

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.