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Herds on the Move

**Winds of Change
among Pastoralists in
the Himalayas and on
the Tibetan Plateau**

D.J. Miller

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Herds on the Move

Winds of Change among Pastoralists in the Himalayas and on the Tibetan Plateau

D.J. Miller

MNR Series No. 95/2

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Preface

This current discussion paper in the Mountain Natural Resources' Series, "Herds on the Move: Winds of Change among Pastoralists in the Himalayas and on the Tibetan Plateau" is one of a number of papers delivered at the "Regional Conference on the Sustainable Development of Fragile Mountain Areas of Asia" which took place from December 13th to 16th 1994 in Kathmandu, Nepal. Support for this Conference came from the Swiss Development Cooperation, FAO, UNDP, UNEP, and the UNU.

The unanimous concern expressed at this conference was for the deteriorating conditions of both the environments and livelihoods of mountain people. Mountain development had not been geared to the people nor the environment it purported to serve.

One of the achievements of the Conference was a wider sharing of knowledge amongst the mountain countries of Asia and insight into the constraints that confronted them and the opportunities offered by the wide diversity of their special mountain environments. Another significant achievement was the formulation of a Call to Action on the Sustainable Development of Mountain Areas of Asia, or SUDEMAA recommendations.

By publishing the conference papers in its various discussion paper series, ICIMOD seeks to share the knowledge gained with a wider audience. This current paper should be of interest to all those who are working with or concerned about the condition of Himalayan rangelands and their pastoralist communities.

Contents

Abstract	1		
Introduction	1		
Rangelands and Pastoral Production Characteristics	3		
<i>Rangeland Resources</i>	3		
<i>Wildlife</i>	4		
<i>Pastoral Production Systems</i>	5		
<i>Trade</i>	6		
Changes Taking Place on the Rangelands	7		
Major Issues Regarding Rangelands and Pastoralism	9		
<i>Poor Understanding of Rangeland Ecosystems</i>	9		
<i>Inappropriate Pastoral Policies</i>	9		
<i>Lack of Appreciation for Pastoralists' Strategies</i>	9		
<i>Lack of Effective Management of Biodiversity</i>	9		
Misconceptions and Realities Regarding Pastoralism	10		
New Perspectives for Pastoral Development	11		
		<i>Greater Appreciation for Pastoral Production Systems</i>	11
		<i>New Concepts in Explaining Ecosystemic Processes</i>	11
		<i>Doubts about the Carrying Capacity Concept and Support for 'Opportunism' as a Management Strategy</i>	12
		Factors to Consider in Developing Strategies for Pastoral Areas in the Himalayas and on the Tibetan Plateau	13
		<i>Adopt a Systems' Approach</i>	13
		<i>Develop a Better Understanding of Pastoral Systems</i>	13
		<i>Promote Range Ecosystem Research</i>	14
		<i>Wildlife Conservation</i>	14
		<i>New Techniques for Integrating and Updating Information</i>	14
		<i>Range and Pastoral Policies</i>	14
		<i>Innovative Roles for Donor Agencies</i>	15
		Conclusion	15
		Bibliography	17

Herds on the Move: Winds of Change among Pastoralists in the Himalayas and on the Tibetan Plateau

Abstract

Rangelands cover about one-third of the Himalayan land area and over three-fourths of the Tibetan plateau. A large livestock population and possibly 10 million livestock dependent people reside in these mountain grazing lands, along with a unique assemblage of large wild ungulates. Most of Asia's major rivers originate in these rangelands and what takes place in these headwaters' ecosystems has far-reaching effects on downstream areas which have not been fully measured. Factors, such as geographical extent, biodiversity conservation, environmental protection, economic development, and human welfare, suggest that Himalayan and Tibetan rangelands should be a priority area for development, but, unfortunately, they are not. This paper examines some of the reasons why the rangelands and pastoralists on the Tibetan frontier have been ignored, describes changes taking place on the rangelands, discusses issues facing pastoralists, highlights new perceptions emerging to help explain rangeland dynamics and pastoral systems, and outlines factors to be considered in developing strategies for pastoral development in the region.

Introduction

I have been asked to talk about "people affected by degraded ranges and pastures" in the Himalayas and on the Tibetan Plateau in this session on Management of Rangelands and Control of Desertification. First of all, I want to mention that I would have preferred the title of this session to have been something like, "People on the Rangelands of the Himalayas and the Tibetan Plateau Affected by *Modernisation*", because I believe the process of modernisation is having a profound effect on people residing in rangeland areas and is part of the process that leads to degraded ranges. These effects are poorly understood at the present time. Secondly, it is a misconception that all ranges and pastures in the Himalayan region are 'degraded'; many grazing lands are, in fact, in good condition and quite productive given the environmental constraints they function under. While some rangelands have deteriorated in condition, it is wrong to conclude, or imply, that most rangelands in mountain areas of Asia are degraded. Such misconceptions lead to inappropriate policies

and programmes for rangeland areas. It is more important to understand the processes that result in overgrazing and that lead to degraded ranges.

