Shift in Management Strategy of Yak Herding in the South of Mustang District, Nepal, Himalaya

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Abstract
In the Himalayan regions of Nepal, people herd yaks (*Bos grunniens*) under transhumant pastoralism, seasonal migrations of herds between summer highlands and winter lowlands. For several decades, the number of yaks has decreased, and the management strategy of yak herding has been altered due to the influence of substantial changes in both the social environment and their livelihoods. We conducted field surveys on yak herding in the south of Mustang District from 2012 to 2016 to examine the recent shift in management strategy and practice. The surveys were focused on fifteen yak owners and their herdsmen who lived in southernmost three villages in the district and organized a yak owners' cooperative group. The herd scale has been constant in recent years, although the owners had a willingness to increase the scale. The herding practices were traditional and extensive, which might not have led to an increase in herd size or productivity. Dairy production has shown an obvious declining trend, whereas sales of meat and the revenue from the yak blood drinking festival hosted by the cooperative group have become more important income sources for local yak herding in association with the development of local infrastructures and livelihoods. Because the economic incentives for yak herding remained strong in the study area, the herding scale will be maintained, or expanded if the management practices are improved in the future.

Introduction
Yaks are the most indispensable livestock for people living in Asian inland highlands. Yaks are kept for various purposes, including milk and dairy products, meat, wool, hides, feces (as manure and fuel), draft power and pack animals. In the alpine and sub-alpine regions in Nepal, Himalaya, people rear yaks under transhumant pastoralism, seasonal migrations of herds between summer highlands and winter lowlands. Nepal has a population of 70,000 yaks and its hybrids with cattle in 2011, decreased from an estimated 200,000 heads in 1961, partly due to government restrictions on livestock numbers and access in national parks (Wiener et al. 2003). The attractions of the tourist business for increasing trekkers and other economic options have also reduced the incentive to pursue yak herding (Joshi 2000). In addition, the production strategy of yak herding has been altered over the last several decades in Nepal (Bishop 1989).

Mustang District had a population of 12,318 people and 3,215 yaks in 2010 (Mustang District Development Committee 2011). Almost half of the yaks are kept in Kali Gandaki Gorge, the south part of the district. The southern area of the district, called *Thak Khola*, is the home province of the ethnic group of Thakali (Vinding 1988). Manzardo (1984) and Degen et al. (2007) conducted field surveys in this region and reported on their yak herding. In recent years, the livelihoods in Mustang District have been drastically changed by infrastructure development, such as the distribution of electric power network, the conversion of fire source from fuel wood to gas cylinders, and the rapid spread of mobile phones. In particular, the improvement of Jomsom Street as an arterial roadway for vehicles has substantially activated flows of people and goods. The local yak herding may have been affected by these changes. We conducted field surveys on yak herding in the south of Mustang District to examine its recent shift in production strategy and management practice.

Methods and Study Site
The investigation was conducted in the southern parts of Mustang District (28.7°N, 83.6°E). The study site is located in the steep gorge between Mt. Dhauragiri in the west and Mt. Nilgiri in the east. At the bottom of the gorge, the Kali Gandaki River flows from north to south, and Jomsom Street runs along the river. The street has been an important route for the salt trade from Tibet and for the pilgrimage to Muktinath Temple, a sanctuary for Hindus and Buddhists. The area has been a part of the Annapurna Conservation Area and recently popular for foreign trekkers. Since 2008, the street has been completely open to traffic for vehicles from Beni, the headquarters of Myagdi District, to Jomsom, the headquarters of Mustang District. Although the street was often divided by summer heavy rains and landslides, flows of people and goods have increased.

We visited the site and conducted surveys eight times: Dec. 2012, Apr. 2013-2016 and Sep. 2013-2015, each for a month. Fifteen yak owners who lived in Kowang, Lete and Kunjo VDCs (village development committees) organized and belonged to a yak owners' cooperative group. We interviewed these yak owners and herdsmen employed regarding their management and production practices of yak herding.

