Grasslands of the Tibetan Plateau

Daniel J. Miller

Nomads' tents were scattered across the valley floor. Made out of belts of woven yak hair, supported with poles, and staked out with yak hair ropes, they resembled giant black spiders. Thin columns of smoke rose from the tents as the sun came over the top of the mountains. Flocks of sheep moved slowly across the valley floor like thick, low-lying fog. Large herds of yaks were being herded by young boys, skillfully employing slingshots that snapped like rifle shots. Men in sheepskin clothing and with long braided hair trotted past on stout ponies. Sitting on elaborately woven saddle carpets, with rifles slung over their shoulders, and long swords dangling from their waists, these horsemen had an air of confidence about them. They looked like they owned the place, these proud nomads on horseback riding across some of the last of the open range: the grasslands of the Tibetan Plateau.

These grasslands have, for centuries, supported a pastoral culture. Though remote, these grassland ecosystems are coming under pressure from factors such as increased demand for livestock products generated by economic growth in the People's Republic of China. The "personal responsibility system", which has replaced the commune system, has also contributed to an increase in livestock numbers.

The recent increases in livestock numbers on these grasslands do not recognize the carrying capacity nor the need to improve range management techniques. Modern techniques of range management are not well understood in Tibet. If well managed, the grasslands have the potential to support productive livestock populations.

In the summer of 1988, I was fortunate to be able to travel across some of the grasslands of the Tibetan Plateau. Accompanied by a wildlife biologist from the Northwest Plateau Institute of Biology located in Xining, Qinghai Province, and two other researchers from the University of Montana we were looking for study areas to begin collaborative research on wildlife and rangelands on the Tibetan Plateau. From Xining, we drove across the Glok nomads' summer encampment in northeastern Qinghai Province.
northeast part of the Plateau, known in Tibetan as Amdo, south to the town of Nangchen on the banks of the Mekong River and further south into the Tibetan region of Kham on the border between Qinghai Province and the Tibetan Autonomous Region. We covered approximately 1,500 miles, almost all of it on gravel roads.

The Tibetan Plateau is the most extensive high elevation region on earth. Known as the "Roof of the World", it encompasses almost one million square miles of the People's Republic of China, equivalent to the combined area of the states of Montana, Wyoming, Idaho, Utah, Nevada, Colorado, Arizona, and New Mexico. The Tibetan Plateau stretches for about 800 miles from north to south and over 1,000 miles from west to east. The Plateau is found between 28 and 38 degrees North Latitude, about the same latitude as New Mexico. The Qinghai-Xizang Plateau, as it is termed by the Chinese, includes all of the Tibet Autonomous Region, most of Qinghai Province, the northwestern part of Sichuan Province, the southwestern part of Gansu Province, and the southern border area of Xinjiang Uygar Autonomous Region—approximately 20 percent of the total land area of China.

The Tibetan Plateau is literally the heart of Asia, where some of the major rivers of Asia such as the Yellow River, Yangtze, Mekong, and Brahmaputra originate. The Plateau is bounded on the north by the Kunlun Mountains and by the Himalaya Range on the south. Numerous mountain ranges with peaks over 20,000 feet crisscross the middle of the Plateau. It is big, wide-open country with extensive grasslands. Approximately 70% of the total land area of the Tibetan Plateau is grazing land.

Vegetation on the Plateau varies remarkably, depending on altitude, temperature, and precipitation. Almost all of the Tibetan Plateau is at elevations over 10,000 feet and extensive areas are located above 14,000 feet. Little vegetation is found above 16,000 feet. Temperatures throughout the year are cold and growing seasons are short. Snow can fall every month of the year. Precipitation varies from about 30 inches on the southeastern edge of the
Plateau to less than 4 inches a year in the northwest. The decrease in precipitation from southeast to northwest provides a moisture gradient from humid to arid with a corresponding vegetational gradient from forest and meadow to steppe and desert. Precipitation on the Tibet Plateau is influenced by the Southwest Monsoon coming from the Indian Ocean in the summer and the Westerlies in the winter. Most precipitation occurs during the summer and winters are generally cold and dry. Heavy snowfalls can occur during the winter.

The Tibetan Plateau has been divided into five main vegetation zones. These are: (a) the moist high-cold meadow and low scrub in the east; (b) the arid and high-cold steppe in the north and central region; (c) the high-cold desert of the northwest; (d) the temperate desert zone in the west; and (e) the arid steppe and shrublands in the south around the Tsangpo (Brahmaputra) River Valley. The first two types of vegetation are the most predominant on the Tibetan Plateau.

The grasslands of the northeastern part of the Tibetan Plateau have long been regarded as some of the best grazing lands in all of Asia. Numerous explorers to Tibet in the 19th century wrote at length about the lush pastures, large herds of livestock, and incredible wildlife of this region. The rangelands of northeast Tibet are the kind of country cowboys dream about. It's Marlboro Country. It is a land of numerous snow peaks, large mountain valleys with clear running streams and good grass, and cold, wind-swept steppes where you can ride for hundreds and hundreds of miles and never see a fence. It is still "open range".