With that said, I think it is now important to ask, Who are these 'people'? What do we know about them? These 'people', who reside on the rangelands and are affected by the process of modernisation, are 'pastoralists' who can be defined as people who derive most of their income or sustenance from keeping domestic livestock in conditions in which most of the feed eaten by their livestock is natural forage, not cultivated fodders and improved pastures (Sandford 1983). In its broadest sense 'pastoralism' refers to the way of life of pastoralists, their socioeconomic institutions, and land-use systems. The definition here covers 'pure' pastoralism, or nomadism, and transhumance and other forms of animal husbandry in which the pastoral component is dominant, for example agro-pastoralism.

Pastoralists are found throughout the Himalayas and on the Tibetan Plateau but are concentrated in the higher elevation areas (> 3000m) where rangelands are the dominant vegetation type and livestock grazing the primary land use. Accurate figures are not available, but there are possibly 10 million people residing on these mountain grazing lands in the Himalayas and on the Tibetan Plateau who are dependent upon livestock for their livelihood.

I have titled my presentation, *"Herds on the Move: Winds of Change among Pastoralists in the Himalayas and on the Tibetan Plateau,"* to emphasise the transformations taking place in pastoral systems in the Himalayas and on the Tibetan Plateau today. Pastoralists and their production systems have always been confronted with changes -- droughts that wither the grasses, winter storms and livestock epidemics that wipe out herds, and tribal wars that displace people and their animals -- but the changes pastoralists are facing today are profound and likely to have more significant, long-term effects on their way of life and the ecosystems they reside in than any changes that have taken place in the past. The paper refers to the northern areas of Bhutan, Nepal, and India, which border Tibet, and the entire Tibetan Plateau. The more remote parts of the Tibetan Plateau, the *Chang Tang*, or 'northern plains', in the northwestern part of the Tibetan Autonomous Region and western Qinghai Province are in many ways a 'frontier environment.' A territory only now coming under the influence of the modern world.

Most of Asia's major river systems originate in the rangelands of the Himalayas and on the Tibetan Plateau, and what takes place in these headwaters' ecosystems has far-reaching effects on downstream areas which have not been

fully measured. Factors such as geographical extent, biodiversity conservation, environmental protection, economic development, and human welfare suggest that the Himalayan and Tibetan rangelands should be a priority area for development, but, unfortunately, they are not. Largely neglected by range researchers and development agencies alike, the rangelands of the Himalayas and Tibetan Plateau offer unique opportunities for achieving the twin objectives of conservation and development. Programmes stressing multiple use, productivity, sustainability, and biodiversity could be realised through the complementary development of livestock production, wildlife conservation, and rangeland management.

This paper: (a) briefly reviews the characteristics of the rangelands, wildlife resources, and pastoral production systems; (b) describes changes taking place on the rangelands; (c) discusses issues facing pastoralists; (d) examines some of the reasons why the rangelands and pastoralists on the Tibetan Plateau have been ignored; (e) highlights new perceptions regarding rangeland dynamics and pastoral systems; and, finally, (f) outlines factors to be considered in developing strategies for pastoral development on the Tibetan Plateau.

Rangelands and Pastoral Production Characteristics

Rangeland Resources

Rangelands of the Himalayas and Tibetan Plateau are diverse in structure and composition, ranging from cold, steppe-like rangelands, dominated by species of *Stipa* grasses, to mountain desert shrublands with shrub genera such as *Ceratoides*, *Artemisia*, and *Ajanía* found with a sparse cover of grasses, to alpine valleys in the Himalayas with a diverse floral arrangement, and to temperate conifer and deciduous forests where forest meadows provide valuable grazing for transhumant livestock herds.

Covering about 2.5 million square kilometres, the Tibetan plateau is one of the world's major rangeland ecosystems. With rangeland covering nearly 70 per cent of the total land area the Plateau is an important pastoral region and a valuable refuge for wildlife. Most of the area is above 3,000 metres and the climate is harsh with a short growing season. Precipitation varies from about 2,000mm annual rainfall in the southern Himalayan ranges to less than 50mm in the far northwestern parts of Tibet.

