

PASTORAL LANDSCAPE





Rangelands and Yaks, Madol, Qinghai, China, 1988

The rangelands of the Tibetan Plateau and adjoining Himalayan region are one of the world's great grazing land ecosystems. Stretching for almost 3,000km from west to east and 1,500km from south to north, and encompassing about three million square kilometres, the region is one of the largest and most important pastoral areas on earth. Most of the area is above 3,000m and the climate is harsh. Annual rainfall varies from about 1,500mm on the southern slopes of the Himalayas to less than 100mm in northwest Tibet. The varied topography, altitudes, and climate give rise to great diversity in rangeland types. Rangelands include the lush, alpine meadows in the Himalayan mountains and eastern Tibetan Plateau, semi-arid shrublands of the dry valleys of Central Tibet, the spacious alpine steppes of Tibet's northern plains, and the cold, dry deserts of the Kunlun mountains. These different rangelands display a diverse assortment of plant communities, wildlife species, and various, distinct nomad cultural groups and nomadic pastoral production systems. The fact that these grazing lands have supported pastoral cultures for thousands of years while sustaining a varied and unique flora and fauna bears witness to the existence of a remarkably diverse and resilient rangeland ecosystem. Some of these rangelands, especially in northwestern Tibet, also represent one of the last notable examples of a grazing land ecosystem relatively undisturbed by man.

River and Yaks, Hongyuan, Sichuan, China, 1996 [chapter photo]





Tianzhu white yak bull, Tianzhu, Gansu, China, 1996

Rangeland and sheep, Phala, Tibet, China, 1997

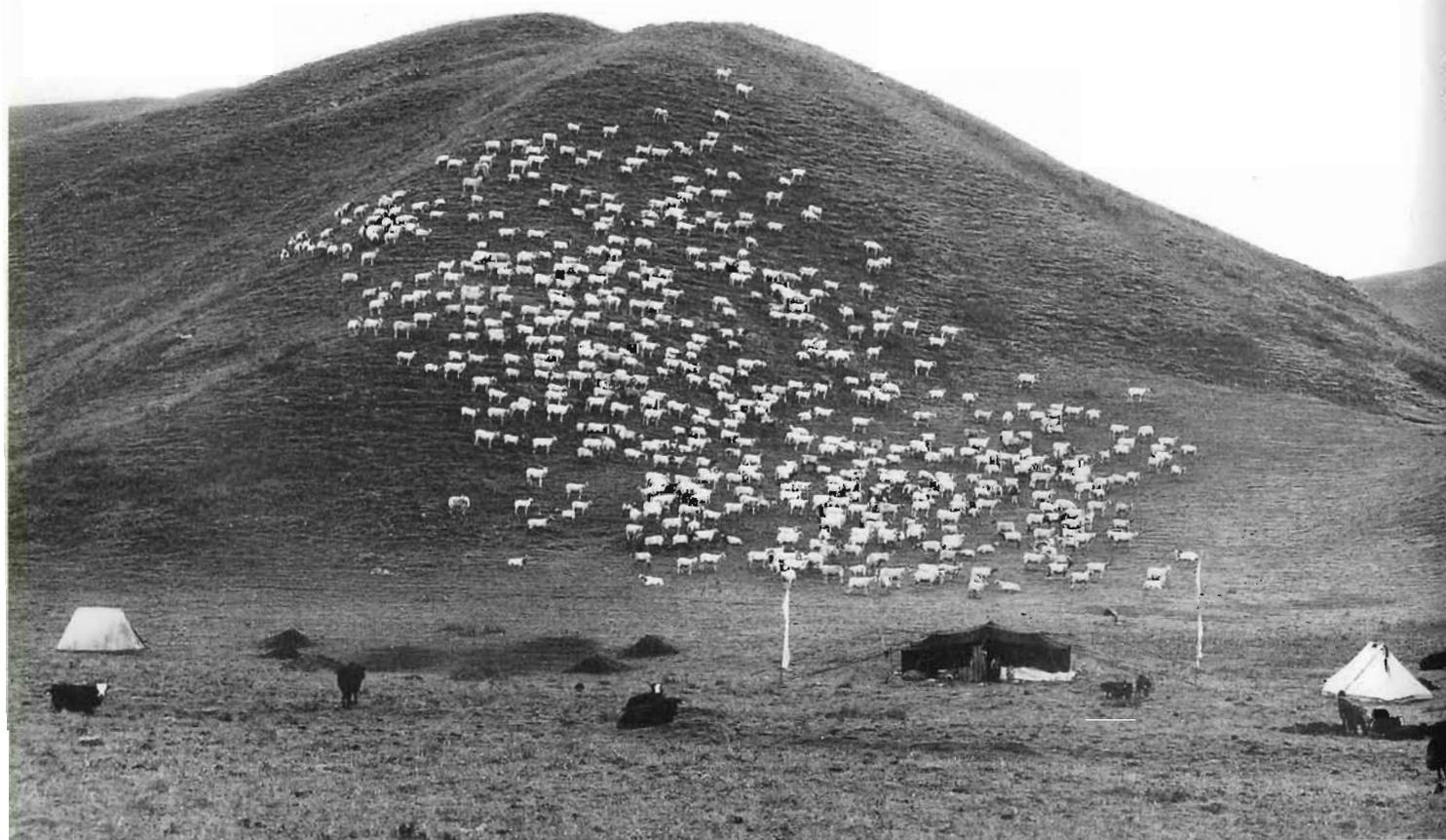


Rangelands are defined as those areas of the earth which, due to physical limitations, such as low and erratic precipitation, rough topography, or cold temperatures, are unsuited for cultivated agriculture and are a source of forage for wild and domestic animals. This definition encompasses grasslands, steppes, deserts, and alpine meadows, as well as shrublands and forest areas often used by grazing animals. Rangeland refers to not only grass and other plants grazed by animals, but to all the natural resources of the rangelands, which include vegetation, animals, soil, water, and space.

Across most of the pastoral region of the Tibetan Plateau, the land is too cold and arid to support cultivated agriculture and forests. Here, fields of grass, green for only a few months of the year, clothe the rugged mountain ranges, extensive steppes, and broad valleys. Growing seasons are short and cool. Nevertheless, the grasslands nurture a rich wild fauna and a flourishing pastoral economy. The lives of pastoralists and animals, both wild and domestic, are tuned to the growth of the grass and the rhythms of the grazing lands. These fields of grass provide the theatre in which nomads and their animals interact and bring into force a unique pastoral culture - a remarkable nomadic way of life, thousands of years old, about which little is known.



