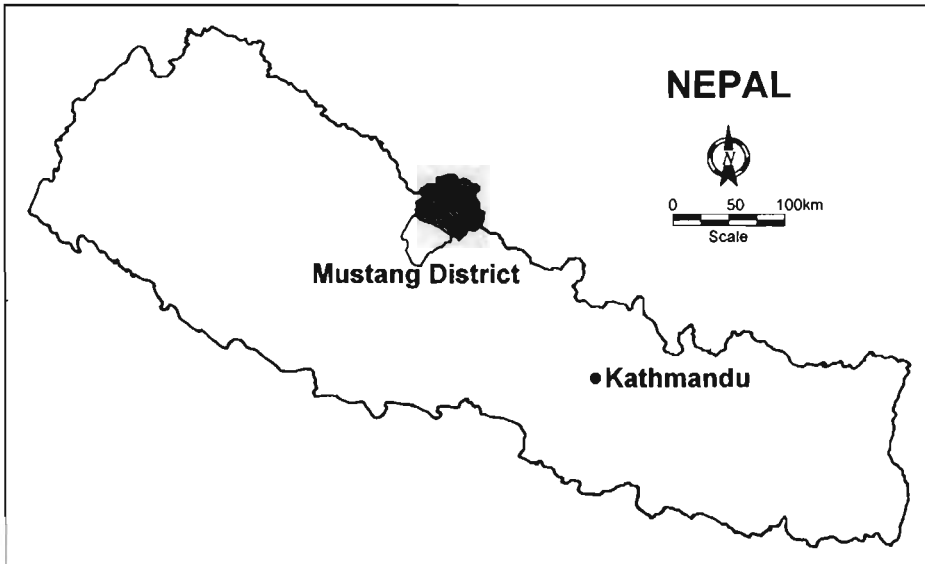


Upper Mustang's Shifting Animal Husbandry Practices

Denis Blamont

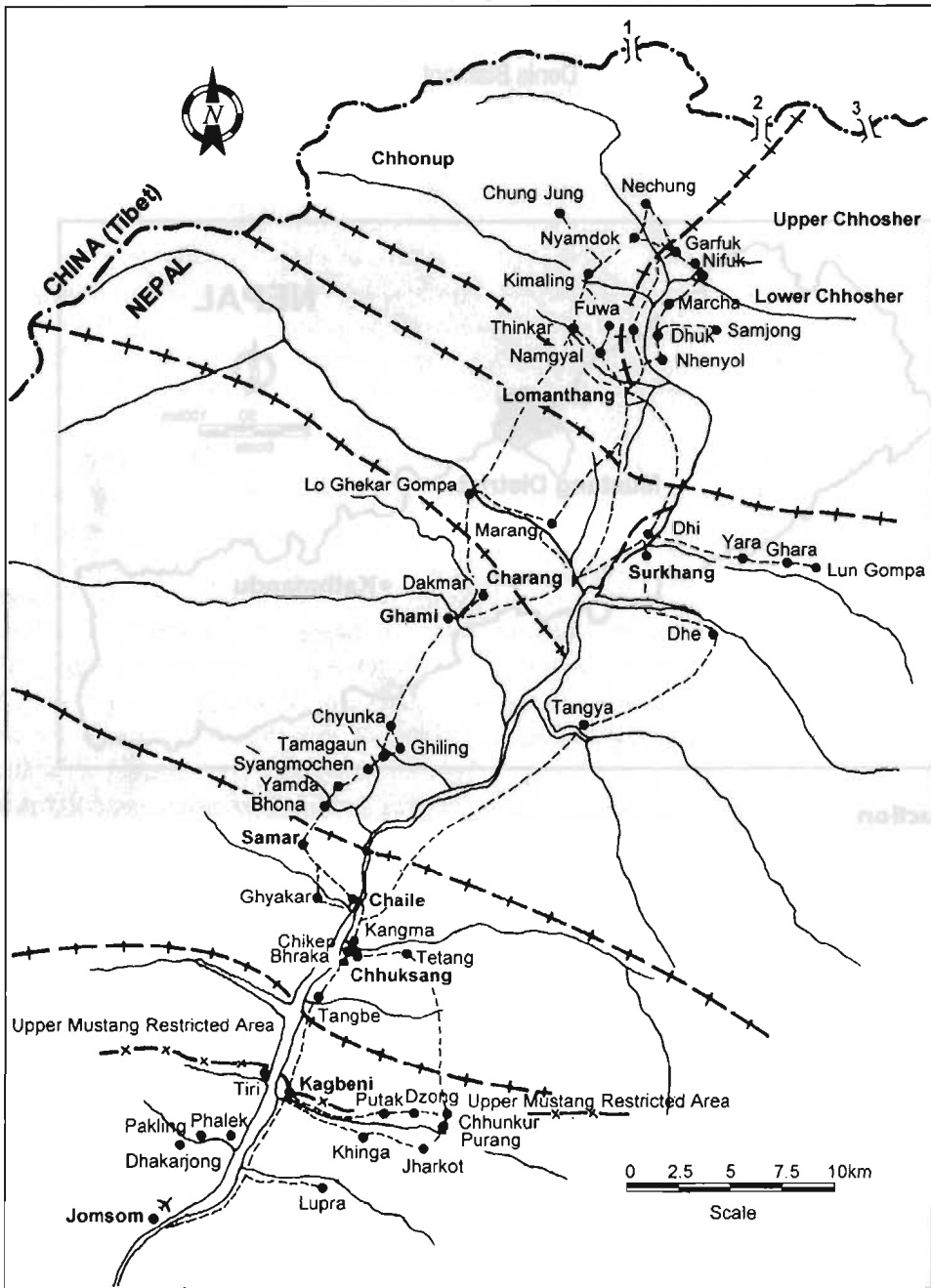


Introduction

The Upper Kali Gandaki Basin, or Upper Mustang¹, situated on the southern face of the Tibetan Plateau, north from the Annapurnas and Dhaulagiri, has one of the highest population densities in Nepal — 1,508 per cultivated square kilometre, whereas the national average is only 455 people per sq. km. How can one explain that striking figure in such a high, arid area where cultivated land accounts for between

3,000 and 3,900 metres and where only one crop is harvested per year above 3,300 metres. Yields are also scanty (about 17 q/ha in a good year)? The paradox becomes even more striking when one realises that, on average, local production of food meets only 55 per cent of subsistence needs and that only eight per cent of the 5,700 inhabitants of Upper Mustang are self sufficient in terms of grain (Thakali 1994).

¹ Following the Nepalese administration, by Upper Mustang we shall improperly mean not only the historical 'kingdom' of Lo, composed nowadays of six VDCs (Chhoshar, Chhonup, Lomanthang, Charang, Surkhang and Ghami), but also the upper part of Baragaon, as is called the area situated just to the south of Lo, Chhuksang VDC, comprising the villages of Samar, Gyakar, Chaile, Tetang and the different hamlets of Chhuksang (see map in fine). The inhabitants of Lo are called *Loba(s)*. A VDC (Village Development Committee) is the smallest administrative unit in Nepal. It is further subdivided into 9 wards.



Upper Mustang Conservation and Development Project Area

Actually, only 0.3 per cent of the district area is cultivated, while five per cent is covered by forest. More than 40 per cent of Mustang's area is rangelands and pastures² at altitudes ranging from 3,000m to higher than 5,000m. Animal husbandry is, by far, the main source of income, above agriculture and trade, and accounts for this population density. In 1992, according to the National Research Council, animal husbandry accounted for 53 per cent of the total annual income of the *Loba(s)* (people from Lo). Man Bahadur Thapa estimates that livestock activities produced an average income of NRs. 10,118.10 per household in 1990, whereas agriculture produced only NRs 7,665.60 — a ratio of 4:3.

Recent evolutions in the animal husbandry systems in Upper Mustang are of great concern. If the *Loba(s)* have long been used to short cycles of prosperity and hardship, it seems that, for the last 30 years at least, they have been experiencing a trend of slowly but surely deteriorating conditions, as well as geological, climatic, social, and political changes.

After having reviewed the spatial distribution and the present situation of animal husbandry in the area, this paper relates them to some of their possible causes, especially the ones concerning changing ecological conditions of pastures and rangelands. Finally, some of the possible consequences of this degradation and changes in animal husbandry practices are discussed. Suggestions as to how to counteract these trends are suggested.