Vegetation on the Tibetan plateau has been broadly categorised into five major vegetation zones: (a) high-cold meadow in the east; (b) high-cold steppe in the

north; (c) xeric shrubland-steppe in the south; (d) montane desert in the west; and (e) high-cold desert in the northwest (Chang 1981). The structure of plant communities varies considerably throughout the plateau. Rangelands in the *chang tang*, or 'northern plains' of Tibet are dominated by grasses and sedges of the genera *Stipa*, *Carex* and *Kobresia*. Small forbs, especially of the genera *Potentilla* and *Oxytropis*, are important forage plants in *Stipa* rangelands (Miller 1990, Miller and Bedunah 1994). In mountain ranges and in eastern Tibet, *Kobresia* dominated sedge meadows are common.

In the Himalayan country of Nepal, approximately 12 per cent of the total land area is classified as grassland vegetation. These grasslands vary from Tibetan-like steppe in the trans-Himalayan region north of the main mountain ranges, to *Stipa* and *Danthonia* dominated alpine grasslands, to *Andropogon tristis* grasslands in the temperate zone, and subtropical grasslands associated with chir pine (*Pinus roxburghii*) savannahs (Miller 1986, 1987). Large areas of forest and shrubland are also used for grazing by livestock and I estimate that nearly one-third of the Himalayan land area can be considered grazing land. In this paper, grazing lands and rangelands are used interchangeably and refer to grasslands, shrublands, alpine meadows, and forest grazing areas.

Wildlife

The rangelands of the Himalayas and the Tibetan Plateau provide habitats for a unique assemblage of large wild ungulates (Schaller 1977). Although wildlife populations have been reduced throughout much of their range significant herds of wildlife are still found in western Tibet (Schaller and Gu 1994). In some areas, up to seven wild ungulate species coexist in the rangelands (Harris and Miller, in press). In Western Tibet, the Tibetan wild ass (*Equus kiang*) can be seen in herds of over 200 animals. Tibetan antelope (*Pantholops hodgsoni*), which migrate long distances to birthing grounds, still roam the northern plains of Tibet. Tibetan gazelle (*Procapra pitiacaudata*), probably the most graceful of all Tibetan wildlife, are common in the rangelands of the Tibetan plateau. Blue sheep (*Pseudois nayaur*), are found in many of the mountain ranges in Tibet and the Himalayas. Wild yaks (*Bos grunniens*), which weigh up to a ton and stand two metres at the shoulders are found in the more remote parts of Tibet. No other animal characterises the raw wildness of the Tibetan *Chang Tang* the way wild yaks do. There are an estimated 15,000 wild yaks left on the Tibetan plateau and wild yaks can still be found in large herds.

Other ungulates that inhabit the Tibetan rangelands are the Tibetan argali (*Ovis ammon*), red deer (*Cervus elaphus*), white-lipped deer (*Cervus albirostris*), musk

deer (*Moschus chrysogaster*), Himalayan tahr (*Hemitragus jemlahicus*), and takin (*Budocorcas takin*). In addition, mammals, such as brown bear (*Ursos arctos*), wolf (*Canis lupus*), snow leopard (*Panthera uncia*), leopard, lynx (*Lynx lynx*), fox (*Vulpes vulpes*), marmot (*Marmota bobak*), and pika (*Ochotona* spp.) are found as well as a variety of birds. The preservation of these wild animals and their habitat is essential for conserving biodiversity in the Himalayan and Tibetan rangelands. The future of wildlife will depend on development of proper management policies and programmes (Schaller and Gu 1994).

Pastoral Production Systems

Pastoralism in the Himalayas and on the Tibetan plateau has its own unique identity and is differentiated from the classic examples of nomadic pastoralism such as that found in Africa (Ekvall 1968). Here, altitude and temperatures are the major factors that separate grazing lands from arable lands, quite unlike the situation prevailing in the arid zones of Africa and Central Asia where availability of water is usually the key factor that determines land use. Pastoralists inhabiting the Tibetan Plateau depend primarily upon livestock for their livelihood as the region is generally too high for crop production, except for the eastern and southern regions of the Plateau and in the Himalayas -- here pastoralists have the possibility of complementing livestock production with crop production in the lower-elevation valleys. Pastoralists maintain milking and non-milking herds of yak (*Bos grunniens*), yak-cattle hybrids, sheep (*Ovis aries*), and goats (*Capra hirtus*) which are herded daily. Grazing takes place throughout the year and little forage is conserved as hay. Although the horse makes a minor contribution to the economy of pastoralists in the Himalayas and in Tibet, it does create attitudes and value judgements that are part of a horse-culture modal personality (Ekvall 1968).

