.

Despite China's extensive pastoral area and its large pastoral population, little information is available about nomadic pastoralism and misconceptions abound with regards to nomads and their way of life. China's nomads possess vast indigenous knowledge about rangeland ecosystems. Nomads' local knowledge is based on their interactions and experiences within the environment they use, their traditions, and knowledge imported from elsewhere. The rationality of nomadic practices needs to be better acknowledged and nomads' indigenous knowledge has to be incorporated into research and development programs. Paying attention to nomads' indigenous knowledge can create more respect for traditional pastoral systems and foster partnerships for resolving issues. Better acknowledgement of nomads' knowledge systems can also facilitate the participation of nomads in the design and implementation of development interventions and help build a more sustainable future for the rangelands of China.

Conclusion

For China's range professionals, the challenge for the future is to balance the diverse economic, cultural and social needs of rangeland users with the need to protect the many benefits rangeland resources provide for livestock production, biodiversity, and watershed protection. Promoting ecological sustainability in China's rangelands requires culturally sensitive rangeland professionals who can merge together the best aspects of traditional nomadic pastoralism with new technologies and development paradigms.

Khartse Xiang 1989

Total households: 346

Total population: 1952

Total land: 9783.8 mu

Number of land planted: 9667.8mu

Total fertilizer used: 16210 jin (1.68 jin/ mu)

Total amount of money spent on fertilizer: 6326.56 (0.65 yan per mu)

One jin of fertilzer costs: 0.39 yuan

Total amount of grain sold to government: 194772.6 jin
(8.4% of total output, 19.91 jin per mu)

Total output of grian: 2312961 jin

Per mu yield: 260.14 jin

Khartse Xiang 1998

Total households: 366

Total population: 2159

Total land: 9411.6 mu

Number of land planted: 9124.56mu

Total fertilizer used: 219707 jin (24.08 jin/ mu)

Total amount of money spent on fertilizer: 145006 (15.89 yan per mu)

One jin of fertilzer costs: 0.66 yuan

Total amount of grain sold to government: 518950 jin
(9.8% of total output, 55.14 jin per mu)

Total output of grian: 5274836.38 jin

Per mu yield: 578.01 jin

Mag Xaing 1980

Total HH: 570

Total Population: 3502

Total Land: 9170.5 mu

Number of Land planted: 8952.55 mu

Total fertilizer used: 86000 jin

Fertilizer/ mu = 9.61

Total amount of money spent on fertilizer:

One jin of fertilizer costs:

Total amount of grain sold to government: 25602 jin

Total output of grain: 3625338 jin

Per mu yield: 404.95 jin

Mag Xiang 1995:

Total HH: 574

Total Population: 4481

Total Land: 8842 mu

Number of Land planted: 8740 mu

Total amount of fertilizer used: 171000 jin (top dressing: 97840 jin, deep dressing: 73160 jin)

Fertilizer/ mu= 19.56

Total amount of money spent on fertilizer: 79199.9 yuan

One jin of fertilizer costs: Top dressing 1 jin = 0.51, Deep dressing 1 jin = 0.43

Total amount of grain sold to government: 154867 jin

Total output of grain: 5054698 jin

Per mu yield: 578.3

Norkyong Xiang: 1980

Total HH: 1025

Total Population: 5997

Total Land: 24759 mu

Number of Land planted: 21261 mu

Total fertilizer used: 317298 jin

Total amount of money spent on fertilizer:

One jin of fertilizer costs:

Total amount of grain sold to government: 1057897 jin

Total output of grain: 9563384 jin

Per mu yield: 449.8 jin

Norkyong xiang: 1995

Total HH: 742 (number of household was reduced from 1980 because there was a change occurred during 1987 that some of the previous villages were included in other xiang)

Total Population: 5769

Total Land: 14876 mu

Number of Land planted: 13481 mu

Total fertilizer used: 1070300 jin (top dressing: 599150 jin; deep dressing: 471150)

Total amount of money spent on fertilizer: 508161

One jin of fertilizer costs: Top dressing 1 jin = 0.51, Deep dressing 1 jin = 0.43

Total amount of grain sold to government: 1750000 jin

Total output of grain: 12015000 jin

Per mu yield: 891.3 jin

Tsasho Xiang 1989

Total households: 474

Total population: 2911

Total land: 7109.4

Number of land planted: 6728.64

Total fertilizer used: 97800

Total amount of money spent on fertilizer:

One jin of fertilizer costs:

Total amount of grain sold to government: 164434

Total output of grain: 2104638

Per mu yield: 312.79

Tsasho Xiang, 1991

Total households: 468

Total population: 3003

Total land: 6978.79

Number of land planted: 6662.83

Total fertilizer used: 148180

Total amount of money spent on fertilizer:

One jin of fertilizer costs:

Total amount of grain sold to government: 10887

Total output of grain: 2327730

Per mu yield: 349.36