Nomad camp, Zoige, Sichuan, China, 1996





Flock of sheep, Hongyuan, Sichuan, China, 1996

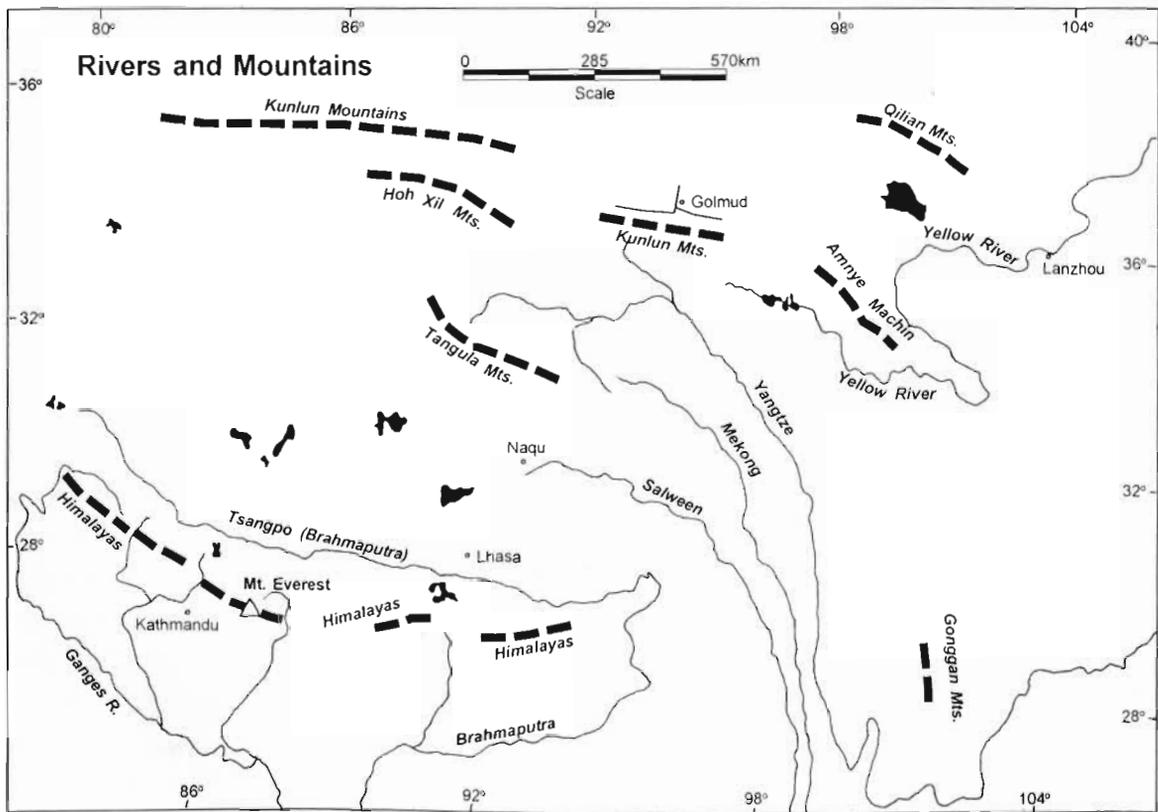


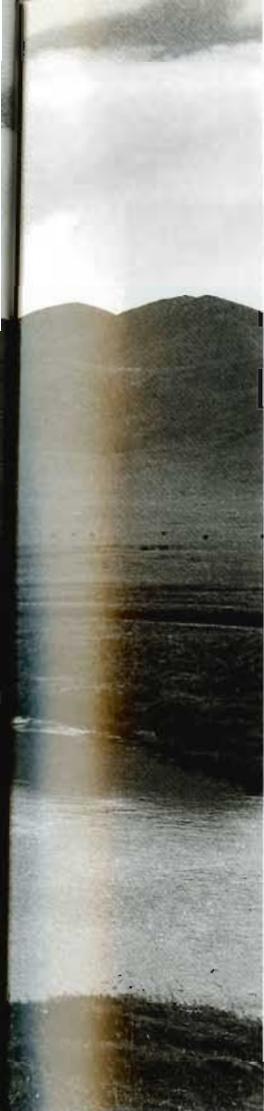
Tibetan sheep, Hongyuan, Sichuan, China, 1996





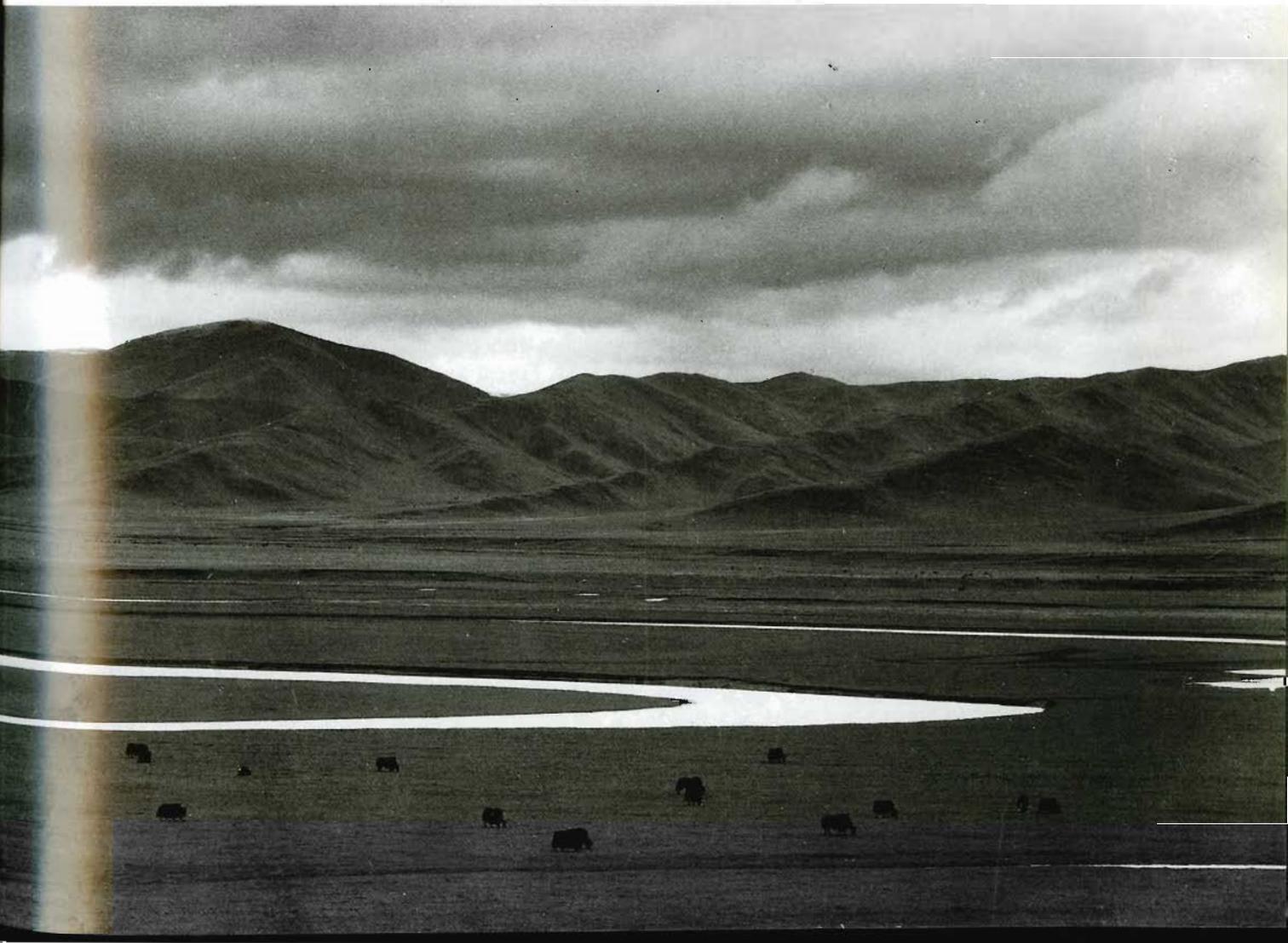
River and rangeland, Henan Mongol, Qinghai, China, 1997