Results

Yak herding

Among the 15 yak owners, three had kept yaks for more than 50 years, but three owners begun herding during this decade. Eight and five owners employed one herdsman (called *gothalo*) with a one-year contract each in 2014 and 2015, respectively, and one owner employed two herdsmen in both years. The other owners cared for their herds by themselves. On average, NRs. (Nepalese rupee) 70,000 and 76,000 were paid per year per herdsman in 2014 and 2015, respectively, with a provision for clothing, food, tent and daily necessities. The average herd size was 51 heads, ranging from 33 to 149. Breeding females at the age of 3 years and above accounted for 67% of the total, whereas most males were slaughtered around the ages of 3-4 years, except for one or two head(s) of sire in a herd. Although the owners were willing to increase their herd size, accidents such as a snow slide in 2009 and an epidemic of foot-and-mouth disease in 2013 killed many yaks at once. In April 2015, there were totally 514 breeding females in the 15 herds. For two years from April 2014 to March 2016, 498 calves were delivered, whereas 236 calves died within a year after birth. The major causes of death were attacks by wild animals such as snow leopards (*Uncia uncia*), ingestion of poisonous plants and slip drops from cliffs. When a calf dies, milking from its dam would be difficult until the next calving.

The yaks were kept by year-round transhumant pastoralism on pastures at the bases of mountains. They grazed on grasslands and forests ranging between 2,500 m and 3,400 m asl from November to April (winter) and on grasslands between 3,400 to 4,600 m asl from May to October (summer). Only salt was fed to yaks once a week in summer and twice a month in winter. Eight of the 15 owners stayed in the tents almost every night during the busy period to care for the calves and pump milk (generally May to August), while the other 7 owners did not continuously stay in tents. During winter, the herds constantly migrated from one pasture to another when there was little grass. Because the winter pastures were closer to their settlements and herding was less busy, herders less frequently stayed in tents.

Dairy production

After calving and migration to summer pastures, herders began to milk. They pumped 1-1.5 L of milk per animal per day only in the morning. Ghee (clarified butter) and hard cheese (*chhurpi*) were made from acidified milk. A kilogram of ghee was made from 22-26 L of milk in summer or 17 L in winter and sold for NRs. 667. A kilogram of *chhurpi* was made from 17 L of milk and sold for NRs. 275. The milking duration varies by herd; five herds were milked every day for 4-6 months, four herds were milked every day for 1-3 months, and six herds were not continuously milked. The average annual sales for dairy products in 2014 and 2015 were NRs. 15,053 and 6,447 per herd, respectively, ranging from NRs. 0 (no sales) to 41,000. Eight of the 12 owners who had conducted yak herding for more than a decade responded that the milking duration had decreased compared with a decade ago, whereas three owners answered 'not different' and one owner answered 'increased'.

Sale of meat

Young male yaks not for sire, old sires, and female yaks which were old or had some reproductive difficulties were slaughtered for meat. Female yaks were mostly culled at the ages of 9 to 14 years. Leans with bones and edible internal organs were divided into even portions of 2-3 kg and sold for NRs. 2,000 each. A head and four limbs were totally sold for NRs. 2,000 as food; a tail was sold for NRs. 1,000-3,000 as a traditional ornament or as a souvenir; and a gall bladder was sold for NRs. 500-1,000 as a crude drug. Fur skin or wool was domestically used as a carpet or thrown away. A 3-year-old male, a 10-year-old male and a 10-year-old female were sold for approximately NRs. 34,000, 80,000 and 60,000, respectively. From April 2014 to March 2016, 47 young males, 6 old males and 52 females in the 15 herds were slaughtered; in total, 105 yaks were sold for NRs. 5.6 million. The average annual sales per herd in 2014 and 2015 were NRs. 273,200 and 96,533, respectively, ranging from NRs. 0 (no sales) to 498,000.

Blood drinking festival

The owners held traditional festivals on pastures in April-May (*Baisakh* on the Nepalese calendar) and in July-August (*Shrawan*). The spring festival was held only by the surveyed group at a place along Jomsom Street, whereas the summer one was also held by other yak owners around the area, at every herder's tent on summer pastures. During the festival, they cut the jugular veins of the yaks with a blade and poured the blood into cups

of around 200 ml. People drunk the blood because they believed that drinking yak blood might cure their gastric problems or diseases as a crude drug but not owing to a religious belief. Blood was collected from most male and unpregnant female yaks aged 2 years or above, and 10-15 cups of blood were obtained from each animal. A cup of blood was sold for NRs. 150 in 2013-2015 and for NRs. 200 in 2016. The festival continued for around 10 days until the participants were sated with drinking blood. The owners, their family members and some participants stayed in tents on pasture during the festival, and the owners' families earned money by providing beds, food and drink. Although this festival was one of the traditional and seasonal festivals for Thakali, people including non-Thakali visited from distant places. In April-May 2015, around 2,500 cups of blood were sold. Five yaks were slaughtered for meat during the festival after blood collection.