Spatial Distribution of Livestock in Upper Mustang

As in all high elevation communities of the Himalayas, *Loba(s)* rear a wide variety of domestic animals of Tibetan origin. The historical structure of their society not only allowed them to maintain the size of their land tenures and herds over generations, but also allowed one family to indulge in many activities such as rearing different types of domestic animals, cultivating fields, and engaging in long distance trade. These inseparable three activities were key components of their economic life. Generally, the eldest son inherited all his father's fields and animals after marriage. The second son was often sent to a monastery. Subsequent sons were either adopted by an uncle with no son or, more often, married to the older brother's wife. This system of polyandry is found throughout other areas of the Tibetan-speaking world and requires that the younger brother ask the permission from his brother's wife. The third son could also be 'adopted' by a family with only daughters, one or several of whom he would marry. This '*magpa*' could then inherit his father-in-law's possessions. Ordinary families, therefore, were often comprised of two or three brothers and their wife, parents, children, and unmarried sisters; or, one woman, her sister(s), their parents, and her/their husbands.

Although Lo is one of the rare regions where Tibetan culture is still living and active, Lo has been a part of Nepal since its unification at the end of the eighteenth century. The people of Mustang are becoming in-

² 1991 Census. According to ACAP, the three northernmost VDCs (Chhoshher, Chhonup, Lomanthang) cover 21 per cent of the district area and 2.3 per cent of their area is cultivated. In Lomanthang, 1.53 per cent of the land is cultivable, 1.3 per cent is cultivated, 41.5 per cent is under pastures and rangelands, and 5.2 per cent is forested.

creasingly more integrated into Nepalese lifestyle, culture, etc. It is not surprising that Mustang's own customs tend to give way to Nepalese laws. Younger sons are practising polyandry less and less with their elder brothers³, who are, in turn, giving them a small share of paternal lands and herds — unless the younger brother is 'adopted' as a *magpa*. Although the average family size is only four (with basically an equal number of families of one to six members⁴), the variety of domestic animals is still high. Several households often group their animals together by types and graze them by turn. Family size, therefore, cannot explain the wide differences in the spatial distribution, numbers, and different types of domestic animals found in Mustang.

Spatial Distribution of Animals

The Tables in Annex 1 show that the distribution of the different types of reared ani-

mals is not uniform in Lo. First, means computed from data collected by the Veterinary Office in Jomsom, Mustang's District headquarters, from 1993 to 1995 will be analysed. (The utilisation of means is justified by high annual variations, which will be described and analysed later.

Goats (*Capra hirtus*) are by far the most numerous of all domestic animals in Upper Mustang. They are present everywhere, especially throughout eastern Lo (Chhosher and Surkhang VDCs). Goats, like sheep and yaks, are reared for their meat, milk, skin, wool, and packing capacities. They, as well as sheep, are used to carry salt from Tibet⁵ (8).

Horses (actually Tibetan ponies) and bovines (*Bos taurus*) are found throughout Mustang; proportions are greatest in Lomanthang. Bovines are reared mainly for milk whereas horses are used on trade routes like yaks, mules, and donkeys.

³ Only 11 per cent of the families were polyandrous in Lomanthang in 1987, following Navin K. Ray

⁴ 1991 Census. In this paper many statistics will be used. As anyone knows, statistics are generally not available and, when they are, they are neither reliable nor comparable for many reasons. Data might not have been correctly recorded when collected or incorrectly copied during their many transfers; some misunderstanding might have occurred between the interviewer and the interviewee; the interviewer could also see some advantage in over or understating his declarations. They are not comparable because, from one census or one survey to another, either the administrative boundaries or the categories used have been changed, or data have not been collected in comparable conditions. In Nepal, for example, as far as goats or sheep are concerned, there is a very significant difference in their number if they are counted before or after Dasain. Some exceptional event such as a bad winter might have occurred the very year of data collection and comparison with a census from ten years ago, or from another area, might lead to very erroneous conclusions. Let us cite an example: in 1994, the Veterinary Branch Office of Jomsom counted 121 sheep and 616 goats at Samjong, while the staff of ACAP counted respectively 700 and 600.

Having said that, statistical information must be justified. One justification could be that very few people can resist the temptation to use statistics; in fact, papers are not taken seriously unless they use such figures. Likewise, the figures used in this paper fit what the *Loba(s)* declare to any person who asks them about the evolution of animal husbandry in Upper Mustang. Statistics generated by the Jomsom Veterinary Office about Upper Mustang are even less reliable than the author's. These figures should definitely not be taken literally but used as an illustration of the points underlined by the author.

⁵ Local goats and sheep are considered to be stronger than those from Tibet, which are reputed not to be able to perform this task.

Horses also work locally, carrying fuelwood, dung, and harvested crops, which they also thresh.

All the other animals have a specific spatial distribution. Mules and donkeys are found mainly in Lomanthang and in the south. Sheep (*Ovis aries*), very surprisingly, are nearly absent in the whole southern part of Lo (the VDCs of Ghami Charang, Surkhang) and in Chhuksang; but they are very numerous in Lomanthang, Chhonup, and Chhosher, especially in Chung Jung, one of the northern-most villages, where sheep are sometimes even more numerous than goats. Yaks (*Poephagus grunniens* or *Bos grunniens*) are also not found, or seen only in a very limited number in the north-east (Chhosher), the south-west (Ghami and Charang), and in Chhuksang. Dzo(s) (yak-cow crossbreeds) are used mainly for ploughing and transporting goods. Their spatial distribution is limited throughout northern Lo (Chhosher, Chhonup, and Lomanthang). These animals are not produced in Lo⁶ where the crossbreeding of yaks and other bovines is ritually forbidden, as is crossing horses with donkeys to produce mules (although it has successfully been practised in Samar).

All animals are found in the northwestern part of Lo (Chhonup) in standard numbers, though dzo numbers are fewer than in the south. Within Chhonup, there is a definite difference between the village of Chung Jung and the rest of the area. Chung Jung, one of the

northern most villages, has 75 per cent of the yaks and 45 per cent of the sheep of Chhonup VDC. In northeastern Lo (Chhosher), sheep and goats are the primary reared livestock. The yak pastures of the Rajah⁷ of Lo are also located in Chhonup.

Lomanthang's relatively small territory hosts a comparatively high number of yaks, horses, and donkeys, as well as goats. The number of sheep in Lomanthang is less than in other areas. The rajah is the only inhabitant of Lomanthang who owns dzo(s).

Western-central Lo (Charang and Ghami) rears few yaks, a fair amount of dzo(s) and goats, but, most surprisingly, no sheep. Southeastern Lo (Surkhang) has by far the highest number of goats in proportion to the number of households as well as in absolute figures in all Lo. Few yaks and dzo(s) are found in the villages of this district; and there are hardly any sheep. Finally, Chhuksang, the VDC bordering Lo to the south, has no yaks and, once again, no sheep but a high number of goats, mules, donkeys, and dzo(s).

In Lomanthang and Chhonup, yaks are reared for their milk, meat, and portage abilities. The number of females is generally higher (between five to 10 times, depending on the village and the year) than male populations. Sometimes, however, the proportion is reversed when yaks are reared only for meat, as is the case for at least one yak owner in Dhi.

⁶ Some say that the cows (*lulu*) are too small and either would be afraid of the yak or die while giving birth and that the female yaks (*brimo*) would not allow the cow bull to come near them.

⁷ Today, Lo belongs to Nepal and is only part of one district. Lo's 'Rajah', or king, has no real political power any more. However, he is the biggest land, pasture, and herd owner in the area and plays a very important role as a symbol of unity, identity, survival, and security of Lo. He is also a mediator in the majority of conflicts over land or water ownership or grazing rights. As such, he has been able to maintain some of his privileges: his grass and crops are the first to be harvested and *Loba*(s) do this work for him, though today they are paid for this labour.

Table 1: Mean Numbers of Animals Per Farm, 1991-92

	cattle	buffaloes	yak & hyb.	sheep	goats
Nepal (*)	3,5	2		4	7
Mustang District (*)	4		15	35	32
Upper Mustang (1994**)	3		2	6	37

Sources: * National Sample Census of Agriculture. Central Bureau of Statistics. Kathmandu.

** Agricultural Development Office of Mustang District. Jomsom.

The figures in Table 1 show that, if the number of goats stays more or less the same in the whole district, the number of sheep is much higher in the southern part of the district, as are the numbers of yaks and dzo(s). These figures reiterate the point that the absolute number of reared animals in Upper Mustang is quite low, compared with the lower part of the district.

Annual Variations in Herd Size

Wide differences occur in herd size if one analyses this data according to annual figures instead of by means (for example, between 1994 and 1995.) Yet care must be used when handling these figures because the numbers are highly variable. In 1993, for instance, dzo(s) were not counted in Lomanthang.