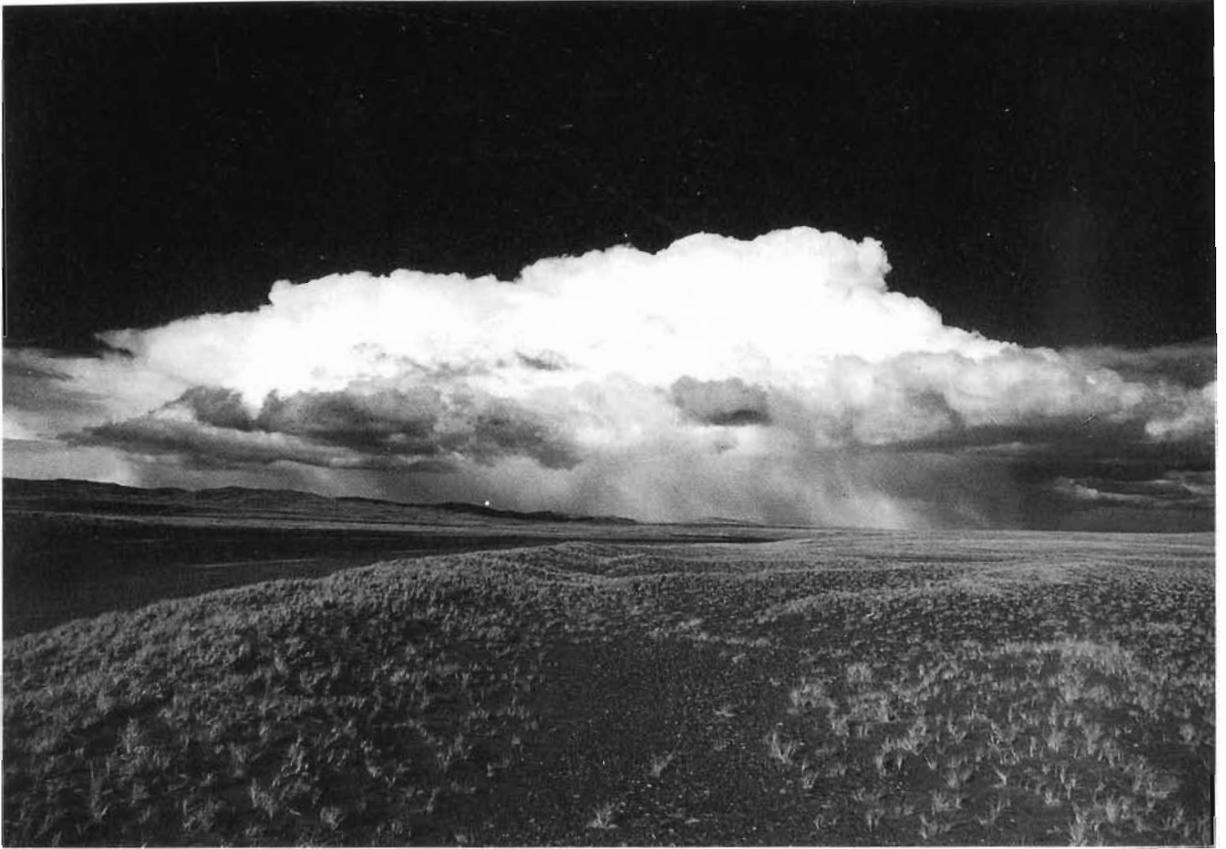




Tibetan rangelands are at the heart of Asia. These grazing lands form the headwaters' environment where many important rivers have their beginnings. Here, the Yellow, Yangtze, Mekong, Salween, Brahmaputra, Ganges, Indus, and Sutlej rivers originate. The preservation and management of these river source environments have global implications, as the water from their watersheds will be of increasing importance in the future. Upsetting the ecological balance in these high-elevation rangelands will have a profound effect on millions of people living downstream. As such, these grazing lands demand respect and should be considered sacred ground.

