

THE HERDSMEN'S DILEMMA¹

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Introduction

Migratory herding is still an important part of the livelihood of a significant section of the Bhutanese people; but it was central to our traditional pastoral economy. Cattle, grazing land, labour and cultivatable land were the four primary sources of wealth in the past. A balance among these four factors of production had to be struck for the agrarian society to be sustained. Obviously, the area of grazing land, and the number of cattle depended on it, could not have been so large as it was if forests were allowed to grow with rampant vigour, as we do now.

Migratory herding embodies considerable empirical knowledge about ecology, climate and topography among the herdsmen, although this is not widely acknowledged. This fund of knowledge have enabled the herdsmen to know the best grazing places and the most nutritious plants, which can be foraged by being at the right place in the right time, by moving with precision. Being always out in the open, the herdsmen, and to some degree their cattle, have acute perceptions of weather patterns. They have an acute sense of timing to move from one place to another to avoid frost at a pasture, or snowfall on a pass, or to escape the vampirish experiences of ticks and leeches drilling into their eyes, noses, and groins.

¹ This article is a small fraction of information that exists among villagers and herdsmen. It has been further supplemented by reports relevant to the topic. I am grateful to a number of informants, in particular, Choeten of Trashigang; Dasho Karma Gayleg; Ap Wanghuck of Zursuna, Haa; Tshewang Darjay of Ura, the late Jowo Thinley Tshering and many others. I thank Dr Pema Gyamtsho for activating my interest on this topic.

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The traditional cattle breeding system has a marked preference for *jatsham*, a cross between *thrabam* and *bamin*, unique to Bhutan. *Jatsham* is the main breed adapted to long distance migration, as its characteristics are highly favourable when judged on the criterion of disease resistance, longevity, foraging ability, milk -fat content, fertility, mobility, and ease of management. Although jersey and brown -Swiss breeds perform better on the scales of milk yield as well as duration of lactation, farmers in many parts of the country rank *jatsham* above cross breeds of brown -Swiss and jersey. Issues about breed selection and grazing land on the one hand, and cattle breeds and organic farming systems on the other, can hardly be separated: they are closely interrelated. Besides several other desirable characteristics, *jatsham* breed fits the high milk -fat content and mobility requirements, and mobility in turn enables migration to optimise foraging across different regions.

Grazing land ownership ranges from holdings by villages or monastic institutions as corporate entities, to holdings by private individuals. There are conceptually six different kinds of holdings. Ownership is sometimes seasonal because of overlapping users: a patch belongs to a cattle herdsman in winter and a yak herdsman in summer.

The dissemination of exotic breeds is usually accompanied by exotic-fodder based pasture promotion around villages. This has far-reaching effects on land use and the farming system, especially in view of the expected decline in the number of native cattle that will reduce the supply of manure for organic traditional farming.

This article also discusses the Draft Livestock Policy (1995) and inquires into the consequences of its implementation, if it is passed as law. The divorce between forest and livestock that is underway will profoundly modify vegetation composition on the one hand and herd diversity on the other. The Draft Pasture Policy, if enforced, will dramatically tilt the breed selection towards jersey and brown Swiss crossbreeds;

the consequence of this choice will carry over into many other spheres, with outcomes that have not been contemplated.

Overview of Rangelands

Nature created open rangelands in the rugged mountains in the northern part of Bhutan where grassland dominates. But most of the rangelands in our country were fashioned by man for human and livestock uses. Rangelands have been developed, through human effort, by clearing and burning out undergrowth. Alpine rangelands in Merak, above 3,900 metres, were created several hundred years ago; according to its settlement history, the name Merak means “settlement created by burning out”. Rangelands and pastoral activities have been a pastoral societies in the Himalayas. In our country, the concept of rangeland is not limited to open grassland as is the case elsewhere, but extends to forest floor grazing in lower elevations with chirpine, broad-leaf and sub-tropical forests. A registration document of rangeland or grassland (*rtsa 'brog khram*) specifically mentions what were traditionally entailed in the ownership of a rangeland: terrestrial surface, water, river, mountains and valleys (*sa chu klung phu mda*).