The number of yaks totalled 1,660, 1,937, and 1,145 in 1993, 1994, and 1995, respectively, creating a variation of 41 per cent between 1994 and 1995. Goat populations were 27,808, 27,935, and 22,340, in these three years, an overall decrease of 20 per cent. Horse populations were 1,431, 1,731, and 1,429 in the same years, decreasing by 17 per cent from 1994 to 1995, after similar increase the previous year. In contrast to these decreases, the number of sheep increased by 35.5 per cent during the same period;

the population rose from 7,529 to 11,679 during the same period. Chhonup's sheep population rose by 88 per cent — the sharpest overall increase in Upper Mustang. Chhoshher, which already had the largest number of sheep rose by 44 per cent, while Lomanthang's sheep population rose by 23 per cent. The dzo population varied widely, dropping by 37 per cent between 1994 and 1995.

Shifts in Relative Importance of Domestic Livestock

It is very difficult to measure exact changes in livestock populations. According to Loba(s), the number of horses has been steadily increasing in recent years, while the number of yaks is decreasing. Although these animals have slightly different uses⁸, horses are tending to replace male yaks more and more both for local use and for trade between Tibet, Lo, and southern areas.

As for sheep and goats, between 1994 and 1995 their respective proportions seem to have risen from 2/3 to 6/5 in northern Lo, indicating a tremendous change in herd composition and husbandry strategies, if this change is permanent and not just a temporary shift — a distinction which is not possible to make at this time.

⁸ Horses bear no wool and cannot be eaten, but they are used for transporting harvests and for threshing, while yaks provide meat, dairy, and wool products, as well as draught power, but they are not used for threshing.

Drastic and Steady Reduction in Yaks and Other Livestock

All *Loba(s)* complain that they cannot rear as many animals as they did in previous decades. Five years ago, for example, three farmers owned yaks in Lomanthang; last year only two *Loba(s)* had yak herds. One of these farmers has just sold all his remaining yaks in Tibet. The Rajah of Lo is also earnestly considering a similar move. The Rajah used to keep more than 800 sheep ten years ago; in 1996 he had only 284 (Sienna Craig, personal communication). (This figure contradicts census and Jomsom Veterinary Office statistics for Upper Mustang, once again revealing the unreliable nature of such figures.) In Dhe (Surkhang), the rearing of yaks has been abandoned by all but one farmer. Fifteen years ago in Samar, Gyakar, and Chaile (Chhuksang), yaks were also quite numerous; none are left. Samjong (Chhosher) keeps only one-third of the livestock it used to rear 20 years ago and has also lost half of its cultivated fields. Considered to have once been one of the richest villages of the area, it is now one of the poorest.

Natural and Human Causes of these Shifts

The causes of all these shifts in livestock numbers are accidental as well as structural. Some causes are not new to Lo, but have been seen throughout Lo's history. Yet the combination of historical patterns and natural, unexpected changes in combination might have long-term, definitive consequences for the ecology — human and otherwise — of Upper Mustang.

Lack of Suitable Slopes

The river beds throughout Lo are very rarely suitable for green meadows and the lower

versants are often too steep to be used as pastures; the rivers have dug very steep ravines throughout Mustang. It is doubtful whether *dzo(s)*, who cannot stand as cold temperatures as yaks and, therefore, need to move to lower elevations in winter, could find sufficient grazing land around Lomanthang. The fact that *dzo(s)* are less hardy than yaks is one of the primary reasons *Loba(s)* give when asked why they do not rear *dzo(s)*. In Samjong, people also correlate the absence of *dzo(s)* with the scarcity of favourable slopes. *Dzo(s)* are mainly bought from Samjong's eastern neighbours, people from Manang District, who barter *dzo(s)* for yaks throughout Lo.

With the exception of Lomanthang, *Loba(s)* rarely mention female crossbreeds (*dzomo*) and their milking capacities⁹. When reared at all, *dzomo* appear smaller in numbers than males. The Rajah of Lo sold his females once he was no longer able to keep their young caves Tsinam Jya of Gyakar tried to cross yaks with *dzo(s)* when he was still rearing yaks, but failed. Dorje of Chung Jung successfully reared two *dzo(s)* after two of his cows 'accidentally' met a yak; all his attempts at planned crossbreeding, however, failed because, "The cows are afraid of the yak."

Unlike *dzo*, goats thrive on steep slopes and, therefore, appear to be more adapted to the Upper Mustang topography. Yet these grazing slopes are not always present near villages. Goat and sheep shepherding patterns also impact population fluctuations. Goats are taken back to villages every evening; after a day of grazing, sheep stay on rangelands at night. The difference between the number of sheep and goats, and, perhaps, the sharp increase in the number of sheep and decrease in the number of goats in Chhosher between 1994 and

⁹ *Loba(s)* say the fat content of *dzo* milk is lower than the female yak's, therefore yielding unsatisfactory butter.

1995, might be attributed in part to the distance from villages to winter pastures (when flocks must cross one crest line to reach rangelands). If rangelands are affected by a scarcity of grasses in summer or excess snow in winter, sheep are more autonomous and can be driven further in search of rich and/or snow-free grazing areas. Poor slope quality is, most importantly, of little concern for sheep.

Inadequate grazing areas due to poor slopes can also bear consequences on agricultural cycles. In Dhe, for example, dzo(s) are taken to higher pastures immediately after wheat is sown, as is the custom in the rest of Lo. Yet in Dhe, due to the lack of pasture land, the dzo(s) cannot be taken down later to sow mustard; this crop is, therefore, not cultivated.

Floods

The rarity of river bed meadows is further increased by floods. In 1984 and 1987, two floods of the Kali Gandaki River were caused by earthquakes which had provoked landslides and caused glacial lakes to burst. At least 14 people and many animals were killed in Chhosher during these floods. Houses, watermills, bridges, half the fields, and all the low pastures (used from mid-October to mid-April) were washed away. The destruction of winter pasture by this flood forced the people of Chhosher to sell their dzo(s). As a result of this flood, the number of dzo(s) in the VDC was reduced from 200 to 12 in 1993 and four by 1995.

Aridity, Snow, and Low Temperatures

As one can see in Figures 1, 2, 5 and 6 (Source: Dept. of Irrigation, Hydrology and Meteorology and Ministry of Food Agriculture and Irrigation, Kathmandu) in Annex

4, Upper Mustang's climate is arid and cold. Mean annual rainfall was 161 mm between 1974 and 1990 (Figure 1) and 191 mm in Ghami between 1973 and 1984 (Figure 2). Mean temperatures do not exceed 28° Celsius in July and are negative three months per year. Yet mean monthly maximum temperatures are rarely below zero, indicating that, even in winter, temperatures generally become positive during the day in Lomanthang (3,700m). On average, however, only seven months of the year can be considered dry (in spring and in autumn, when $R < 2f2$ [see Figure 1]). In winter, snowfall covers high pastures, preventing access to animals other than yaks. In Ghami, where temperatures have not been recorded, it seems that snowfalls are more abundant than in Lomanthang. This could be one of the reasons why sheep are absent from southeastern Lo. On the other hand, shepherds of villages around the Kali Gandaki in Chhosher say that snow cover generally does not prevent their sheep from grazing, even though winter temperatures can be colder there than in Samjong, east of Lomanthang.

Forests are scarce in Lo, and cultivation is impossible without irrigation. One crop is cultivated per year in Upper Mustang, with the exception of Dhi, Tangye, and most of Chhuksang, where two crops are grown yearly. According to Shrestha, Grela, and Joshi, lower forests are populated by *Juniperus squamata*, *Cupressus forulosa*, *Betula spp*, *Betula utilis*, *Pinus roxburghii*, *Pinus wallichiana*, *Populus ciliata*, and *Salix spp* between 3,300 and 3,500 metres. The 'forest' in Samar has a ground cover hardly exceeding 60 per cent and is mainly populated by *Juniperus* and *Cupressus*, with *Betula utilis* on the north-facing slopes. Higher up towards Ghami, forest density decreases to 40 per cent; it is only 20 per cent in Charang. On rangelands and pas-