Yaks characterise pastoralism on the Tibetan Plateau. Yaks provide milk, meat, fibre, and hides. They are also used as pack and draft animals and for riding. Yak dung is also the source of cooking fuel in most of Tibet. The hair of the yak is also woven into tents for nomads. It is doubtful if man could survive in Tibet without the yak (Miller 1986). Economically, sheep are probably the most important animal for pastoralists in much of the region. Tibetan sheep are renowned for their wool, which is in high demand in the carpet industry. A single nomad family in northern Tibet may keep 400-600 sheep. About 30-40 sheep will be slaughtered every year by a family for their own meat consumption. Pastoralists, especially in Western Tibet, also raise cashmere goats for their valuable fibre. The cashmere or shawl wool produced in Western Tibet has enjoyed a high reputation for centuries. Early British efforts to establish

trade with Tibet in the 18th century were based on their interest in exploiting the profits in the shawl wool trade.

Pastoralism in the Himalayas and in Tibet has evolved through long-term persistence under generally inhospitable conditions. It is unclear when yaks were first domesticated and animal husbandry became a major activity among early Tibetan tribes, but evidence suggests that herding has been common for at least 2,000 years in the northeastern part of the Tibetan Plateau. Pastoralism would certainly have been widespread during the 8th century, which marked the height of Tibetan expansion in Central Asia. In the Nepalese Himalayas, regions such as Dolpo have a recorded history going back to the 10th century A.D., suggesting that animal husbandry is at least 1,000 years old in parts of the Himalayas. Pastoralists throughout much of northern Nepal integrate animal husbandry with agriculture, and livestock provide much needed manure to maintain soil fertility.

Over the centuries, pastoralists have been successful in using multiple species and traditional rotational grazing systems to maintain the productivity of the range resources and to prevent overgrazing (Brower 1991, Ekvall 1968, Goldstein et al. 1990, Miller and Bedunah 1993). Pastoralists also employed opportunistic strategies (e.g., trading, raiding, and subsistence hunting) to complement herding and to survive in a harsh environment. Despite the long history and importance of this pastoral system, ecosystemic dynamics and pastoralist's production strategies are still poorly understood.

The fact that rangelands on the Tibetan Plateau have supported pastoral cultures for thousands of years while sustaining a unique wild ungulate fauna underlies the existence of a remarkably diverse and resilient rangeland ecosystem. The survival today of nomadic pastoralism in Tibet also provides proof of the rationality and efficacy of traditional Tibetan livestock production practices as a means of converting forage from cold, arid grasslands into useable animal products (Goldstein and Beal 1990, Miller and Jackson 1992).

Trade

Trans-Himalayan trade represented an essential element in the economy of many pastoralists in northern Nepal and, for some people, defined the structure of their herding operations as well. Various factors, such as ethnicity, religion, subsistence patterns, and environment, played key causal roles in the development of trading enterprises within each community. In some regions of

northern Nepal, it is still an important way of making a living in high altitude, agriculturally marginal areas (Levine 1988, Ross 1983).

For centuries, this trade linked Tibet, Nepal, and India and both the means of transport and the basic characteristics of this trade remained constant over long periods of time (von Furer-Haimendorf 1975). Trade was based on the exchange of grain from the hills of Nepal for salt in Tibet and the subsequent bartering of Tibetan salt for grain in Nepal again (Fisher 1987, Manzardo 1984). Political changes in Tibet in 1959 brought economic upheaval among pastoralists throughout northern Nepal, completely disrupting traditional trading patterns. These political events beyond the control of pastoralists had effects on the rangelands and livestock production systems as well. In 1959, large numbers of Tibetan pastoralists fled with their livestock into Nepal placing increased pressure on rangelands, which led to heavy grazing and decline in rangeland productivity. Nepalese pastoralists, who traditionally used grazing lands in Tibet during the winter, were denied access to Tibetan pastures, compounding grazing pressures on rangelands in northern Nepal.

Border restrictions with Tibet began to relax in the 1960s and trade was once again allowed, but on a more controlled basis. Improved road infrastructure in southern Nepal has made Indian salt more readily available, and there has been a gradual decline in profits from the salt-grain trade. People in some areas have been more successful in making adjustments than others. For instance, the *Sherpa* in Khumbu were able to capitalise on income-earning opportunities in the emerging mountaineering and trekking industry. Transformations in the livestock production systems and trade arrangements continue to take place today.

Changes Taking Place on the Rangelands

In the past 40 years, profound changes with implications for the future of the rangeland resources, the pastoralists, and their production systems have taken place on the rangelands of the Tibetan Plateau. These changes include the modernisation process itself which has brought improved access and services to previously remote nomad areas; the expansion of agriculture on the grasslands; the transformation of the traditional pastoral system in Tibet, first to collectivised agriculture and recently towards privatisation under the 'household responsibility system' for land and livestock; a disruption in traditional trans-Himalayan trade networks; an increase in tourism and alternative employment opportunities for herders, especially in the Himalayas;

and a general 'settling down' of many nomads in Tibet with a corresponding reduction in the spatial mobility of livestock herds (Clarke 1988, Goldstein and Beall 1989, Goldstein et al. 1990).