From Xining, which is situated on the edge of the old Silk Route, we crossed the Qinghai Nan Shan mountains onto the northeastern edge of the Plateau. The first valley to the south of Koko Nor Lake is a large loess plain at about 10,000 feet. Common grasses here were splendid grass (Achnatherum splendidens), alkaline grass (Leymus secalinus), and Orinus kokonorica. The two-humped Bactrian camels could be seen grazing with cattle, yaks, and sheep among large sand dunes. Ascending out of this loess plain we crossed the secondary ranges northwest of the main Amnye Machin Mountain Range. (For a period in the late 1940's Amnye Machin was thought to be higher than Mount Everest.) Shrublands of willows and shrubby cinquefoil were common on the mountainsides. Numerous species of wildflowers wove a tapestry of colors into the green meadows.

Traveling across the Tibetan Plateau reminds one of the cold deserts of Nevada or the plains of eastern Montana. The country rolls on and on, with endless ridges merging into a purple haze on the horizon. Numerous lakes are found on the Plateau and nowhere in the world are skies so blue. You can see clearly for miles and miles. Distances are deceiving.

High elevation meadows dominated by sedges of the genus Kobresia comprise a large percentage of the total grassland area of the Tibetan Plateau. These cold, wet meadows provide an important grazing resource for livestock during the summer. Purple feathergrass (Stipa purpurea) is one of the most common grasses of the high-cold steppes of Tibet. Other common grasses are Littedalia racemosa, Roeperia kokonorica, Ptilagrostis dichotoma and Koeleria cristata. Near many settlements, grazing lands have been fenced to provide emergency winter grazing areas or to be used as hay meadows. One of the dominant grasses in these grasslands is a wildrye grass, Elymus nutans.

The northeastern part of the Tibetan Plateau is the territory of the legendary Golok tribesmen. Considered among the best horsemen of Asia, they are also renowned for having the best horses of all the Tibetan tribes. The Goloks descended from ancestral nomads who considered it bad manners to walk even when exchanging greetings between one tent and another. For centuries these wild, nomadic Tibetan tribes raided and plundered caravans crossing Tibet and stole horses and livestock from other tribes in the northeastern regions of the Plateau. The Goloks were always known as some of the toughest mounted warriors in Asia and successfully thwarted many attempts by early explorers on the Tibetan Plateau to reach Lhasa through Golok country.
A large encampment of Goloks is an impressive site. During the summer, these nomads will gather in one place for a week or more to hold festivals and trade or sell their wool. At these summer festivals most of the tents are large, richly decorated canvas tents, a departure from the traditional tents made of woven yak hair. The nomads dress in their finest clothes, their sheepskin robes decorated with embroidered silk and trimmed with otter fur. Women wear large necklaces of amber, coral and turquoise, gold and silver jewelry, and plait large amber beads into their hair. Many of the men and women wear Stetson-like felt hats and leather boots. Most men still wear their hair long with bright red tassels braided into their hair and wrapped around their heads. Hundreds of horses graze around these camps, where horse races and other horseback contests are held.

Horsemanship is a highly regarded skill in this part of Central Asia. Numerous legends attest to the Tibetans' prowess with horses. In one well-known Tibetan tale, the kings of India, Persia, Turkestan, and Tibet sent envoys to the Chinese court, each seeking the emperor's daughter as a bride for their king. These envoys were subjected to a number of tests. In one of the tests set to the envoys, 100 mares were kept in one place, 100 foals in another, and the envoys had to identify the offspring of each mare. When the Tibetan envoy succeeded in this, the Chinese emperor waved the matter aside, saying, "The test is not a fair one, for Tibet is known as the land of horses."

Everyone thinks of the Mongols as the great horsemen of Central Asia, which indeed they were. However, the Tibetans came galloping over the steppes 500 years before the Mongols did. Tibetan civilization was a horse-oriented society and there is evidence that Tibetan kings assumed the throne as soon as they could ride a horse, which was supposedly at the age of thirteen. The height of Tibetan expansion in Central Asia was in the 7th and 8th centuries. There is historical proof that by the late 700's the Tibetans were the greatest military power in Central Asia. In 763 A.D., Tibetan cavalry seized the Chinese Tang Dynasty Imperial capital in Xian, and in 790 A.D., Tibetan troops rode to the Oxus River in northern Persia. These daring exploits could have only been accomplished with well-trained mounted warriors. The Tibetans even developed a "pony express" for carrying dispatches across their vast territories almost 1,000 years before the Spanish brought the first horses to North America.

It is estimated that there are about 12 million yaks in China, the majority of which are found on the Tibetan Plateau. Over 30 million sheep and goats utilize the grasslands on the Plateau. Herds of thousands of animals are not uncommon. Yaks provide milk products, meat, hair, wool and hides. The wool from Tibetan sheep has long been regarded as a fine carpet wool and about three thousand tons of wool is exported every year to Nepal for its thriving carpet industry. The fine, inner wool from Tibetan goats (cashmere) is used for making expensive pashmina shawls. In the 1880's the British Raj in Tibet made numerous unsuccessful attempts to obtain control of the wool and cashmere trade in Tibet.