The area devoted to rangelands in the Hindu-Kush Himalayan region has a staggeringly large area of rangelands as a percentage of total land area. At 0.34 percent, Bhutan's own rangeland area is highly underestimated², and there is no credible basis for this estimate.

From a narrow economic point of view, which does not take account of ecological and environmental functions, rangelands have very low opportunity cost. Because of the

² See Miller D. et al, 1997. *Rangelands and Pastoral Development in the Hindu Kush-Himalayas*. Kathmandu: ICIMOD, 1997 . Rangeland accounts for 60.8 percent of Tibetan Plateau, 19.4 percent of Pakistan, 9.7 percent of Afghanistan and 8.7 percent of India. Miller gives a figure of 0.34 percent rangeland for Bhutan, but in the absence of an accepted criterion for what constitutes rangeland, this figure cannot be assumed as accurate.

lack of an alternative use for agricultural or other purposes, and due to remoteness, steepness, and poor soil, rangelands are marginal land. It is therefore best to convert plant biomass into essential animal products.

In fact, wealth and prosperity in traditional society were generated by four primary sources: labour, arable land, cattle and grazing land. These four factors had to be kept in some sort of proportion for the society to be sustained. Excessive forest regeneration at the expense of grazing land can negatively affect cattle farming, and hence production of dairy foods.

Substantial knowledge, cults and rituals have developed around migratory cattle. A significant part of pre-modern administration was geared toward tracking cattle and yak populations for the purpose of in-kind tax collection. A good deal of empirical ecological and geographic knowledge has accumulated as a result of migratory herding, but it remains oral and localised among a group who do not find media or academic voice. This fund of knowledge has enabled the migratory herdsmen to find the best grazing places and the most nutritious plants for foraging, by being in the right place at the right time, which in turn depends on moving with precision. Being always in the open, the herdsmen, and to some degree the cattle, have an acute perception of climatic or weather patterns. They have to know when to move from one place to another on time, if they are to avoid frost at a pasture and snowfall on a pass, or if they have to escape the vampirish attentions of ticks and leeches drilling into their eyes, noses, and groins. Although there are research findings on certain aspects of pastoralism, a comprehensive analysis of how the whole sphere of pastoral activities is integrated within various eco-systems the herds frequent is yet unavailable. In contrast, research stations have devoted considerable time and resources on crossbreeds, and the improvements of their pastures near the villages.

Founding Grassland (*rtsa 'brog*) and Claiming Holding Title (*Thram*)

The establishment of Merak as a rangeland -based village by burning fir and juniper forests is mentioned in their origin history (' *byung rabs*). It mentions that Merak was named in that manner as fir forest was set on fire to establish the village (" *Merak zerwani spa mai nags la me rgyab nas grong chags pa la Merak tu thogs*")³. Merak's history gives a detailed list of grazing land patrimony (*brogs skal* meaning patrimonial share of rangeland) in Merak, Sakteng and Sapo. A rangeland, like Throlemang, was bought by the herdsmen of Merak and Sakteng from a certain Rakha Jowo, who occupied it in those days, by paying gold dust measured in a bowl ("*gser sder ma la jal nas nyos*").

Another rangeland called Jomo -choyi-nangi '*brogsa* was bought by paying 17 horses. Thus, rangelands were either created or bought. Those which were bought had already been created earlier. The notion that a grazing land (*rtsa 'brog*) is a free natural resource is only a half-truth.