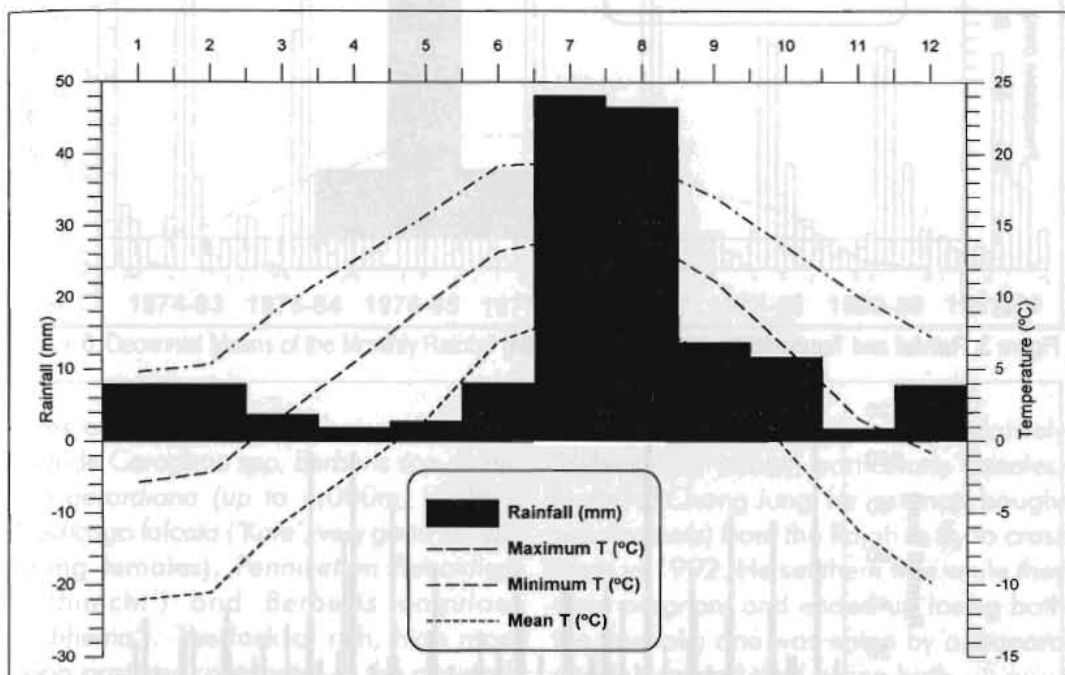


Figure 1: Mean Rainfall and Temperature at Lomanthang from 1974 to 1990

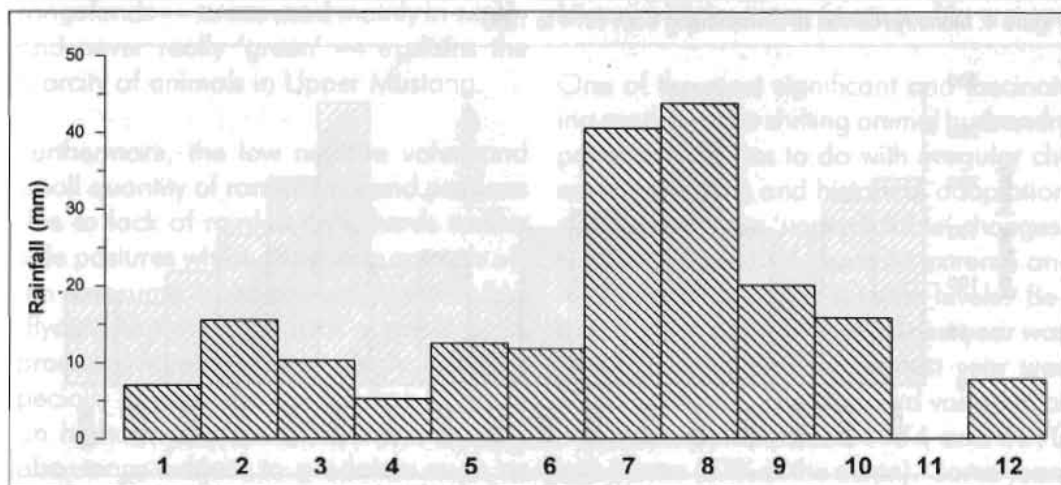


Figure 2: Mean Rainfall at Ghami between 1973 to 1984

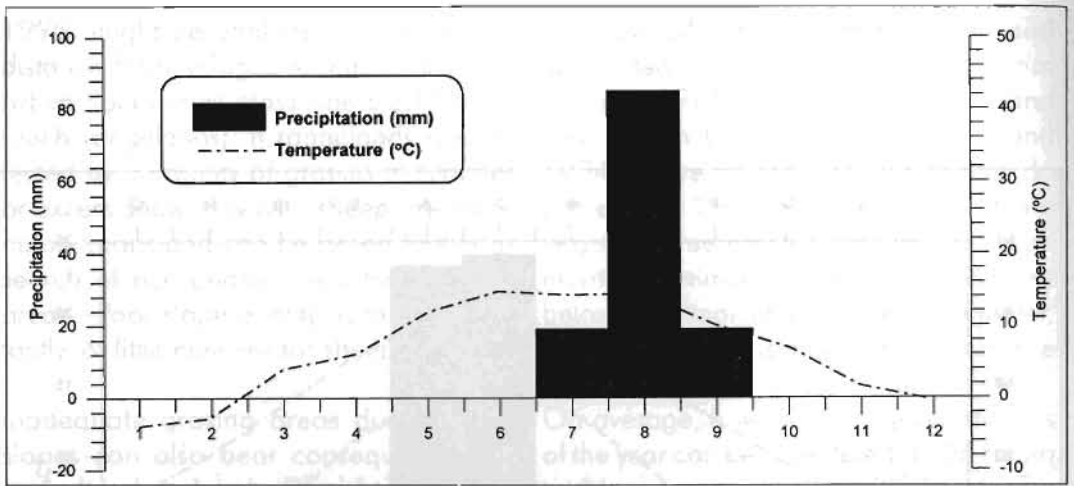


Figure 3: Rainfall and Temperature at Lomanthang (1984)

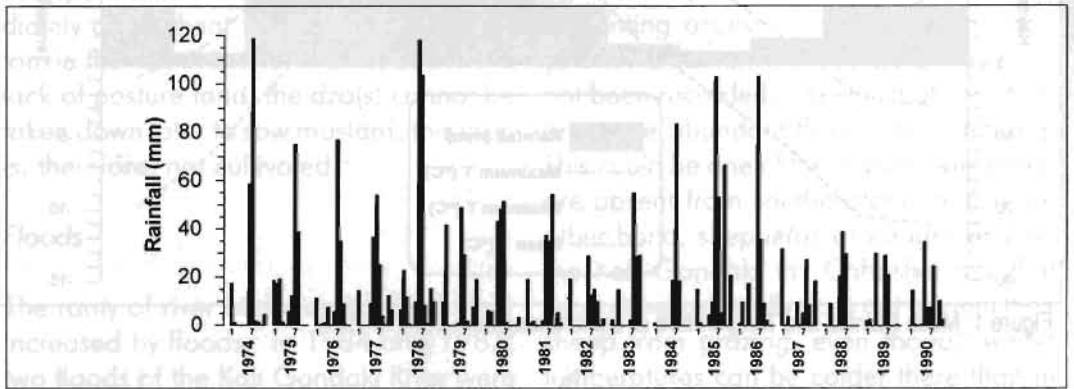


Figure 4: Monthly Rainfall at Lomanthang from 1974 to 1990

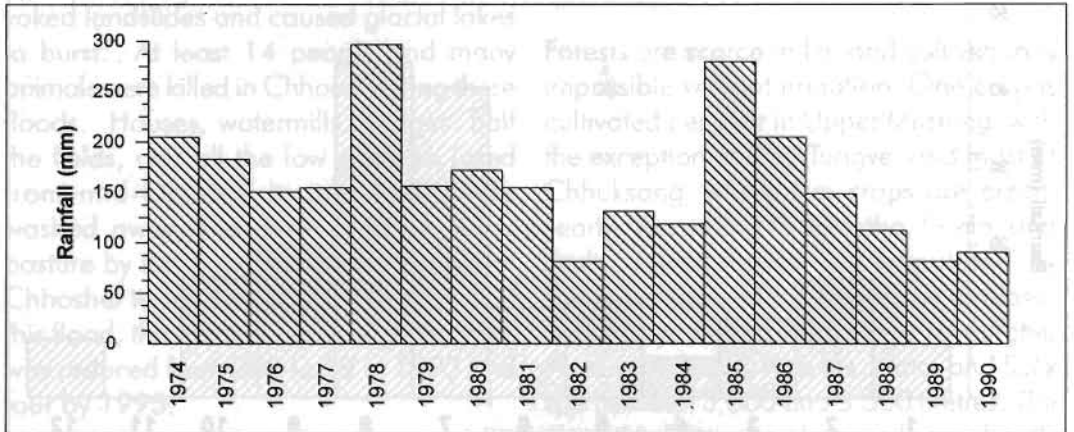


Figure 5: Annual Rainfall at Lomanthang from 1974 to 1990

As one can see in Figures 1, 2, 5 and 6 (Source: Dept. of Irrigation, Hydrology and Meteorology and Ministry of Food, Agriculture and Irrigation, Kathmandu) in Annex