Yaks, river, and grazing land, Hongyuan, Sichuan, China, 1996

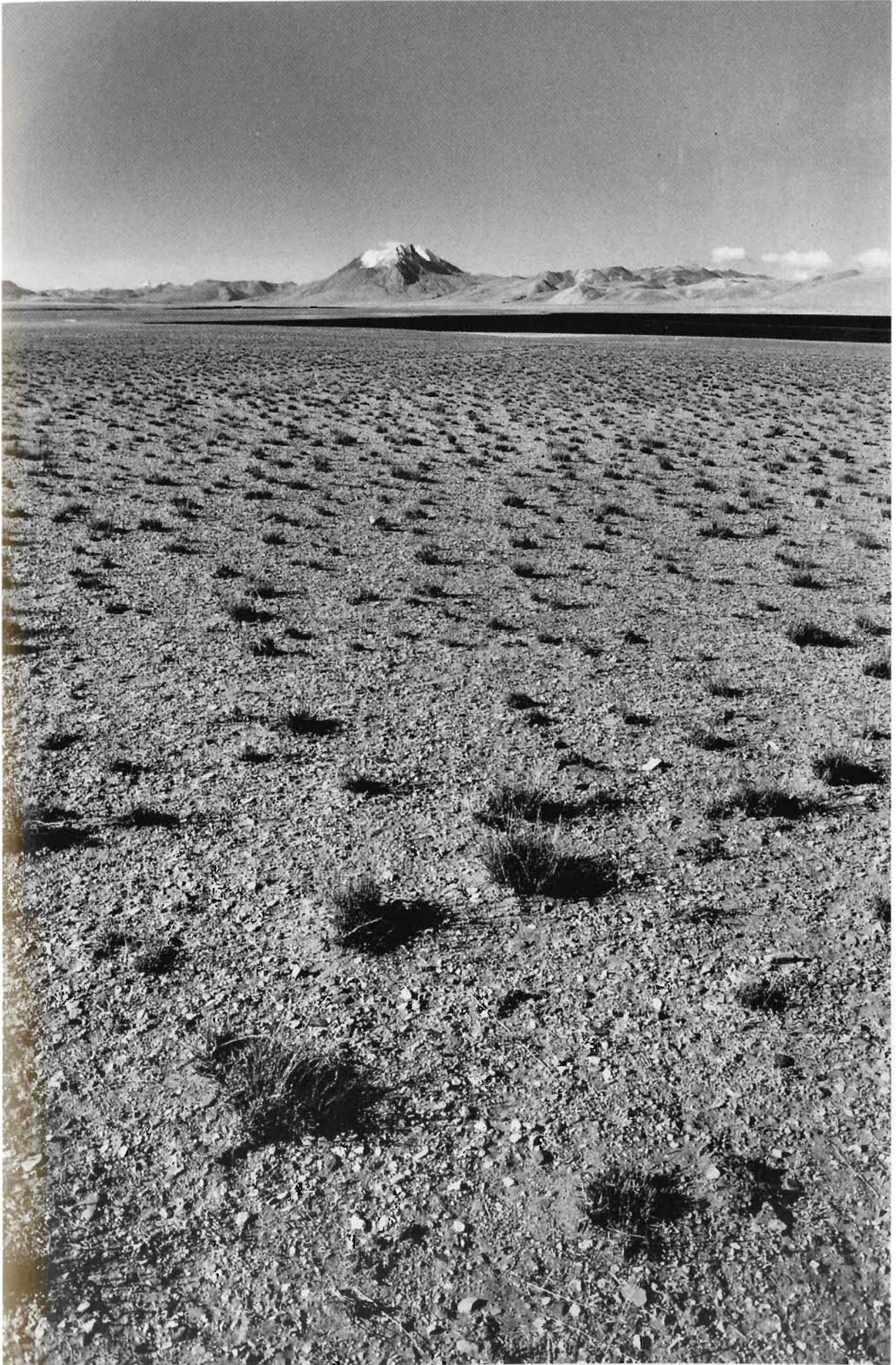




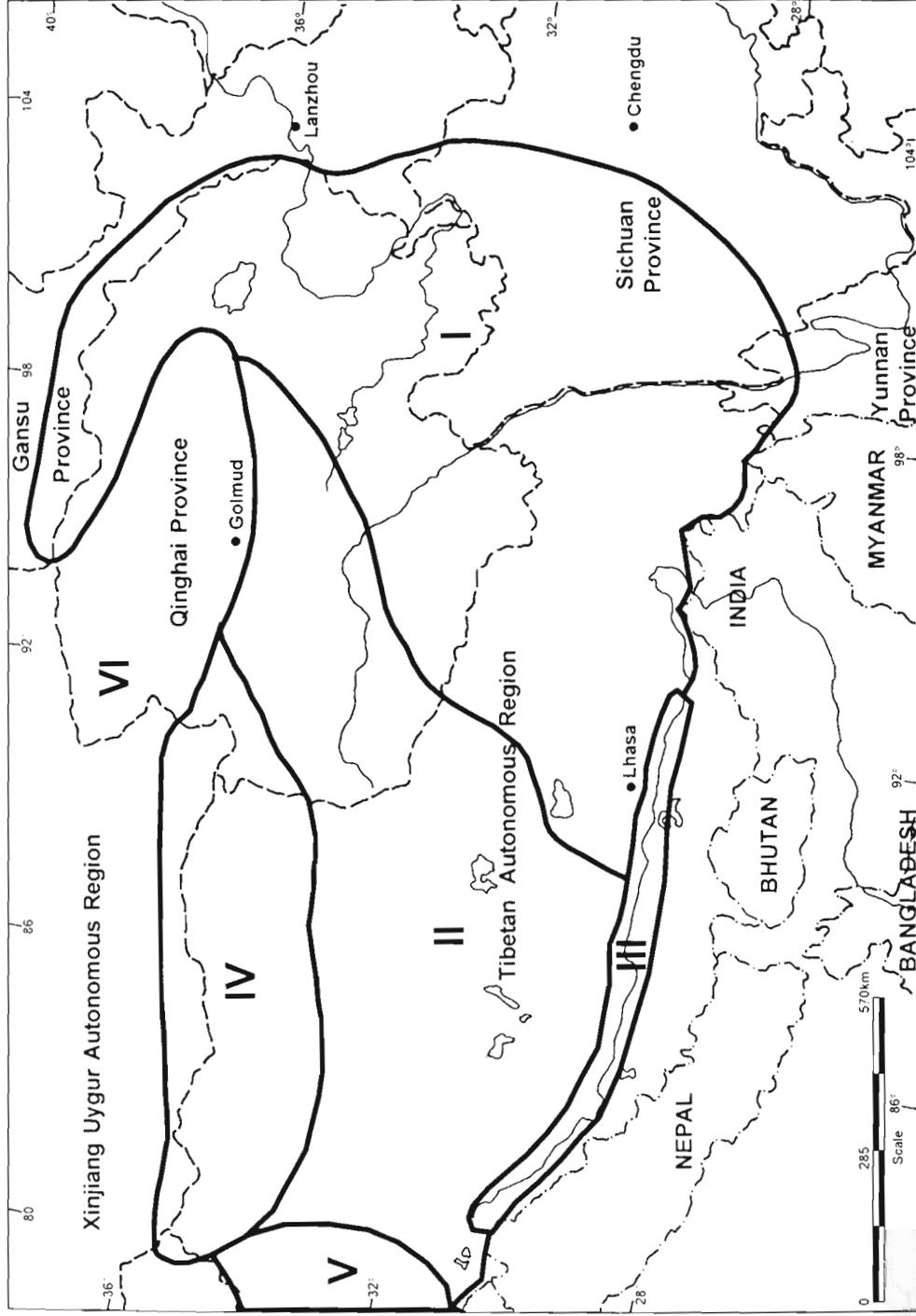
Summer storm, Chang Tang Wildlife Reserve, Tibet, China, 1994

Rangelands of the Tibetan Plateau and the Himalayas are unique, as they are the highest elevation grazing lands in the world. Much of the Tibetan Plateau is above 4,000m; some nomads maintain permanent camps at elevations as high as 5,100m. Temperatures of minus 30°C are often reached in the winter and snowstorms are common even in the summer. As such, these grazing lands are one of the world's most extreme environments and, undoubtedly, the harshest pastoral areas on earth — still used extensively by nomads.