With the increase in human population and rise in incomes there is growing demand for livestock products from pastoral areas. Pastoralists in Tibet have entered the market economy and now sell wool, cashmere, and live animals and purchase goods they require, in contrast to traditional barter systems. Many pastoralists have an improved standard of living. Nomads throughout western Tibet are building houses and erecting fences around private winter pastures. Fencing, however, is disrupting the spatial mobility that characterised traditional pastoralism, with potential negative effects on range resources and livestock production. Herders are also demanding improved livestock veterinary services. Gold mining and oil drilling on Tibetan rangelands present new problems and undetermined socio-economic effects on pastoralists as well as ecological effects.

In the Nepalese Himalayas, changes in land tenure, introduction of winter wheat, and increased spread of community forests are restricting transhumant sheep production systems. Increased employment opportunities for herders in the tourism sector also pose problems for the future of sheep production. Tourism and the demand for pack yaks to carry supplies for mountain climbing expeditions and trekking groups are also transforming the traditional *Sherpa* pastoral production systems, which are yak-based.

Wildlife populations, especially in Tibet, have also been negatively affected by the modernisation process in recent decades. Large ungulates, once numerous and widespread, have been reduced in abundance with the introduction of roads and meat hunting. Small mammals, such as pikas, which are thought to compete with livestock for forage, have been exterminated through rodent control programmes. Commercial hunting threatens the future of all large ungulate species, especially wild yaks, which have been exterminated or decimated throughout much of their range, and Tibetan antelope which are poached for their wool (Jackson 1991, Schaller and Gu 1994).

These political, social, ecological, and economic transformations have altered previous stable relationships between the settled agricultural population, the pastoralists, and the rangeland environment. The rangelands of the Tibetan Plateau are still in a state of social, economic, and environmental transition, and it is not clear what patterns will emerge.

Major Issues Regarding Rangelands and Pastoralism

Poor Understanding of Rangeland Ecosystems

Local conditions on the Tibetan plateau and in Himalayan rangelands are so variable that development and conservation decisions need to be made on the basis of micro-level information. However, at present, not enough is known about this unique rangeland ecosystem to make informed decisions about altering traditional, pastoral production practices. It is essential that systematic research is conducted before interventions are proposed in the name of progress (Goldstein et al. 1990).

Inappropriate Pastoral Policies

The 'mainstream view', which maintains that traditional pastoral practices need to be improved, has largely shaped pastoral development policy throughout the world (Sandford 1983). Policies that fail to appreciate the efficacy of traditional pastoral systems are also common in the Himalayas and Tibet (Goldstein et al. 1990, McVeigh 1994, Rai and Thapa 1993). Agricultural policies in Himalayan countries have generally ignored the role of livestock in development and the potential positive contribution that livestock can make to sustainable agriculture and economic growth has largely been neglected.

Lack of Appreciation for Pastoralists' Strategies

Traditional grazing and livestock management systems, which have evolved over centuries in many cases, are often underrated by planners and development specialists. The complexity and ecological and economic efficiency of these indigenous practices are usually not sufficiently recognised. There is little doubt that poor understanding of traditional pastoral systems has contributed to the lack of suitable development programmes for these rangeland areas. The usual livestock development project that focuses on forage development, animal health, and crossbreeding falls far short of its potential impact if designed without proper appreciation of the herder's social and economic values, priorities, and incentives.

Lack of Effective Management of Biodiversity

The rangelands of the Tibetan Plateau are home to many important species of medicinal plants and wildlife. Significant gaps exist in the information about

these resources, and long-term ecological studies of important wild ungulates are lacking. Although large areas have been set aside as protected areas, there is little effective management of these reserves. In many of the protected areas there are resident pastoralists whose needs and desires have received little attention from the authorities. New approaches to conservation in Nepal, which emphasise a local people-centered model, are an encouraging step towards reconciling conservation issues, but much more work needs to be done to actually implement effective programmes.

Range development in the Himalayas and Tibet tends to centre on improving livestock production, rather than on multiple-use range resource management which provides for wildlife and the conservation of their habitat as well. Interactions between livestock and wildlife on the rangelands are still poorly understood and ways to minimise conflicts between livestock production and wildlife conservation still need to be established. This will require much greater knowledge of the needs, production potential, and constraints faced by pastoralists as well as the distribution, status, and ecology of wild ungulates, in order to develop management plans that permit the coexistence of both wildlife and livestock.