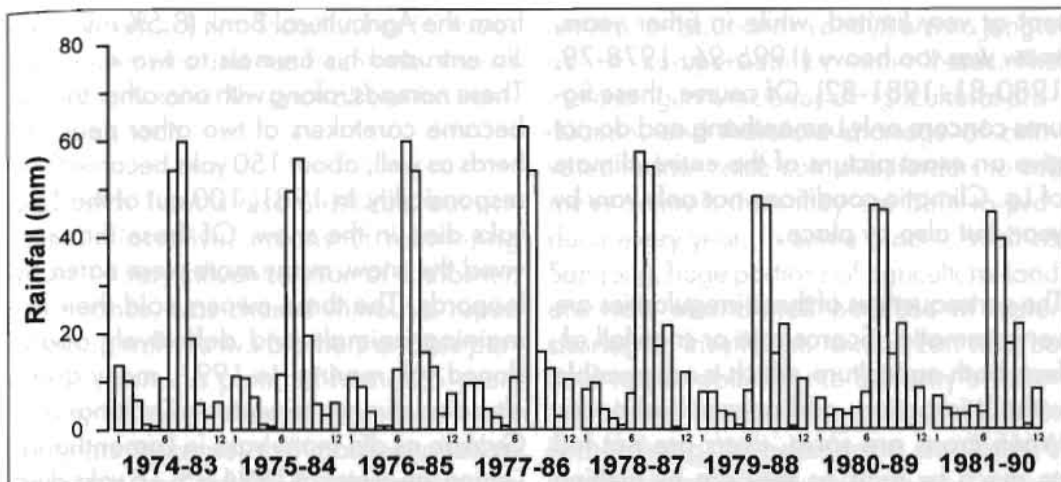


Figure 6: Decennial Means of the Monthly Rainfall at Lomanthang (1974-1990)

tures of northern Lo, bushes and grasses include *Caragana spp*, *Berberis spp*, *Ephedra gerardiana* (up to 4,000m, 'Chhe'); *Medicago falcata* ('Kote', very good for lactating females), *Pennisetum flaccidum* ('Dhimchi') and *Berberis angulosa* ('Chhema'). The lack of rich, high monsoon pastures contributes to the generally low numbers of livestock in Lo. Yet the low density and feeding capacity of these rangelands — areas used mainly in winter and never really 'green' — explains the scarcity of animals in Upper Mustang.

Furthermore, the low nutritive value and small quantity of rangelands and pastures due to lack of rainfall drive herds to less safe pastures where the young animals often consume a poisonous plant called 'Byoja'. In winter, the lack of good grass promotes weakness and weight loss, especially in yaks who are left free to graze on high rangelands. These animals are also more subject to predators such as snow leopards (*Panthera uncia* or 'Sanje') or wolves (*Canis lupus*; 'sau'). Villagers routinely lose between one and five head of livestock per winter. One can easily assume, also, that the presence of these wolves or wild leopards is definitely not en-

couraging to the Loba(s) to rear relatively 'defenseless' dzo(s), particularly females. Dorje, of Chung Jung, for instance, bought two dzomo(s) from the Rajah to try to cross them in 1992. He set them free while they were pregnant and ended up losing both the animals; one was eaten by a leopard and the second died giving birth.

Highly Irregular Rain and Snowfalls and Historical Adaptation Strategies

One of the most significant and fascinating aspects of the shifting animal husbandry patterns in Lo has to do with irregular climatic variations and historical adaptation strategies to these 'unpredictable' changes. Figures 3 through 6 illustrate extreme annual variability in precipitation levels. Between 1974 and 1990, the driest year was 1982 (85mm) and the wettest year was 1978 (296mm). The standard variation of annual rainfall between 1974 and 1990 was 60mm (37% of the mean). Some years are extremely dry. In 1982, 1988, and 1989, only four months were considered 'not dry' ($R > 2t$; see Figure 3). In 1982, 1989, and 1990, monsoon rainfall was scanty or came too late. In some years, snowfall in winter was virtually non-exis-

tent or very limited, while in other years, snow was too heavy (1995-96; 1978-79, 1980-81, 1981-82). Of course, these figures concern only Lomanthang and do not give an exact picture of the entire climate of Lo. Climatic conditions not only vary by year, but also by place.

The consequences of these irregularities are very dramatic. Scarce rain or snowfall affects both agriculture, which is not possible without irrigation, and animal husbandry. When crops are sown, rivers are not fed as much by rains as they are by melting snow; a dry winter will compromise summer cultivation. Snow is also very important for pastures and rangelands since summer melt provides water for these areas. During years of insufficient rain or snowfall, many animals die or are sold in anticipation of fodder shortages. The sharp decrease in the number of goats between 1994 and 1995 resulted from rain shortages in 1994. For example, Pemba of Samjong lost 100 out of 120 goats and Ningma of Ghara lost 50 out of 54 of his newly born goats. Angyel from Thinkar saved only nine young goats of his 55 females; only four survived. He has been obliged to sell half his adult animals to meet his expenses.

Excessive winter snowfall also has profound effects on herd size. Tsinam Jia of Gyakar owned about 100 yaks which he bought from the *Khampa(s)*¹¹ when they left Mustang. He made this purchase with a loan

from the Agricultural Bank (8.5% interest). Jia entrusted his animals to two nomads. These nomads, along with one other friend, became caretakers of two other peoples' herds as well; about 150 yaks became their responsibility. In 1981, 100 out of the 150 yaks died in the snow. Of those that survived the snow, many more were eaten by leopards. The three owners sold their remaining animals and definitively abandoned yak rearing. In 1991, many goats also died during the winter in Drakmar and Gyakar, as did many yaks in Lomanthang. During the winter of 1994-95, 15 yaks died in Dhe, at least 20 in Drakmar, and many more in Lomanthang.

The combination of poor monsoon rains and a snowy winter in 1994-95 jointly contributed to the current demise of yak rearing and the decline in livestock populations throughout Lo. Yet such climatic fluctuations and the subsequent death of animals, are frequent occurrences in Lo's history. One can even find mention of them in ancient texts (see below). Yearly fluctuations in herd size are not surprising. Animal husbandry in Mustang, as in other parts of Nepal or different mountainous areas of the world, is a precarious endeavour. *Loba(s)* are used to the risks they must take and have generally been able to overcome them by anticipated sales, personal savings, or by borrowing money to restock herds when conditions improve. Ten years ago, Ningma of Ghara borrowed Rs 17,000 (at the rate of 2.5% per month) with which he bought 60

¹⁰ One has to be careful handling the available climatic data. The climatic stations at Lomanthang and Ghami opened in 1974 and 1973, respectively. Twenty-six years is too short a period to be able to draw reliable, long-term conclusions. Furthermore, data for the years after 1990 were either not available or too incomplete to use. These stations are also situated in low areas; surrounding crest lines receive more rain and snowfall than villages or fields. The data collected at Lomanthang and Ghami greatly underestimate actual rainfall.

¹¹ One can consider a month as dry when the amount R of rainfall (expressed in mm) is lower than the double of the mean temperature (t) expressed in °Celsius. This clearly appears on figures where scales have been designed so $R=2t$.

young goats in Tibet. Today he has 50 males and 56 females and has been able, thanks to his yearly sales, to repay all but the interest on his loan.

Trade with Tibet is also a difficult, but potentially lucrative, means of recovering losses. A very influential man of Chhoshar, for instance, was chased without a rupee — along with his two brothers and his parents — from his paternal home 25 years ago by his newly married elder brother. In the years to come, this man engaged in tenacious and industrious trade between Tibet, Lo, and the mid-hills. (This trade included Tibetan salt for Nepali grains, goats and yaks from Tibet, edible oil, kerosene, lighters, watches, cloth, etc) The ousted brother and his family were able to buy fields and animals with the profits from this trade and are now one of the wealthiest families in the area — much richer than their elder brother who, incidentally, lost his house twice and nearly all his fields and animals during the two Chhoshar floods.