Rangelands, diverse in structure and composition, vary from cold deserts to semi-arid steppe and shrublands to lush alpine meadows. Forest areas in the eastern Tibetan Plateau and Himalayas also provide grazing land for wildlife and livestock. Vegetation differs considerably in plant community structure, depending on altitude, temperature, rainfall, and the uses the land has been subjected to by man and his animals. Each rangeland type has its own unique assemblage of plants and animals. Vegetation variations define movements and foraging behaviour of both wildlife and livestock and influence the manner in which ungulates affect the ecosystem. Although often limited in overall plant species' richness, especially in the cold, arid steppes of northern Tibet, the rangelands are still fertile environments, providing a habitat for numerous species of wild animals, as well as grazing for domestic animals.



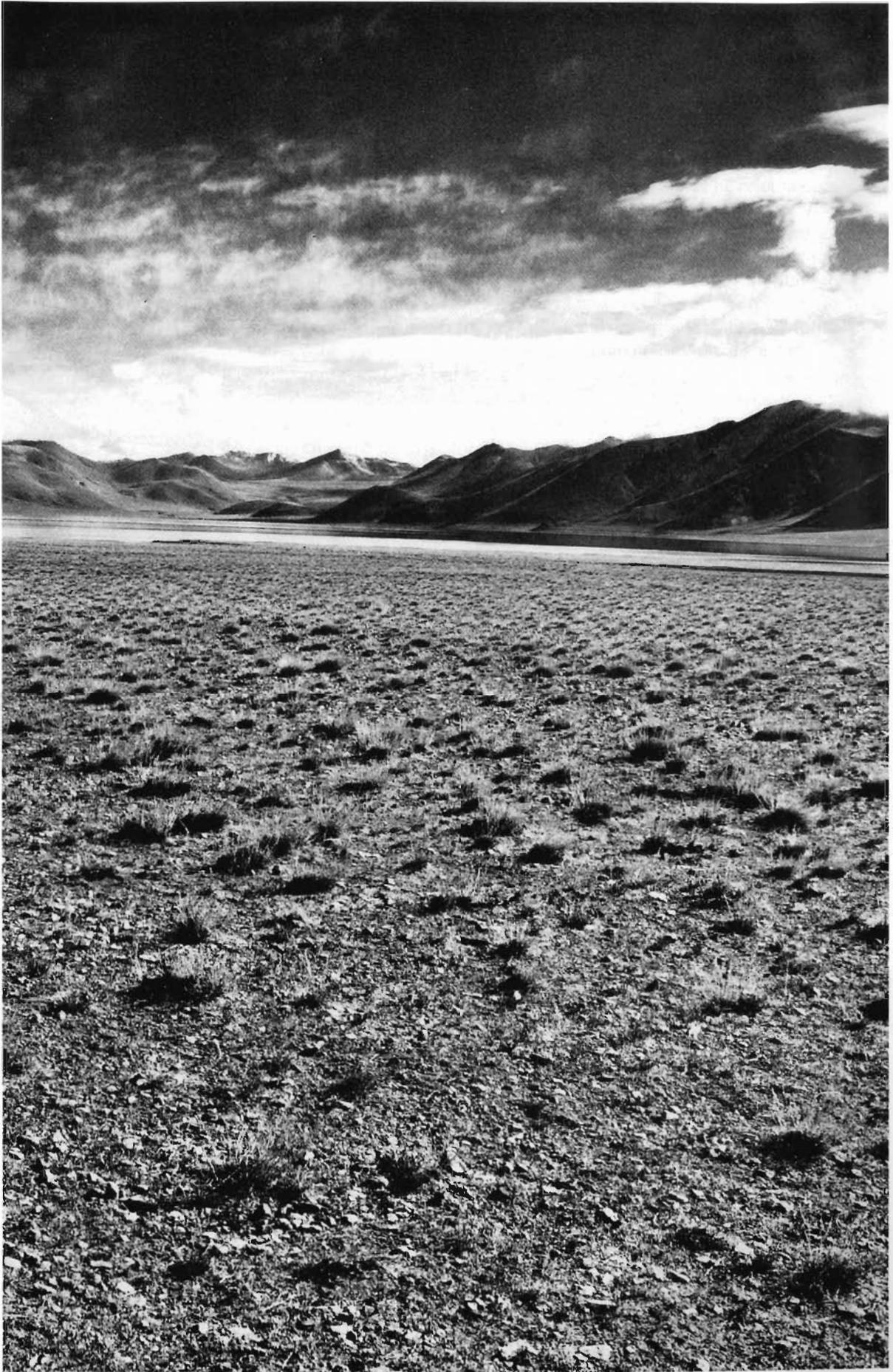
Rangeland and mountain range, Tsatsey, Tibet, China, 1997



Adapted from Chang, 1981

Vegetation Zones of the Tibetan Plateau

- I Eastern Tibetan High-cold meadow and Scrub
- II Changtang Plateau High-cold Steppe
- III Tsangpo Valley Xeric Shrubland-steppe
- IV Northern Tibetan High-cold Desert
- V Western Tibetan Temperate Desert
- VI Central Asiatic Temperate Desert



Rangeland, Phala, Tibet, China, 1997

These high elevation rangelands are important for a number of reasons. First, they provide water and are the source for many important rivers. Second, rangelands provide habitats for a wealth of plant and wildlife species, many of which are endangered. Numerous plants are of medicinal value and other species may provide important genetic material for future economic use. Many of the protected areas in the Himalayas and on the Tibetan Plateau are dominated by rangeland vegetation. Conserving the rich biological diversity of these lands is crucial for sustainable development, yet grazing-related issues are often the main management concerns in protected areas. Third, these grazing lands provide forage for livestock. Since cultivated agriculture is not possible on the rangelands, grazing by livestock enables pastoralists to convert otherwise unusable plant biomass into valuable animal products. As economies in the region modernise and begin to demand more livestock products, it is the rangelands that are expected to be the source for this increased demand. Fourth, many mountain rangeland environments are becoming increasingly popular as recreational sites for tourists. Tourism has the potential to not only help improve the livelihoods of pastoralists but also to contribute to the overall economic development in pastoral areas.