Misconceptions and Realities Regarding Pastoralism

Popular misconceptions about the sustainability of pastoralism on the Tibetan Plateau include ideas that: livestock are the cause of environmental degradation; degraded ranges could be improved if stocked at carrying capacity; large and unproductive herds are uneconomic and people can be persuaded to reduce herd size; grazing areas can be turned to more productive uses; and that new institutions and organisations need to be put in place to improve range resource management. These misconceptions help explain why rangelands and pastoral societies have largely been left out of the development agenda.

The realities are that it is not livestock but the management systems that should be blamed for environmental degradation. Secondly, it is now becoming increasingly apparent that existing paradigms for explaining the dynamics of rangeland ecosystems have not captured the dynamic nature of rangelands and, therefore, traditional measures for carrying capacity and range conditions have not been effective gauges for management in pastoral systems. Thirdly, even if seemingly uneconomical, herders oftentimes will not give up their large numbers of animals which provide manure, insurance against losses, social status, and competitive advantage in exerting control over grazing resources.

Fourthly, much of the land being used for grazing is marginal and unsuitable for cultivation, and ruminant livestock are the most efficient land use means to convert plants into protein. Finally, pastoral societies have usually developed sophisticated ways of managing shared resources which outsiders often do not understand or acknowledge.

New Perspectives for Pastoral Development

The poor perception of rangeland environments and pastoralism and the limited support for pastoral development and range resource management in the Himalayas and on the Tibetan Plateau need to be counterbalanced by new perspectives that are emerging regarding range ecosystem dynamics and pastoral development possibilities.

Greater Appreciation for Pastoral Production Systems

There is growing consensus among those involved with pastoralists that indigenous systems of livestock production in rangeland areas are generally efficient, well adapted to the environment, and have evolved as rational responses for using range resources available to herders (Coppock et al. 1986, Coughenour 1991, de Haan 1990, Ellis and Swift 1988). This is evident from reports of those working in the Himalayas and Tibet as well (Brower 1991, Cincotta et al. 1991, Goldstein et al. 1990, McVeigh 1994, Rai and Thapa 1993, Robinson 1992). Ellis and Swift (1988) argue that pastoral ecosystems would be better supported by development policies that build on and facilitate traditional pastoral strategies rather than constrain them. There is also increasing realisation that range management concepts developed in North America and Australia are not necessarily relevant to the contexts in which traditional pastoralism is practised (Perrier 1990). This expanded appreciation of pastoral systems is encouraging and provides hope that pastoralists' needs and desires will receive more attention in the future.

New Concepts in Explaining Ecosystemic Processes

Fresh research in the arid and semi-arid rangelands of Africa (Coughenour 1991, Ellis and Swift 1988, Ellis et al. 1991), where climatic variability is high and ecosystemic behaviour very dynamic, concludes that most arid and semi-arid range ecosystems function as non-equilibrium systems. In these systems, range productivity is more a function of climate than of livestock stocking rate and the effect of livestock on the vegetation is sporadic rather than continuous.

The applicability of traditional approaches to range management in arid ecosystems, based largely on the concepts of equilibrium dynamics and plant succession, is being challenged, and this suggests that alternative management practices need to be designed. The concept of relatively stable multiple vegetation states with thresholds or transitions between these vegetation states is emerging as a new framework for rangeland monitoring and management (Laycock 1991, Westoby et al. 1989). The concept, which differs markedly from the Clementsian Paradigm of plant succession, offers promise for improved descriptions and measurements of range conditions.

Doubts about the Carrying Capacity Concept and Support for 'Opportunism' as a Management Strategy

There are increasing questions about the relevance of the carrying capacity concept for planning stocking densities in pastoral systems, because it is difficult to accurately estimate carrying capacity in the highly dynamic ecosystems where pastoralism takes place (Bartels et al. 1991, Ellis et al. 1991). The difficulty of applying carrying capacity concepts means the notion of 'opportunism' is gaining favour as a management approach for livestock production in pastoral systems. Instead of considering 'average estimated carrying capacity', an opportunistic approach bases the annual grazing strategy on that year's forage production, thus allowing herders to better adjust herd numbers to the spatial variability of forage, establish a better distribution of livestock to forage availability, and enable increased production (Bartels et al. 1991). Opportunism in this context basically means being prepared to respond rapidly to grazing opportunities and is a strategy that works in situations requiring high herd mobility and rapid destocking or restocking as forage conditions change (Ellis et al. 1991).