Constant Decrease in Average Rainfall

Although stories like the one above are not anomalies, it is also common for people to fail to recover their losses. The main reason for these failures and also for the generally diminishing number of animals reared in Lo is not only the recent succession of climatically unfavourable years, but also the steady decrease of monsoon rain during the last 25 to 35 years, according to local residents. The shifting means shown in Figure 6 do illustrate a definite declining trend, although data are not sufficient either in number or in quality to make a definitive statement. Mean rainfalls have dropped from 169mm in 1974-83 to 142mm in 1981-1990 (negative 16%). This indicates that it is mainly monsoon rainfall which fails, since snowfall in winter

is still quite abundant. Loba(s) are no longer able to compensate for winter losses. The increasing insufficiency of agricultural production, and therefore shortage of cultivated fodder, also compels herders to sell more animals than they are able to produce every year. In some places, such as Samjong, huge portions of agricultural land are now abandoned because of water shortages. Insufficient rainfall can also be held responsible for the difficulty in rearing sheep in southern Lo and even in Lomanthang. In addition to the Rajah's sheep losses (mentioned above), Angel Bista now keeps only 80 of the 500 sheep and goats he owned four years ago.

The lack of grazing areas, especially in winter, further contributes to declining livestock numbers. Sheep, for example, can no longer be kept in Dhe (3,835m). Even goats cannot be kept in the village but must be sent down to the neighbouring village of Tangye (3,280m) (Snellgrove 1992). Tangye itself has been particularly affected by drought. After the death of 15 yaks in the winter of 1994-95, only one herd of yaks remains out of the three which used to graze the high pastures of Dhe. Ten years ago, Suram Siri of Dhe was rearing up to 30 yaks; he has none today. After losing many head of goats during the dry monsoon of 1993, Suram kept around 90 goats in a common flock with two other people who each had 60 animals. These villagers shepherded the animals in turn (1 day for 5 head). The lack of rain is so extreme in Dhe that, two years ago, the entire village was thinking about abandoning their settlement. The last two relatively abundant monsoons, and the impossibility of finding new sites on which to settle, caused them to change their minds.

Contrary to other sources, according to Thapa (1991), if the rangelands and pas-

tures are overgrazed, it is not because Loba(s) have increased the number of animals they rear, but because rangelands have been deteriorating these 25-35 years due to adverse climatic conditions.

Increasing Winter Migration

Another factor contributing to shifts in livestock numbers, especially after losses are incurred, is the deterioration of trade with Tibet. The introduction of Indian salt in the lower areas of Nepal has had a drastic impact on the once lucrative trans-Himalayan trade of Tibetan salt¹² for Himalayan grains. Some Loba(s) and other people in neighbouring regions continue this trade on a small scale. The taste of Tibetan salt is still preferred to Indian salt. However, merchants have had to diversify their items and places of trade. Very few people can earn enough income from local trade with Tibet to survive. Some Loba(s) now travel as far as Lhasa, Bangkok, Singapore, and Nagaland to trade, backed by big investors.

These international traders and businessmen are the exception rather than the norm. Yet the diminishing local resources have driven more and more Loba(s) (particularly men) to leave Lo during the winter. Some go to India to sell 'handmade' Tibetan sweaters. Actually, these sweaters are purchased wholesale in Ludhiana, Punjab (India), and then resold. Each village has its privileged trading area (Varanasi or Lucknow for Lomanthang or

Charang-Marang, Assam for Ghami or Baragoon.). Others go to Pokhara where they barter wild garlic (*'jim-bu; Allium fasciculatum*) harvested during monsoon on the rangelands and high pastures of eastern Lo or in Tibet, receiving rice as compensation. Then, these Loba(s) travel from one village to another in the mid-hills or Terai, bartering rice for vegetables or finger-millet with which they prepare and sell alcohol. During these journeys, Loba(s) also look for antiques and precious stones which they can sell for a high profit in Pokhara or Kathmandu.

During the winter of 1992-93, out of the 170 houses in Lomanthang, 41 homes were totally deserted¹³. Nearly two-thirds of the population of the 109 households investigated by ACAP had left Lomanthang. One-fourth had gone trading between Tibet and the Nepalese lowlands, while one-tenth were in India. These statistics indicate a trend in which fewer and fewer people stay in villages to take care of animals during the winter. Thus, the cycle of keeping less domestic animals and increasing seasonal migrations continues. In some villages of Lo, particularly Chung Jung, Nyamdok, and Samjong, people migrate less because of language barriers. Most of these villagers are not fluent in Hindi or even Nepali. They prefer to stay in Lo and are more available in winter to look after animals. This unfurls another aspect of differences in the livestock numbers discussed earlier. The comparatively higher number of sheep and goats encountered in these

¹² It seems, following the appearance of the vegetation, the economy and other factors I have observed over the last four years, that eastern Lo receives even less rainfall than the west.

¹³ Annapurna Conservation Area Project (ACAP) is a branch of the King Mahendra Trust for Nature Conservation, a Nepalese NGO which has been entrusted with the supervision of tourism and development around the Annapurna region. Upper Mustang was opened for tourism on a restricted basis in limited numbers in November 1992. The ACAP office in charge of Upper Mustang is the Upper Mustang Conservation and Development Project (UMCDP) which has been operating in Lomanthang since November 1993.

villages is due, in part, to the presence of good shepherds throughout the winter.

Lack of Competent, Reliable Shepherds

The shepherding situation mentioned above is, however, not the norm. Reliable shepherds are becoming harder and harder to find. Indeed, harsh winters make the lives of these shepherds very hard. In Samjong, for example, the two flocks of sheep have to stay on crest lines surrounding the village at altitudes higher than 4,500m, from December to April, because snow blown down by winds accumulates in valley bottoms. Sheep flocks come down near villages in early May and then go up again to high pastures in the middle of June, this time to escape high temperatures. From mid-October to mid-December, sheep graze in valley bottoms at around 3,900m. One of the shepherds of Chhosher has to travel as far as Ghami, a one-day walk, the entire winter.

Nowadays, few people choose to live the life of a shepherd. Winter trade and migration are also more lucrative than the compensation — often in kind — given for shepherding. Although the constant insufficient monsoon rainfall or the occasional excess of snow in winter affect livestock numbers, the main reason why so few sheep are raised in Charang, Surkhang, or Ghami is lack of good shepherds. Similarly, this lack of qualified manpower is why some farmers in Dhi are not rearing yaks for milk. Villagers are not willing to stay at high altitudes to milk female

yaks every day. As such, people prefer to rear goats or horses which can be kept in the village every night during winter¹⁴. Goats and cattle herds can be looked after by young children, members of a community to whom it would be unthinkable to entrust herds staying over night in high pastures. Some of the 'one-day shepherds' are no more than eight or nine year olds, though they generally begin work at twelve. In the case of goats and horses, community members form common herds and their children take turns to miss school and watch these animals. The length of these turns are in proportion to the number of animals their parents possess. In Kimaling (Chhonup), for example, five goats equal one day's shepherding responsibility; and in Garfuk (Chhosher), the ratio is ten to one (Craig 1996). These practices allow elders to devote themselves to other activities such as trade or to leave Lo for longer periods in search of seasonal employment. Still, in Lomanthang, a majority (51% in 1990) (Thapa 1991) entrust their animals to 'professional' shepherds.

Although keeping less animals limits the amount of profit earned from animal husbandry, having less animals means that losses incurred from predator attacks are less severe and less common. It is possible to keep only a few goats, cattle, or only one horse, while it is difficult to have only a few sheep or yaks. These circumstances further contribute to the high number of cattle (2-4 per household). Dairy requirements are often met by rearing cows.

¹⁴ It seems the tendency to restrict the number and change type of reared animals and keep them nearer farms is becoming a common occurrence in many Nepalese villages, even ones with large pastures and forest areas. Instead of driving animals to the forest during the day and grazing them over a large area, people prefer to reduce their numbers and fodder from neighbouring forests. Since villagers do not have the time to diversify the places where they harvest fodder, however they plunder the same place until resources are depleted. Even in areas where the total production of biomass is higher than human consumption levels, deforestation is still a reality (Wairt 1983).

Exceptions do exist. The villages of Chung Jung and Phua (Chhonup) and of Niphu and Seikang (Chhosher) do rear more sheep than goats. In Chung Jung (29 households) as many as 742 sheep and as few as 22 goats were recorded in 1991¹⁵ by the Veterinary Office in Jomsom. In Phua (25 households), 415 sheep and 323 goats were counted. In Niphu (19 households), 1,782 sheep and 963 goats were counted, while 1,013 sheep and 1,001 goats are kept in Seikang (15 households). In Chhosher and Chhonup, the VDCs in which these villages are located, the highest number of sheep per household in Niphu was found to be 94; 67 being the highest number of goats in Seikang¹⁶.

Chung Jung (3,930m) is by far the best example of the importance of 'tradition' and indigenous pastoral knowledge as far as animal husbandry is concerned. Its inhabitants are *nagagpa(s)*, former pastoral nomads of Lo who used to take their herds from Lo to Tibet and back again, but settled in higher Lo about 45 to 50 years ago. After that time, they had to flee from Tibet and were given land by the father of the current Lo Raja. The fact that Chung Jung rears more yak and sheep than do other villages indicates that they not only manage sufficient pasture land, but that they are also competent and devoted shepherds, as these animals require herders to be competent and willing to endure difficult conditions for the sake of their livestock.