Nomadic pastoralism on the Tibetan Plateau has been in existence for thousands of years. Pastoralism became the prevalent land use on the Plateau, by at least the 7th century, which marked the beginning of the expansion of the Tibetan civilization.

The survival of pastoral groups on the Tibetan Plateau indicates that the strategies of rangeland utilization and animal selections developed centuries ago are well-adapted responses to the different range and environmental conditions. These practices established sustainable range-livestock production under a system which developed without scientific knowledge of range ecosystems and expensive inputs.

With the opening of the Tibetan Plateau and improved communications with the People's Republic of China, the equilibrium of the traditional Tibetan pastoral system was placed under considerable pressure to support more intensive livestock production. Economic growth in China is placing more demands for livestock products. This should stimulate interest in technologies related to livestock production from rangelands on the Tibetan Plateau. There is evidence that the "individual responsibility system" now being implemented is leading to an increase in livestock numbers. Rangeland condition may decline if more animals are kept than the rangelands can realistically support on a sustainable basis.

Pressure increase from human populations and livestock numbers are threatening wildlife species in many areas. In the short time we were on the Plateau, we saw Tibetan gazelle grazing along side the road, wild ass, wolves, and blue sheep in the mountainous rough country. In high elevation spruce forests in southern Qinghai
Province, we saw musk deer, small, secretive animals. One of the few members of the deer family without antlers. The males have large canine teeth. Males produce musk, used in traditional medicinal practices and perfumes, which has resulted in widespread poaching. White-lipped deer (Thorold’s deer) and red deer are also found in high elevation forests and shrublands on the Plateau. Marmots and pikas were common in the Tibetan grasslands, in contrast to the Rocky Mountains where the pika inhabits rocky areas. Many large raptors are found in the eastern part of the Tibetan Plateau probably due to the large numbers of pikas.

In the more isolated valleys in the western part of the Tibetan Plateau, there are still large herds of large wild yaks. Big bulls can stand six feet high at the shoulders and weigh up to a ton. The horns from the wild yaks were used as milk pails by early nomads. Tibetan antelope are also found on the Tibetan Plateau. Mongols believe that a whip handle made from the horns of an antelope will, in the hands of the rider, prevent his horse from tiring. Tibetans used two antelope horns as rests to help steady their rifles. Once widespread, Przewalski gazelle are now found only along the northeastern shore of Koko Nor Lake. Tibetan argalis are found in many of the mountain ranges in the Plateau as are snow leopard. Numerous lakes and marshes provide habitat for a wide variety of waterfowl and shore birds. The first American to really explore Tibet in the late 1800’s called the country around the upper Yellow River “the most wonderful hunting ground in Asia”.

This rich abundance of wildlife on the Tibetan Plateau is being increasingly threatened. Large numbers of blue sheep are killed every year for meat in Europe. Musk deer are poached for the valuable musk and red deer and white-lipped deer are killed for their velvet antlers. Knowledge on the numbers of wildlife and ecology of wild animals on the Tibetan Plateau is limited. Tremendous potential exists for improving the productivity of the rangelands and livestock production of the Tibetan Plateau. To overlap appropriate range policies and development interventions for sustainable use of the range resources, the dynamics of the pastoral ecosystems need to be clearly understood. More information is required on the ecology of the grasslands and the carrying capacities of the different ecosystems. Remote sensing imagery is a valuable tool for analyzing forage production which has important potential given the vastness and remote nature of the rangelands of the Tibetan Plateau. Information is required about the livestock and wild ungulates utilizing the range resources to plan range improvements for efficient utilization of the range. Development strategies must build upon the best aspects of traditional management systems, rather than imposing complete new systems upon them. Local pastoralists need to be involved in the planning and design of development interventions. Investigations are needed on plant-animal interactions. Range and animal scientists must work together. Better grazing management needs to be promoted that considers appropriate stocking rates and proper seasons of use of the range. Grazing systems need to be designed to ensure the efficient and sustained use of rangelands. Hay meadows should be developed to provide supplemental forage during the winter. Development interventions have to be practical. Instead of introducing expensive tractors and forage harvesting machinery for the Tibetan Plateau, it may be more feasible to introduce horse-drawn mowing machines and technology that was widely used on range operations in the western USA not many years ago. Wildlife are an important resource on the Tibetan Plateau and their needs must also be considered when designing range management programs and development interventions.

The grasslands of the Tibetan Plateau are a unique and vital resource. Little attention has been given to the wise and scientific management of these rangeland resources. The rugged terrain, harsh environmental conditions, diverse vegetation types, and interesting pastoral people will make the application of range management principles on the Tibetan Plateau a very challenging and extremely exciting task.

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