Recent trends in the price and sales of yak products

The prices of animal products have increased according to inflation and increasing demand in Nepal. From 2010, when we conducted a preliminary survey in the study area, until 2014, the cumulative inflation rate in Nepal was 42% (IMF 2015). For this period, producer prices increased 50% for buffalo and goat meat, 40% for chicken meat, 35% for fresh buffalo milk and 27% for fresh cow milk in local currency (FAO 2016). In the study area, the prices of ghee and *chhurpi* increased by 52% and 38%, respectively, and those of yak meat and blood increased by 100% and 114%, respectively. The trend in the price of yak dairy products was similar with that of milk at the national level and the inflation rate, whereas the price increase of yak meat far exceeded that of other meat at the national level.

The sales from dairy products and the proportion out of the total sales particularly decreased from 2005-2007, as reported by Degen et al. (2007), to 2014-2015, as obtained from our interview surveys (Figure 1). The sales from meat and blood almost doubled, which corresponded to the price increase rates of meat and blood. The total annual sales of yak products per herd increased by 72% from NRs. 130,195 in 2005-2007 to NRs. 224,783 in 2014-2015, mainly owing to the price increase in yak meat products.

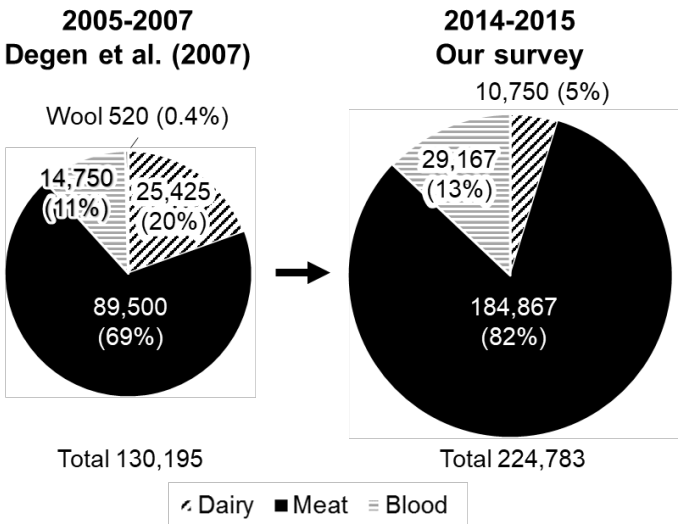

Figure 1. Change in the annual average sales of yak products (NRs./herd). NRs., Nepalese rupee.

Discussion

Approximately one thousand heads of yak were herded by 29 owners in Kowang VDC in 1977 (Manzardo 1984). Although the number of yaks and herds has decreased, the decrease rate was rather smaller than the national trend of Nepal. The mean herd size (51 heads in our survey) has been increasing since 1977 (34 heads) and has remained constant since 2005-2007 (51 heads; Degen et al. 2007). The fact that three owners began yak herding in this decade indicates that yak herding has been still attractive to some people in the area. Although the owners were willing to increase their herd size, several external factors (e.g., wildlife attacks, snow slides and epidemic diseases) prevented it. Management practices of herding were traditional and extensive. The grazing system without supplemental feeds caused low health and mineral nutrition statuses, especially in winter (Kumagai et al. 2016), and reproductive disorders (Aryal and Paudel 2007). Appropriate feed supplementation can reduce these problems and may increase herd size and productivity.

In most cases in Nepal, dairy production has been referred to as the primary purpose of yak herding (Wiener et al. 2003). In this area also, yaks were utilized for dairy products and the production of several types of wool in the 1980s (Manzardo 1984). However, dairy production showed a declining trend, although the milking capacity of dams was far greater than the actual milking amount for most of the herds. Assuming that all of the lactating dams were milked 1 L for 4 months after calving and all of the milk was processed into ghee and *chhurpi*, NRs. 44,000 could be gained per herd per year. Several owners explained that they reduced the milking amount or duration to let the calves drink more milk and thereby improve calf mortality. However, the declining trend might also be attributed to following factors. Although the production amounts of yak dairy products decreased, the price increase was similar with that of milk at the national level, which indicates a decreasing demand for yak dairy products in the study area. This deceasing demand might be related to the increasing availability of fresh or powdered milk for the local people in association with the development of

transportation via Jomsom Street. The local people every day took tea with these kinds of milk but did not routinely take ghee or *chhurpi* made from yak milk. Moreover, because milking and dairy processing requires great daily labour, several owners might think that dairy production does not pay for the work.