The neighboring village of Kimaling, in comparison, is inhabited by 'true *Loba(s)*'¹⁷. As Kimaling belongs to the same VDC as

Chung Jung, the villagers of both areas have access to the same pastures. Yet the villagers of Kimaling only rear an average of three yaks, eight sheep, 13 goats, and three cattle per household compared to 20, 26, one, and one head reared in Chung Jung, respectively. Villagers of Kimaling argue that since goats have recently been more appreciated than sheep for their meat, skin, and wool, raising goats has become more lucrative than rearing sheep. But one must not deny the question of willing or non-willing shepherds.

The few families of *drokpa(s)* ('*brogpa*'), Tibetan pastoral nomads who claim to be from this side of the border, still raise animals as their primary means of livelihood and are skilled shepherds. They live in tents and rear numerous yaks and goats, mainly on the high, western versants of Lo, in Ghami, Lomanthang, and Chhonup. Some of them are the Rajah's shepherds or work for other wealthy *Loba(s)*. Although they do not go any more to Tibet and stay all year round in the same area, they still live under their tents and rear numerous yaks and goats, mainly on the western high versants of Lo, in Ghami, Lomanthang and Chhonup.

Increased Depletion of Fuelwood and Dung Collection

Another reason for shifting pasture use and livestock numbers in Lo is a result of the decrease in fuelwood and the collection of dung for fuel. According to an ACAP report from 1993-94, one family in Lomanthang was consuming between 1.04 and 1.24kg of fuel per person per day

¹⁵ Detailed data were not available for the year 1995.

¹⁶ In contrast, Surkhang VDC supports no sheep, though there are 86 goats per household in Tangye, 73 in Dhe and Yara, and 68 in Ghara.

¹⁷ Following local legends, the *Loba(s)*, former nomads, settled as early as the seventh century AD (Ray 1987).

during the winter — an average of 3.92kg per family/day. Three houses randomly selected in the villages of Thinkar, Dhi, Charang, Ghiling, and Samar were burning an average of 2.9kg of dried dung per head/day. A large quantity of these fuel sources are collected from area rangelands, thus depriving them of a much-needed source of fertilizer and compost material.

Harvesting bushes for fuel also negatively affects the quality of rangelands Caragana, a grass that grows long roots, helps prevent soil erosion, while bushes themselves protect soil surfaces from desiccating winds. ACAP estimated that between 300 and 600ha lose their vegetation cover every year from villagers collecting firewood.

One historical source of this depletion of rangeland and forest resources is said to tie back to the *Khampa* occupation of Mustang. These Tibetan refugees settled down in Upper Mustang from 1959 to 1974 in order to fight the Chinese annexation of Tibet. The *Khampa*(s) might be responsible for impoverishing rangelands and pastures and destroying many forests, thereby adding to the fuel shortages felt today; yet they do not seem to have had a long lasting influence on the number of domestic animals kept in Lo. When the *Khampa*(s) arrived, they stole many animals from villagers and occupied a larger portion of summer pastures. (Yet, according to the Raja and other sources, the *Khampa*(s) did not forbid locals' access to their own pastures; rather, they limited access in the vicinity of their camps and areas they used to graze their animals.)

Ghami, a settlement that had no more than 100 houses at the time of the *Khampa*(s), claimed to have lost 600 yaks and many hundreds of other animals (Bista 1976). The people of Dhe also complain that many of their yaks died and that the 500 to 600 *Khampa*(s) who settled near their forest destroyed it while building their homes¹⁸. But when the *Khampa*(s) left Mustang, they also left their animals behind¹⁹, selling them at ridiculously low prices to the *Loba*(s), to whom the Agricultural Development Bank provided loans at low rates of interest (8.5% per year instead of 2.5-3% per month).

The Tourist Trade

As Craig rightly points out, *Loba*(s) want to harvest more benefits from newly authorised tourism. Currently, 1,000 visitors per year are allowed to visit Lo, but they must be accompanied by a government liaison officer, porters, guides, cooks, etc. The fee for a visit to this 'restricted area' is \$70 per day for a minimum of 10 days. Riding a horse on these beautiful plateaus is a pleasure which tourists often enjoy. Renting horses as pack or riding animals to tourists is one of the few ways *Loba*(s) are 'allowed' to benefit from tourism. Horses are advised as pack animals, since they are (wrongly) considered to consume less of the already rare food grains than porters. The increase in the number of horses and the decrease in the number of yaks are thus further explained by tourism.

The Closure of the Tibetan Border

The worst event in the recent history of Lo animal husbandry has been the signing of

¹⁸ In Dhe it is also said that when the *Khampa*(s) left, the people of Charang and Chhosher, particularly, following instructions from the Rajah, came and took logs to build their own schools and monasteries.

¹⁹ According to one old *Khampa*, they left more than 600 yaks and 1,000 horses in Lo. In Ghami alone, they sold or abandoned between 400 to 600 goats, 70 *dzo*(s), and 30 horses.

an agreement in April 1983 between Nepal and China forbidding traditional transhumance patterns. According to Basnyat and Netra, between 1987 and 1988, the year these new regulations took full effect, and 1988-89, the number of reared animals in Lo decreased by 19 and 24 percent, respectively. Tchokya of Chung Jung is now only able to keep 20 out of the 100 yaks and 30 out of the 400 sheep and goats he reared before 1988. It is also significant that he had many more sheep than goats prior to this agreement, whereas he now keeps them in more or less equal proportions. This closure affects both *Loba(s)* and Tibetans. While the *Loba(s)* used to travel to Tibet in winter, the Tibetans once took their yaks south to Lo's high pastures during the summer.

Although summer pastures have suffered from this closure, it is the lack of winter pastures that has particularly impacted livestock numbers in Lo, especially the number of yaks. The only alternative for yak herders is to bring their animals south in the winter. ACAP counted that 20 per cent of the *Loba(s)* in Lomanthang, Chhosher, and Chhonup take their yaks to Chhuksang and as far as Jomsom (2,600m). Yet winter pastures in these areas are not in excess; the *Loba(s)* are not always welcome. As a result, there are almost no yaks left in Chhosher.

Although Pema Huangdi from Lomanthang lost 70 yaks during the winter of 1991, he rebuilt his herd. During the winter of 1994-95, however, he again lost 228 of his 280 yaks. Pema had sent his yak to Dolpa District in the hope that there would be less snow there than in Lo. The Rajah of Lo lost 70 out of his 160 yaks the same winter. Pema Huangdi sold his 52 remaining yaks last year; the Rajah considered a similar move. The consequences of this cata-

strophic treaty and the decrease in the number of yaks and their replacement by horses are having a drastic impact on the lives of the *Loba(s)*.

Horses can travel to lower areas during winter (Craig 1996) and, thus, escape the harsh conditions of this season and the shortage of grains and fodder. Some of them stop at Jomsom but a number of Lo's horses travel to Pokhara in the winter, bringing down goods such as *jim-bu* and portering necessary oil, kerosene, grains, dresses, etc and back to Lo in the Spring. This ability to be used as pack animals all the way from Lo to Pokhara and back gives horses a definite superiority over yaks who cannot travel lower than Thak *Khola* (south of Jomsom). At this point, they must be replaced by other people's mules.

Conclusion and Possible Solutions

The conjunction of geological, climatic, social, and political events has induced long lasting changes in the animal husbandry practices and overall economy of Upper Mustang. Local alternative sources of income, such as trade and agriculture, are also changing. The long-term consequences of these overall shifts could be a waste of local resources. Replacing the rearing of yaks or sheep with horses, mules, and goats will lead to an under utilisation of the high pastures and rangelands, contributing to probable overgrazing in the vicinity of villages, even if horses which are not used for transporting goods or riding are grazed on high pastures during monsoons. These changes will also lower the resilience of indigenous management systems which could, historically, always overcome a bad year in one sector thanks to the variety of activities in which locals engaged. By using all available rangelands, *Loba(s)* guarded against natural and man-

made hardships. With the decrease in the variety and numbers of animals kept, *Loba(s)* face greater risks and potential losses in livelihood.

At the same time, the growing number of horses in Upper Mustang (1,574 in 1995) introduces competition for food grains between men and animals. When at work, a horse can consume up to four kg of cereals daily. At rest, horses still need one kg of sweet peas or grains each day from October to March. Yet only 55 per cent of local food grain needs are met by local agricultural production. The remaining 45 per cent must be imported. Import levels, particularly of wheat and barley, must now increase to feed horses, so much so that the difference in prices between rice and these two cereals has significantly dropped. In Samjong, for example, the price of grain has risen by three times in the last four years, since the opening of Lo to tourism. Currently, rice, barley, and wheat are sold for basically equal prices.