Considering the notion of opportunism, the optimal strategy for pastoralists in highly dynamic environments may be to exploit range resources during 'good times' and to capitalise on outside resources during 'bad times' as the need arises. Ellis et al. (1991) note that, if this is the case, then the most important development intervention for pastoralists may be that of reducing isolationism and consolidating links between the pastoral ecosystem and external resources. This means ensuring the movement of goods and livestock through trade or marketing systems and external economies which can consume and distribute products to and from pastoral areas as they become available. By assisting in the movement of livestock and products to markets, herders' incomes and access to goods increase and their dependence upon the local environment for subsistence correspondingly decreases. Opportunistic range management is not

new to pastoralists residing in arid and semi-arid areas. Official endorsement of opportunism does not, therefore, require substantive changes in existing livestock production systems (Behnke and Kerven 1994).

Factors to Consider in Developing Strategies for Pastoral Areas in the Himalayas and on the Tibetan Plateau

Strategies for range management and pastoral development in the Himalayas and on the Tibetan Plateau should aim to promote sustainable livestock production, rehabilitate degraded ranges, protect and enhance biodiversity, improve incomes and create employment, and contribute to economic development. Developing such strategies requires a much better understanding of range ecosystem dynamics, increased knowledge of pastoral production practices, more thorough analysis of the issues and opportunities facing pastoralists, and modifications in policies and current approaches. The following paragraphs outline some of the factors that need to be considered in developing strategies and preparing programmes for range management, livestock development, and wildlife conservation in the Himalayas and Tibet.

Adopt a Systems' Approach

An integrated systems' approach is needed for a better understanding of issues concerning pastoralism and in order to promote both conservation and development. In the Himalayas, where agriculture and forestry are especially linked with livestock, pastoral development needs to take place in the context of integrated natural resource management and overall economic development.

Develop a Better Understanding of Pastoral Systems

It is becoming increasingly clear that solving pastoral problems will require greater knowledge of pastoral production systems. Understanding the aims, purposes, and goals of the pastoralists is the key to sustainable pastoral development. This requires information on livestock production parameters, including population trends, herd movements, livestock grazing behaviour and food habits, calving and lambing rates, and so on. Development programmes must be socially as well as ecologically appropriate, and this calls for a much better understanding of the social dimensions of rangeland ecosystems, including the social values attached to livestock and livestock management practices, land tenure, and community interactions.

Pastoralists now face numerous new challenges that may require institutional innovations to deal with fresh dimensions of old pastoral problems. Herders will also need to strengthen their own capacities to manage the process of development.

Promote Range Ecosystem Research

Little is known about the Tibetan Plateau rangeland ecosystem at this time. It is essential that systematic ecological research is carried out to improve the understanding of the dynamics of the ecosystem and to make informed decisions about development planning. Research needs to include vegetative investigations as well as studies on wildlife and livestock ecology.

Wildlife Conservation

As wildlife is a valuable resource in the pastoral areas, greater attention needs to be given to conserving and managing wildlife populations. The distribution, status, and ecology of most species are poorly known at the present time. Interactions between wildlife and livestock also need to be better understood to assist pastoral development planning. Conservation of wildlife cannot be considered without including the attitudes of the local people. Conservation development programmes need to encourage greater participation from local people and allow for local resource use from pastoralists living in the vicinity of protected areas.

New Techniques for Integrating and Updating Information

Recent technological advances in remote sensing and computer data processing (GIS, decisions' support systems) have valuable applications for range resource management and planning, and their use needs to be encouraged in the Himalayas and on the Tibetan Plateau.

Range and Pastoral Policies

Government policies should acknowledge the efficacy of many traditional pastoral systems and seek to understand range resource dynamics and local strategies before advocating substantial changes. Proper incentive frameworks also need to be established for pastoral areas. Livestock development in many countries has been undermined by inappropriate input and output pricing, subsidies, interest rates, and cost recovery policies which have discouraged destocking and investments in rangeland conservation (de Haan 1991). In order

to better integrate wildlife conservation with range-livestock development, policies for pastoral areas should also emphasise multiple-use management practices.

Innovative Roles for Donor Agencies

Given the relative lack of knowledge of rangeland ecosystem dynamics and pastoral production practices in the region, donors need to adopt a more flexible approach towards pastoral development and wildlife conservation. The diverse ecosystems and pastoral societies on the Tibetan Plateau require rather localised interventions and research in pilot areas combined with long-term institutional building efforts. The design of projects, as well as funding arrangements, should be flexible and allow for adjustments as more knowledge is gained. Within projects, decision-making should be decentralised to local levels. Since the emphasis should be shifting from capital investments to institution building, the investment requirements of projects will be low and donors will need to accept that projects, which need a lot of manpower in their design and supervision, require only limited funding and thus do not show well on the balance sheet. Donors may need to shift from detailed project agreements covering short time periods to flexible programme approaches covering a longer time span.