Grasslands with flowers, Maiwa, Sichuan, China, 1996





Early summer nomad camp, Longri, Hongyuan, Sichuan, China, 1996



Factors such as geographical extent, watershed protection, biodiversity conservation, livestock production, and economic development suggest that the Himalayan and the Tibetan Plateau rangelands should be a priority area for development; but, unfortunately, they have not been given the attention they deserve. These pastoral areas are home to millions of people who have mostly been ignored by previous development efforts, due not only to remoteness but also as a result of government policies that failed to appreciate the importance and potential of these grazing ecosystems. The lack of concern for pastoral areas and misconceptions regarding rangelands and pastoral production systems have led to a general downward spiral in the productivity of many areas, loss of biodiversity, and increased marginalisation of herders. Reversing these trends should be a priority for range researchers, policy-makers, range-livestock extension personnel, pastoral specialists, and herders.



Houses and forest, near Zamtang, Sichuan, China, 1996

Despite their extent and importance, rangeland ecosystem dynamics in the Himalayas and on the Tibetan Plateau are still poorly understood. Scientific data on ecological processes taking place throughout different rangeland types are limited. Many questions concerning how rangeland vegetation functions and the effect of grazing animals on the ecosystem remain unanswered for the most part. The socioeconomic dimensions of the pastoral production systems are also not well known. This lack of information limits the proper management and sustainable development of the rangelands.

The poor perception of rangeland environments and traditional Tibetan pastoral production systems, along with the limited support for pastoral development and rangeland resource management in the Himalayas and on the Tibetan Plateau, need to be counterbalanced by fresh perspectives and the new information emerging regarding rangeland ecosystem dynamics and pastoral production. These perceptions and innovative development paradigms suggest new possibilities for and fresh approaches to designing improved, and more appropriate, rangeland management and pastoral development programmes in the future.



Like the prairies of North America, the rangelands of the Tibetan Plateau evolved with large grazing animals. Over millennia, wild ungulates grazing on the plains of Tibet helped create a unique symbiosis between plants and grazing animals. The long history of livestock grazing on these rangelands has undoubtedly contributed to the fact that some species of grasses appear to be more resilient to heavy grazing than the native species in the same genera in North America. Many of the grasses and other plants grazed by animals are especially high in crude protein content and provide nutritious forage during the summer. Wild ungulates and livestock are able to graze enough high quality forage during the brief plant growing season to put on sufficient layers of fat reserves, enabling them to survive the winter and spring when good grazing is scarce. Thousands of years of livestock grazing have also probably resulted in considerable changes in vegetation composition that are often hard to detect and difficult to understand.

Forest and rangelands, Maiwa, Sichuan, China, 1996



Rangelands of the Tibetan Plateau and the Himalayas provide habitats for a wide variety of wildlife, especially ungulates, or large-hooved, grazing mammals. On the steppes of northern Tibet, wildlife such as the Tibetan wild ass (*kiang*), wild yak, Tibetan antelope, Tibetan gazelle, brown bear, and wolves are found. The mountains harbour blue sheep and argali along with the snow leopard and the lynx. In the mountain rangelands of eastern Tibet, where forests mix with grasslands, musk deer, red deer, white-lipped deer, roe deer, and takin are found. In the western Himalayas, ungulates such as urial, ibex, and markhor appear along with the ubiquitous blue sheep and occasional argali. In the central Himalayas, Himalayan tahr and musk deer and, on lower elevation grasslands, goral, serow, and barking deer are seen. Some of these species are among the least-known wild animals in the world. For example, Tibetan antelope are one of the earth's principal migratory animals, yet the exact location of their birthing grounds is still unknown.



Tibetan wild ass (*kiang*), Chang Tang Wildlife Reserve, Tibet, China, 1993

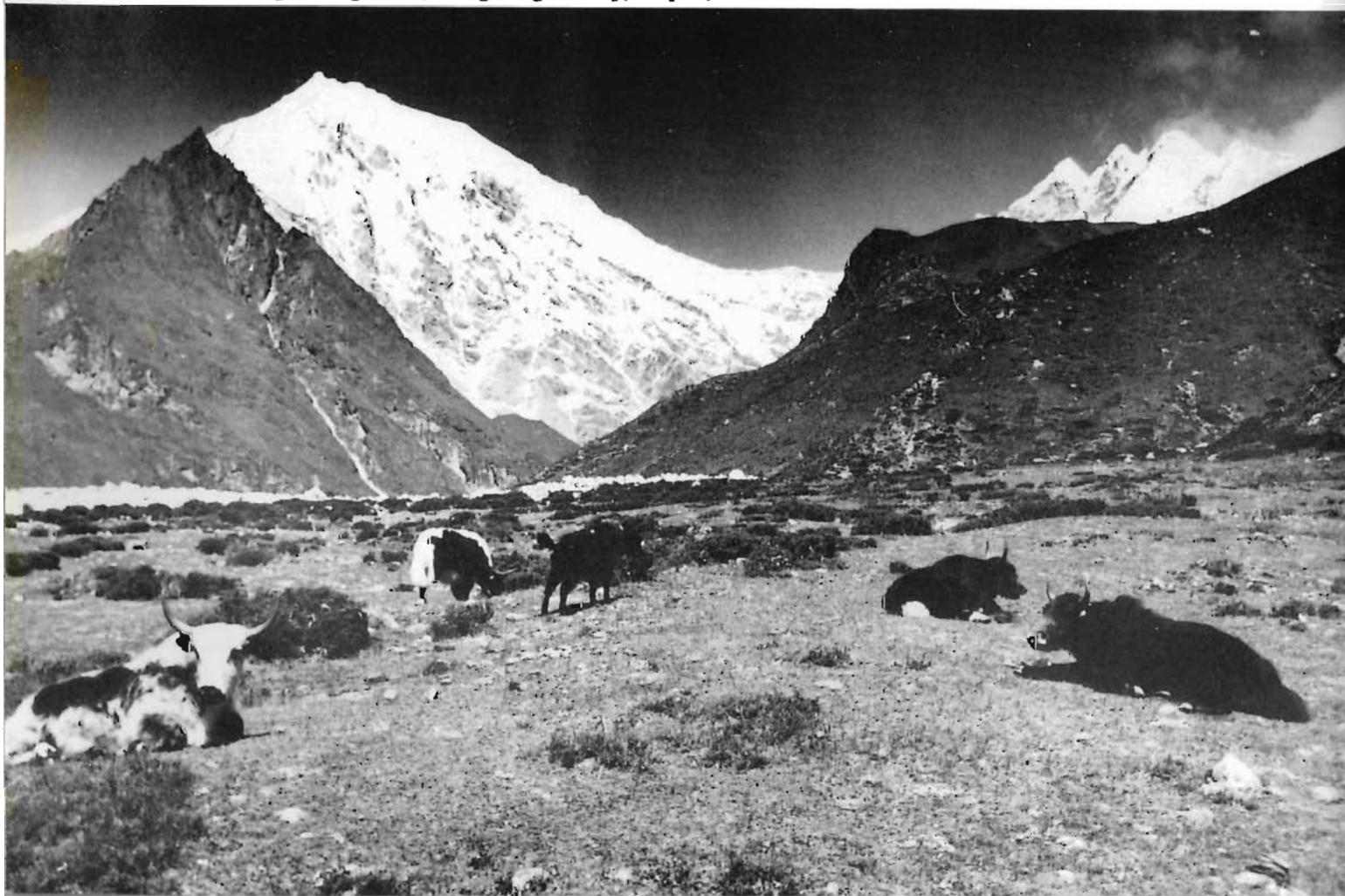
The Chang Tang Wildlife Reserve protects Tibet's remaining, principal wildlife populations and the rangelands they depend upon. It is one of the world's last great wilderness areas. In the Chang Tang Reserve, Tibetan wild ass still roam unfettered across the steppes in large herds. Wild yaks, exterminated throughout most of the Tibetan Plateau, maintain their last refuge in the mountains of the Reserve, and huge herds of Tibetan antelope still follow ancient trails on their annual migration routes. The Chang Tang Reserve provides Tibet's best hope for the survival of its wildlife.