The information on existence of rangelands so long ago is cited here mainly to illustrate their long history, and to suggest that continuity of pastoral culture and communities for hundreds of years implies sustainable use of grazing land. As in the case of the herdsmen of Merak, a rangeland has to be first claimed from nature by certain means and made fit for grazing. In the traditional lexicon, this process is known as 'creation of rangelands' (*gbrog gsar drup*) involving input of human labour. The creation of this resource by investing human labour is expressed in the phrase 'created by welding knife on the shoulders' (*'gri gnya wa lu 'bag ti drup drup yin*'). Grazing land is carved out of wilderness or forest which is not occupied, and not in any dispute or ambiguity over prior ownership, but which has water and potential for forage. No doubt water availability in the centre of a grazing land for *mithun*-cattle is the key requirement, as expressed in *ba 'brog*

³ Untitled handwritten manuscript found with Dorji Tshering of Sakteng

chu dang blang 'brog rtsa, meaning water at grazing land for cows and grass at grazing land for oxen.

Tracks have to be opened for foraging and watering. Routes to forage and to water holes are opened by following tracks used by tahr (*jara*), *shou* and other wildlife. A good rangeland therefore presupposes herbivorous wildlife occurrence. As will be discussed later, *brog sar grup* (establishment of new rangeland) has to be followed by *brog gsal* or rangeland maintenance every year to keep up the quality of the rangeland and avert its constriction by vegetative growth. An absence of maintenance of grazing land (*brog gsal*), will result in the rangeland being overtaken by regeneration of unpalatable plant species and the obstruction of routes to forage and waterholes by plants and trees.

But to continue on the origin of grazing land (*rtsa 'brog*), physical creation of a rangeland was followed sooner or later with the effort to stamp it with legalization of ownership. The founder of a new rangeland (*brog gsar*) approached legitimate authorities for securing the title. A founder of *rtsa 'brog* was usually granted an order document (*bka shog*, which was sometimes known in compound phrase *bka' khra*) and it was registered in the land register (*sa yig khramo bskod de*). *Sa yig* now stands also for signature; originally it meant land record. Some of the *bka shog* or *ka thra* belonging to the people of Bumthang are known as *Chotsip*, meaning *khram* issued by *Trongsa Ponlop*, alias *Chos Zhab*. In other regions, *bka' khra* might have been issued by the respective *ponlop*. But it appears that eventually, the central authorities, such as the *Desi* who meted out the square red seal of the central government, had to be party to the legal recognition of land title. The *bka shog* (order document) with *dmartham chenma* (red seal) of central government, with druk imprint, validated the title completely. Land and *rtsa 'brog* title issued as *bka' khra khra moi rgyab gnon* (additional warranty for order) document were usually issued at the Palace of *sPunthang bdewa chen po*. In one particular land title dated 1887, who actually issued it is not mentioned. Such *khram* were

prepared in triplicate: one for the title holder, one for record in Punakha, and one for the *ponlop* of the region.

Land title bearing red seal (*Khram gmar tham chenma*) for a rangeland mentions five essential pieces of information: year of issue in sexagonal cycle; name of the rangeland; extent of boundaries described in terms of landmarks though this is not always precisely defined; means of acquisition; and the name of the title holder.

As regards the means of acquiring rangeland, establishment of a new one, purchase, gifts or donations as *yo byed* (donations to religious institutions) and inheritance were not the only means. Some old *khram* refer to the transfer of *khram* by *khram bskred* (cancellation of *khram*), from *rtsa stongs* household (household in which family line has died out completely either through deaths or disintegration) to those people who agree to fulfil the obligations of the *rtsa stongs* household. A *rtsa stongs* household had literally ceased to exist due to lack of descendants to carry out the tax obligation.

The red seal land titles were the sources from which the existing land register system was constructed. However, in the case of grazing land registration, in addition to demarcation based on natural landmarks, acreage of grazing land was estimated in a very imprecise way. Grazing land titles incorporated area measurements only in the 1960s and 1970s: but the measurements were carried out by direct ocular estimate, or were based on innocently misleading reports by the village headmen who were compelled to put a figure, with no attention paid to inaccuracy of measurements and its consequences in future. The purpose at that time was to systematise a form of new grazing land tax. Nominal tax on grazing land based on the area of holding was paid for a period of time during the reign of the third king, until the cattle owners were officially required to register for licences to use the grazing lands registered in their own names. The cost

of licence for a year is now Nu 100 irrespective of herd size or the extent of grazing land.