Conclusion

The fact that prosperous pastoral cultures and wildlife remain to this day on the rangelands of the Tibetan Plateau bears witness to the remarkable diversity and resilience of the highly unique ecosystem, as well as the sustainability of its resources if widely used. These rangelands are coming under increasing pressure from an expanding human population but, if properly managed, they should sustain watersheds, supply much of the projected increased demand for livestock products, and provide critical habitat for wildlife, including many endangered species. New perspectives regarding the assessment of range ecosystems, pastoral production practices, and conservation development provide a valuable framework for studying Himalayan and Tibetan rangeland ecosystems and suggest fresh approaches for designing pastoral development in ways that complement environmental conservation efforts. Pastoral development programmes will need to take into account local resource possibilities and constraints and the sensitivities of pastoralists. Development programmes should be flexible enough to take into account new information as it emerges and to support activities based on technologically and socially

accepted options. Only thus will the long-term viability of the Tibetan Plateau rangelands be protected and enhanced.

The remarkable steppes of the Tibetan Plateau will experience a great and tragic emptiness if the productivity of the rangelands diminishes. Unique pastoral cultures will be forced to transform beyond recognition, while wildlife populations will be severely threatened. These consequences can be avoided if timely action is taken to acknowledge the efficacy of pastoral strategies, to evaluate the rangeland resources, and to realistically appraise development alternatives for the Tibetan Plateau. These actions are crucial in order ensure economic development and environmental protection in the face of growing threats from modernisation. Such action requires a concerted effort on the part of range ecologists, livestock specialists, wildlife biologists, sociologists, economists, and development planners to devise programmes sensitive to the range resources and the needs of the local pastoralists. Sensitive ecosystems demand sensitive approaches.

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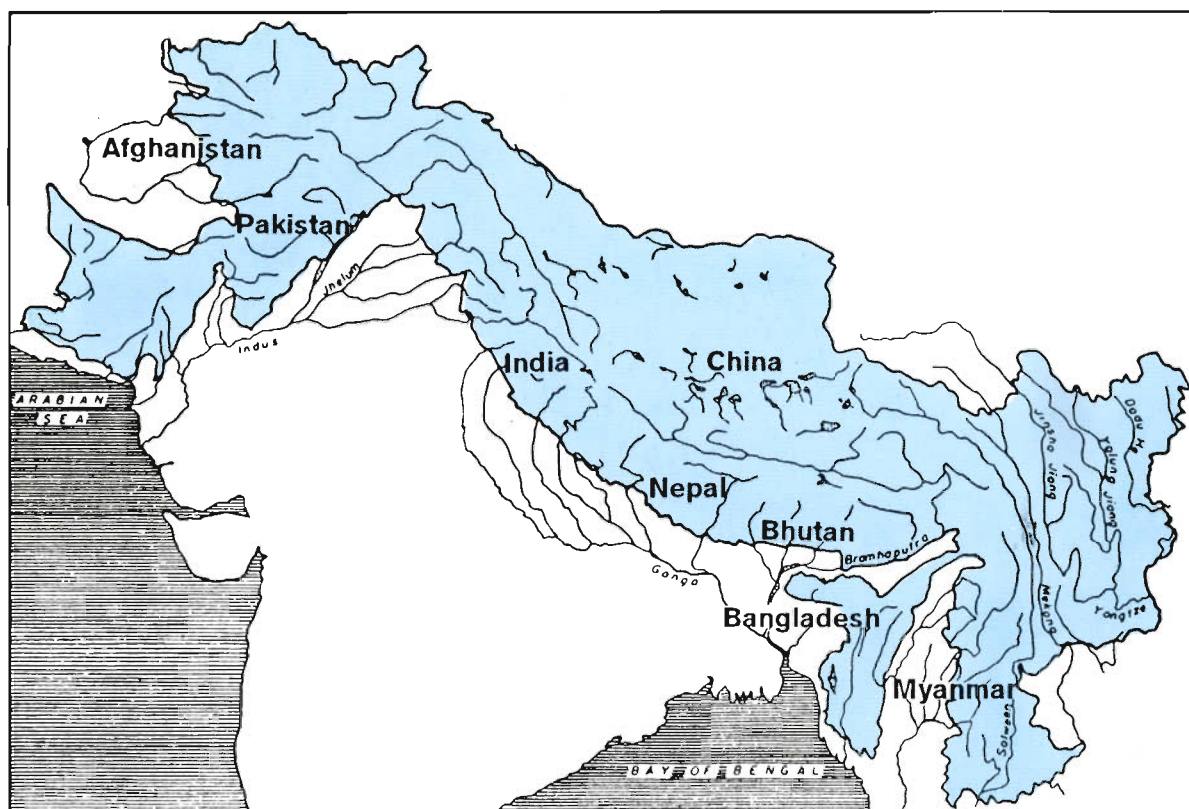
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