In Nepal, about 12 per cent of the total land area of the country is classified as grassland. These grazing lands include the Tibetan-like steppe vegetation type in the Trans-Himalayan region, north of the main mountain ranges, alpine meadows, and temperate and subtropical grasslands. Over one-half of the grassland area is located in the alpine zone. Large areas classified as forests and shrublands are also used for grazing by livestock. Including these grazing lands, it is estimated that about one-third of Nepal is rangeland.

Northern Nepal has a long history of pastoralism. For example, the Dolpo region has recorded history going back to the 10th century. Pastoral production practices vary widely throughout the rangelands of Nepal, but across most of the northern part of the country, pastoralism is Tibetan in character with yaks and yak-hybrids the important animals in the production system. There are few 'pure' nomads in Nepal who rely solely on livestock for a livelihood. Rather, most inhabitants of the rangelands are 'agro-pastoralists' who combine animal husbandry with the cultivation of crops. Trans-Himalayan trade was also an essential element in the economy of many of the agro-pastoralists in northern Nepal.

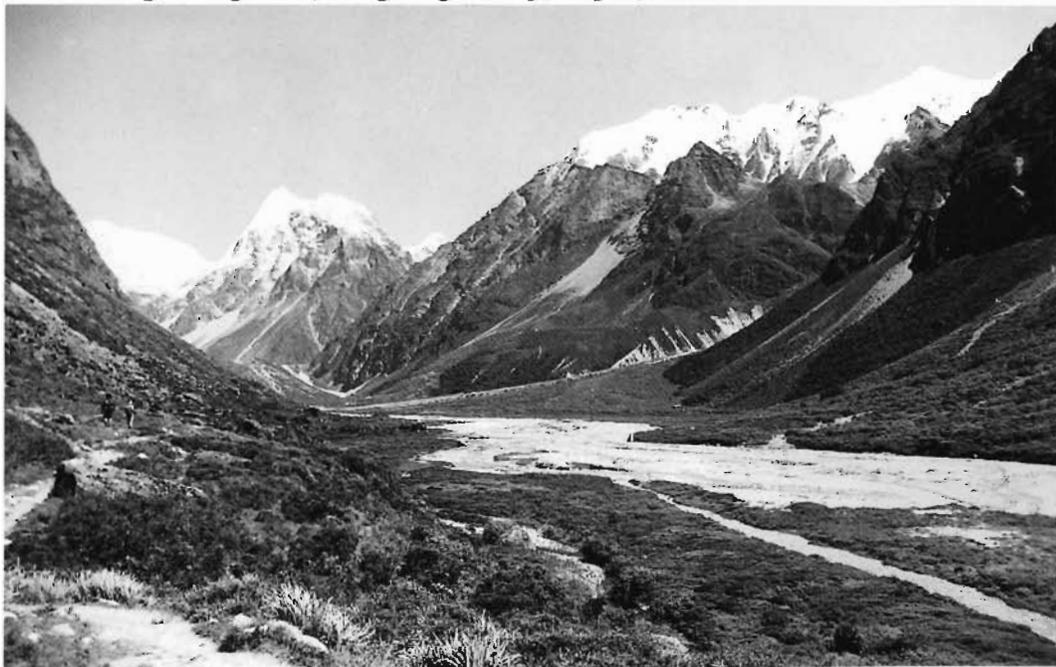
Yaks and grazing land, Langtang Valley, Nepal, 1992





Rangelands, Mustang, Nepal, 1992

Mountain grazing land, Langtang Valley, Nepal, 1992



In the Himalayas of Nepal, rangelands predominate on the valley floors and mountain slopes amidst towering glacier-capped peaks. Here, the pastoral landscape has been greatly influenced by yak herders and their animals. In the Mount Everest region, yak herders have developed some of the highest elevation hay fields in the world. At elevations of 4,500m, native grasses are grown by yak herders and the grass is cut and dried into hay for winter feeding.