These changes bring a greater dependence on lower areas in terms of both grains and pasture land. One must ask the question: How long will the *Loba(s)* be allowed to graze their horses for free in Jomsom and Pokhara?

In order to counteract these trends, some urgent measures could be investigated and taken. First, and most difficult, Nepal should engage in negotiations with Chinese authorities regarding mutual access to pasture land.

Second, facilities should be constructed and fodder raised so yaks and sheep can be fed and sheltered during winter.

Third, high pastures and rangelands should be improved by reactivating traditional rangeland management and introducing

productive grasses and shrubs. One should also keep in mind, however, that this area is remote (one week's walk from the nearest road in Nepal). When introducing improved varieties of grasses, the possibilities of making the best use of local manure should be investigated. In this regard, replacing the use of dung and bushes for fuel with solar energy devices would allow manure to stay on pastures and in fields. Pastoral shepherds could also be equipped with such devices to help improve their living conditions.

Fourth, fodder crops should be cultivated inside irrigated areas between fields. They could also be introduced into the crop rotation cycles and/or planted on fields abandoned due to insufficient yields or irrigation. Since yields and production of staple crops are already low, this would require a shift towards an even more decidedly pastoral economy. This shift has already occurred in a certain way, however, since horses are fed with imported grains.

Actually, Lo boasts a long tradition of harvesting grass within cultivated areas for winter fodder. Fields are often quite distant from one another and a large area is thus left for grass to grow within irrigated areas. Two months before harvesting food grains, cutting this grass is strictly forbidden, even to field owners. Grass is cut just before the harvest. Since the water a farmer puts in his field is also supposed to irrigate most of the grass growing around his field's terrace wall, he is entitled to three-quarters of this grass; the farmer whose field lies below the wall receives the remaining one-fourth.

Fifth, the introduction of mobile veterinary units should be implemented to help improve animal health. Currently, villagers must travel to Jomsom if they want to re-

ceive decent veterinary care from the government clinic.

Finally, low interest rates and insurance systems should be devised in order to allow Loba(s) to rebuild their herds after losses from climate or predators. Such schemes often fail because it is very difficult to regulate misuses or false claims. In order to guard against such problems, credit organizations should be run on a community basis in order to allow for local control of these resources.

Tourism has been introduced in Upper Mustang, in part, to counterbalance the decrease in agropastoral and trade production levels. Tourism offers some very limited employment opportunities to Loba(s), but it cannot be considered as the only solution or even the main source of local income generation. Unless Loba(s) can produce enough on their fields and pastures or with their trade to support themselves, the few tourists allowed to visit Lo will behold a desert and ruins, hopefully with some doorkeepers.

References

- ACAP, Reports.
- Bista, D. B., 1976. *People of Nepal*. Kathmandu, Nepal: Ratna Pustak Bhandar.
- Basynat, N.P. and Netra, B., 1990. *Pasture and Fodder Development on the Higher Altitude Zone of Nepal: Report on Pasture and Rangeland Resources in Upper Mustang, Nepal*. Kathmandu: FAO.
- Boulnois, L., 1983. *Poudre d'or et monnaies d'argent au Tibet*. Paris: C.N.R.S.
- Craig, S., 1996. *Pasture Management, Indigenous Veterinary Care, and the Role of the Horse in Mustang, Nepal*. In the present publication.
- Department of Irrigation, Hydrology and Meteorology. Ministry of Food, Agriculture and Irrigation. Kathmandu
- Nepal Bureau of Statistics, 1991, *Census*. Kathmandu, Nepal: NBS.
- Ray, N. K., 1987. *Social World of the Loba: A Study of the People in Mustang*. Centre for Nepal & Asian Studies, Kathmandu: Tribhuvan University (Draft).
- Shrestha, B.K.; Grela, A.A.; and Joshi N.D., 1989. *Varietal Evaluation Trial*, Marpha: Unpublished.
- Snellgrove, D.L., 1992. *Four Lamas of Dolpo*. Kathmandu: Himalayan Book Seller.
- Thakali, S., 1994. 'Renegotiating Tradition: Tourism and Cultural Invention in Nepal'. MA Thesis. Roehampton Institute, University Surrey, U.K. Unpublished.
- Thapa, M. B., 1991. 'People's Participation in Range Management: The Case of Mustang, Nepal'. Master's Thesis in Rural Sociology. University of the Philippines. Los Banos. Unpublished.
- Veterinary Office. Jomsom.
- Wiert, Jacques, 1983. 'Ecosystème villageois traditionnel en Himalaya nepalais: la production forestière suffiselle aux besoins de la population?' PhD thesis. Unpublished. Grenoble.

Annex 1: The number of Animals Reared in Upper Mustang between 1993 and 1995

	Houses	Cattle	*	Yaks	Dzos	Sheep	*	Goats	*	Horses	*	Mules	onkey	Poultry	*
1993															
Lomanthang	5262	471	3	534	0	1609	12	4196	30	394	3	29	223	0	0
Chhonup	295	554	2	715	102	1692	6	2084	7	366	1	2	0	0	0
Chhosher	146	316	2	0	12	3232	22	6545	45	165	1	0	0	0	0
Charang	112	489	4	42	129	2	0	2800	25	197	2	6	22	36	0
Ghami	139	537	4	34	218	0	0	3909	28	214	2	6	23	122	1
Surkhang	118	207	2	303	65	160	1	7908	67	86	1	0	0	53	0
Lo	839	2583	3	1660	529	6885	8	27808	33	1431	2	43	268	211	0
Chhuksang	239	302	1	0	342	25	0	8069	34	151	1	313	34	443	2
Upper Mustang	1078	2885	3	1660	868	6910	6	35877	33	1582	1	356	302	654	1
1994															
Lomanthang	139	502	4	848	130	1744	13	4057	29	694	5	68	452	0	0
Chhonup	185	582	3	762	102	1820	10	2060	11	366	2	2	0	0	0
Chhosher	146	360	2	10	0	4051	28	5904	40	166	1	0	0	0	0
Charang	112	488	4	45	117	0	0	3412	30	178	2	6	17	49	0
Ghami	139	502	4	42	184	0	0	4547	33	205	1	6	27	117	0
Surkhang	118	358	3	230	78	0	0	7955	67	122	1	0	0	104	1
Lo	839	2792	3	1937	611	7529	9	27935	33	1731	2	84	82	270	0
Chhuksang	239	377	2	0	311	0	0	7450	31	135	1	254	254	636	3
Upper Mustang	1078	3169	3	1937	922	7529	7	35385	33	1866	2	336	336	906	1
1995															
Lomanthang	139	381	3	365	65	2144	16	3658	3	390	3	29	0	0	0
Chhonup	185	328	2	485	52	3423	19	2060	2	381	2	2	0	0	0
Chhosher	146	251	2	0	0	5852	40	4903	1	168	1	0	29	0	0
Charang	112	282	3	45	124	0	0	3799	2	178	2	0	27	48	0
Ghami	139	301	2	39	95	26	0	3538	1	190	1	6	0	118	1
Surkhang	118	271	2	211	48	234	2	4382	1	122	1	0	266	115	1
Lo	839	1814	2	1145	384	11679	14	22340	2	1429	2	37302	50	281	0
Chhuksang	239	230	1	0	155	0	0	7994	1	145	1	339	316	536	2
Upper Mustang	1078	2044	2	1145	539	11679	11	30334	1	1574	1	210	0	817	1
Mean 93-95															
Lomanthang	139	451	3	582	65	1832	13	3970	29	493	4	42	295	0	0
Chhonup	185	488	3	654	85	2312	12	2068	11	371	2	2	0	0	0
Chhosher	146	309	2	3	4	4378	30	5784	40	166	1	0	0	0	0
Charang	112	420	4	44	123	1		3337	30	184	2	4	23	44	0
Ghami	139	447	3	38	166	9		3998	29	203	1	6	26	119	1
Surkhang	118	279	2	248	64	131	1	6748	57	110	1	0	0	91	1
Lo	839	2396	3	1581	507	8698	10	26028	31	1530	2	54	205	254	0
Chhuksang	239	303	1	0	269	8	0	7838	33	144	1	290	113	538	2
Upper Mustang	1078	2699	3	1581	776	8706	8	33865	31	1674	2	344	318	792	1

Source: Veterinary Office, Jomsom

* Number of animals reared per household