In Nepal, contrary to dairy production, the production or consumption of yak meat has been less frequently referred to, which might be partly because the slaughtering of yak and consumption of its meat conflict with religious issues due to the closeness of yak to cattle. The consumption of yak meat had been temporarily regulated in this area in the course of Hinduization (Manzardo 1984). However, the regulation has been eliminated, and the local people prefered to eat yak meat. The sales for meat were the most important income source for the local yak herding. The relatively high rate of the price increase in yak meat might be attributed to the increasing demand. Since the sale of meat was held irregularly, the spread of mobile phones and the expansion of transportation have offered an opportunity for more people to purchase the meat.

The revenue obtained from the blood drinking festival including the sales of blood was also an important income source for the local yak herding. In the 1980s, the spring festival was held in May-June (*Jestha*) at a one-hour walk pasture from Jomsom Street and was traditionally less important than the summer festival for Thakali (Manzardo 1985). The season of the spring festival has been changed to April-May because many people can visit the festival during this time, which corresponds to the New Year holidays of Nepal. The location has been changed to a place along the street since 2009, associated with the opening of the street for vehicles. Owing to an increase in accessibility to the place, the spring festival has expanded in scale and become economically more important than the summer one for the surveyed group. As well as transporting trekkers' baggage or value-added cheese production at other places in Nepal (Wiener et al. 2003), the festival has given an opportunity to utilize yaks for tourist business. This unique and successful utilization of yaks might be attributed to a high level of business skills of Thakali (Kawakita 1955). However, the scale expansion of the festival may increase the risk of losing animal health because 2 to 3 L of blood are collected from an animal after the severe winter season.

The production strategy of yak herding in the study area has been altered in association with the development of local infrastructures and livelihoods, whereas the scale of yak herding and basic management practice have been maintained in recent years. Although options for local people to make a living might have been expanded, the incentive for yak herding seemed to remain strong. The economic incentive particularly derived from the sales of meat and the revenues from the festival. Owing to the high incentive, the scale of yak herding will be maintained, or if the management practices are improved, will be expanded in the future.

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References

Aryal, S. and Paudel, K P. 2014. Reproductive disorders and seroprevalence of brucellosis in yak. *Nepal Agr. Res. J.,* 8: 130-132.

Bishop, N.H. 1989. From zomo to yak: change in a Sherpa village. *Hum. Ecol.,* 17:177-204.

Degen, A.A., Kam, M., Pandey, S.B., Upreti, C.R., Pandey, S. and Regmi, P. 2007. Transhumant pastoralism in the lower Mustang district. *Nomadic Peoples,* 11:57-85.

FAO STAT. http://faostat3.fao.org/home/E

IMF DATA. http://www.imf.org/en/Data

Joshi, D. D. 2000. Impact of National Parks and tourism on yak farming system in the alpine Himalayan region of Nepal. *Yak Newsletter (International Yak Information Centre),* 5:12-13.

Kawakita, J. 1955. Some ethno-geographical observations in the Nepal Himalaya. Part 1—Culture distribution with reference to religion. (in Japanese with English summary) *Jpn. J. Cult. Anthropol.,* 19:1-57.

Kumagai, H., Nakajima, M., Anzai, H., Sakai, T., Oishi, K., Hirooka, H. and Shah, M.K.. 2016. Health and mineral nutrition status of yaks in southern Mustang, Nepal. *Anim. Sci. J.,* 88: 1156-1161.

Manzardo, A,E. 1984. High altitude animal husbandry and the Thakalis of Thak Khola: Biology and trade in the Himalayas. *Contributions to Nepalese Studies* 11:21-35.

Manzardo, A,E. 1985. Ritual practice and group maintenance in the Thakali of central Nepal. *Kailash–A Journal of Himalayan Studies* 12:81-114.

Mustang District Development Committee, 2011. *Livestock census of Mustang District 2067/068*. (in Nepalese)

Vinding, M. 1988. A history of Thak Khola Valley, Nepal. *Kailash–A Journal of Himalayan Studies* 14, 167-211.

Wiener, G., J. Han, and R. Long. 2003. *The Yak Second Edition.* Bangkok: FAO Regional Office for Asia and the Pacific.