Hay fields and rangeland, Pheriche, Khumbu, Nepal, 1992





Hay fields and rangeland, Bibre, Khumbu, Nepal, 1984

Yaks and hay fields, Bibre, Khumbu, Nepal, 1994

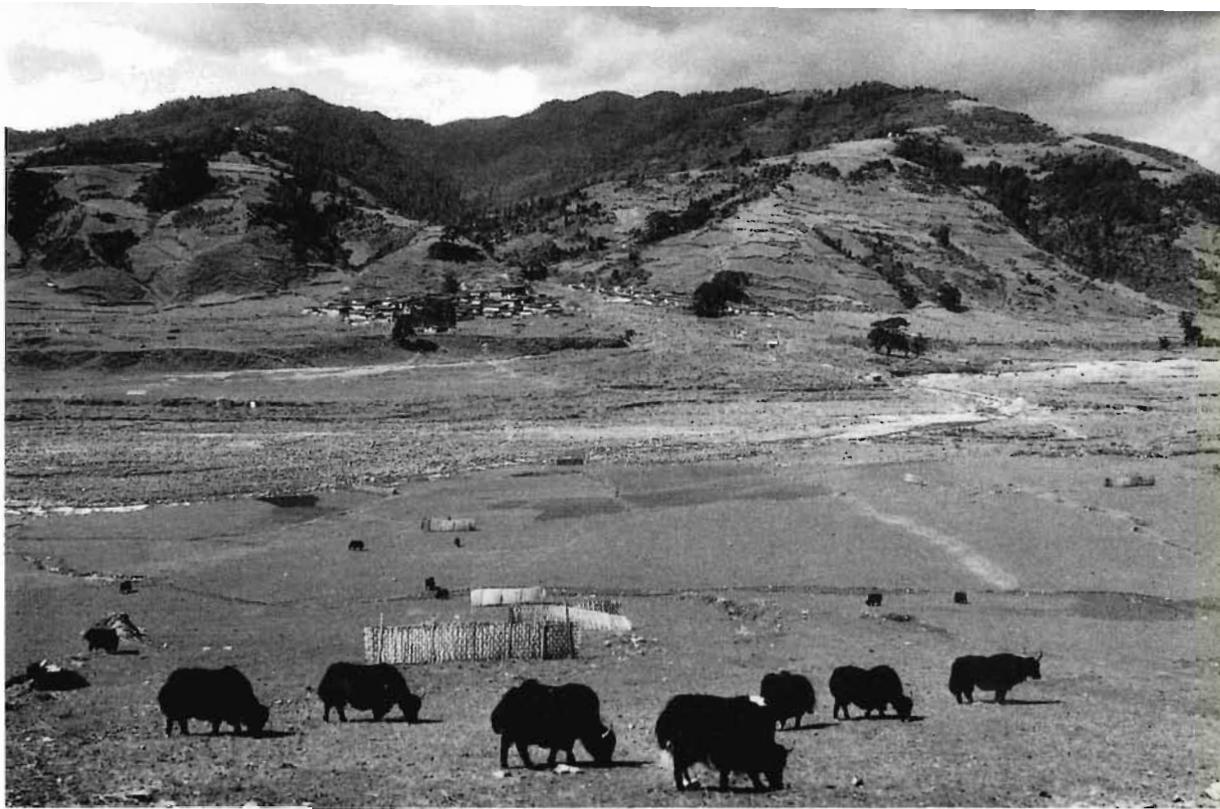




Ruins of old fort and Mt. Chomo!hari, Bhutan, 1987

Tents and rangelands, Soi, Bhutan, 1987





Yaks and grazing land, Saktien, Bhutan, 1985

In Bhutan, rangelands are widespread in the northern part of the country. Here, pastoralists raise herds of yaks and, as in the neighbouring areas of Tibet, herders also use yak-hair tents as a moveable dwelling while camped in the alpine pastures in the summer. Yaks are an important component of Bhutan's high-elevation pastoral system, and there are a number of nomadic groups in the country that are totally dependent upon yaks for their livelihood as they practice no cultivated agriculture. These nomads are located in the northwestern part of Bhutan, in Soi, Lingshi, Laya, and Lunana, and, in eastern Bhutan, in Merak and Saktien.



Early summer snow storm, Phala, Tibet, China, 1997

Tibetan Plateau and Himalayan pastoral areas are complex environments and appear to function as highly dynamic ecosystems. Over much of the Tibetan Plateau, there is considerable variation in forage production from one year to another due to different precipitation patterns. There are even remarkable differences in grass growth in a small geographic area within one year due to local climatic patterns. Severe winter blizzards can bury forage for livestock under snow, often resulting in large livestock losses. These periodic snowstorms add to the complexity and non-equilibrium nature of the pastoral system, making pastoral production a high risk enterprise. Nomads cope with the uncertainties of the environment by adopting a number of flexible production strategies that minimise risk and make optimal use of the resources available to them. One such strategy is to diversify herds and maintain a high degree of mobility. Social arrangements with neighbours and neighbouring groups of nomads have also been established to enable herders to gain access to additional resources or assistance during times of stress. Although not as important now in many areas, hunting and gathering were also strategies engaged in by pastoralists to supplement subsistence livestock production. All of these strategies aimed to minimise risk, stabilise production, diversify food and livestock product sources and income, and maximise returns to household labour.



Dead yak, Phala, Tibet, China, 1997



The foundation for the rise of strong nomad tribal federations, kingdoms, and empires on the Tibetan Plateau was the rangelands. The boundless, fertile grazing lands, and the livestock grazed on them, helped create prosperous, pastoralist cultures. Tibet's vast grasslands nurtured a prolific livestock industry. Tibet was rich with animals, wool, and butter. The pastoral landscape was also home to nomads accustomed to taking care of animals. This legacy enabled troops on horseback to be easily organized and for cavalry to travel swiftly and conquer far-flung territories. Without such a pastoral setting, the people residing on the Tibetan Plateau would never have been able to develop into such an extraordinary civilization.

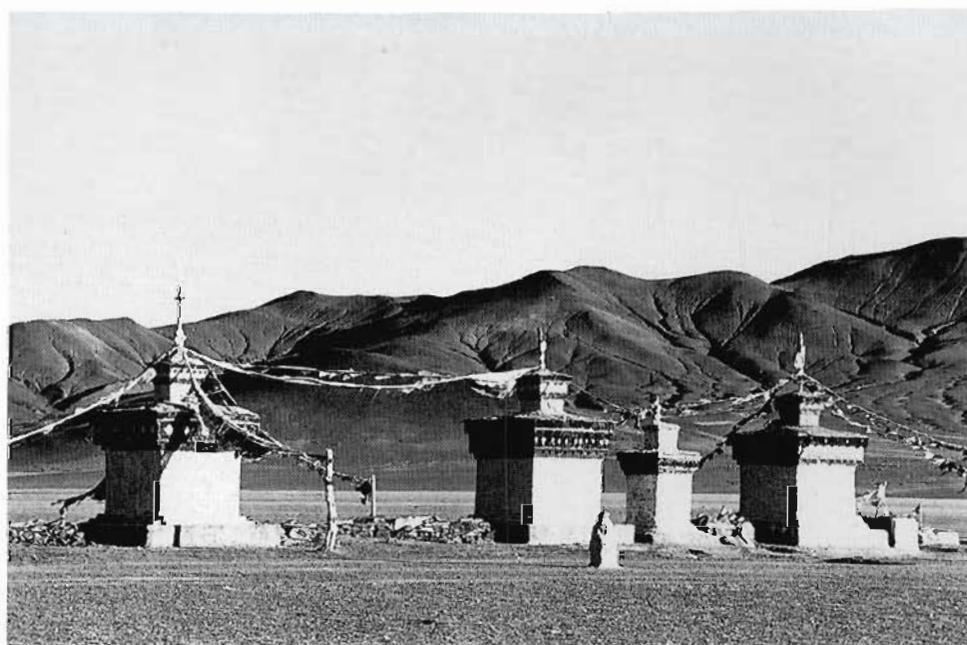


Stupa, Chharang, Mustang, Nepal, 1992





Monastery and rangeland, near Hongyuan, Sichuan, China, 1996



Stupas and Rangeland, Gertze, Tibet, China, 1993



Stupas and rangeland landscape, Near Chharang, Mustang, Nepal, 1992