However, as already mentioned, the quantitative measurement of grazing land is unreliable because of the methods involved. To use the data on grazing land derived from the land register for such purposes as carrying capacity or livestock - grazing land relationship is highly erroneous. Until now, the vast extent of grazing land, stretching into jungles and mountains, has not been surveyed, in spite of bold figures cited in numerous documents.

Typologies of Rangelands in Land Register (*Khram*)

Having discussed the ways by which a title to a grazing land is acquired, a brief typology of grazing lands as reflected in *khram* is presented. This typology is the same as the present system of grazing land registration which took its current classification from the old typology, similar to the adoption of the old cultivated land typology in today's land registration. It must be clarified that the olden typology was based simply on uses of a *rtsa 'brog* and was descriptive, whereas when the olden typology was transposed into the current land classification, it became prescriptive. That is to say, that in the current system under the Land Act, 1979, there is a prescriptive interpretation. A dry land (*kamzhing*) must continue to be a *kamzhing*, *rizhing* (field far away from the village in the mountain used for swidden or bush - fallow cultivation) must continue to be *rizhing* and so forth. However the prescriptive rigidity has been relaxed in the Land Act, 1979, for certain types of land. It permits certain deviation from this prescriptive principle and allows construction and plantation in any land one owns, except grazing land, *sog shing* (leaf-litter wood lot land) and paddy fields.

***Nye 'khor rtsa 'brog* (Local Grazing Land or Local Commons)**

The location of *rtsa 'brog* relative to the position of the livestock owner's village is the first approach to classification.

Rangelands can be classified on the basis of whether they are at the centre; close to the village; or at the periphery, far away from the village.

In every village, there are patches of grazing land at the perimeter of the village; these patches are conceptually equivalent to local commons, providing strategically located open spaces, necessary for the movement and grazing of village livestock. These collective grazing lands are designated in the land register (*khram*) as *nye 'khor rtsa 'brog* (local or neighbourhood pastures), and they are to be grazed as needed by everyone (*je mnyam 'za*). They are not registered in anybody's name, being understood to be traditional community grazing ground; they belong, in principle, to the state (*shungsa*). The Land Act (1979) defines *nye khor rtsa 'brog* as "government land within the radius of one mile from the village which has not been treated as registered in anybody's name". But one doubts precision of the radius of one mile, for the grazing land may lie at a distance beyond this prescribed radius.

Nye 'khor rtsa 'brog, fallow fields, and crop residue grazing are the most important grazing resources for sedentary livestock, as opposed to migratory livestock. These grazing lands which are the only buffer between national forest and untraversable private properties, are foraged by a breed of cattle known as *Boed nor* in alpine regions, and by *thachong* cattle found in almost all villages. With the decline of the practice of grazing horses, tended usually by horse-seers in far flung rangelands, horses have come to graze year round also on *nye 'khor rtsa 'brog*.

Local commons are increasingly subject to pressure from multiple sources: they are host to many new things: schools, clinics, private saw mills, and market sheds are being built on them. Individuals seek kidu (humanitarian gift) land from the local commons. The establishment of animal pens outside the perimeter of a village, for sanitation promotion, has led to the local commons becoming occupied by structures. With the

advent of livestock -proof fencing and enclosure of the fields by barbed wire on one hand, and forest regeneration on the other, neighbourhood grazing lands or local commons have come under further pressure.

***Blang 'brog* (Oxen Pastures)**

A bit further away from the perimeter of a village lies another kind of grazing land called *blang 'brog*, for the draught animals of a village. Some is exclusive grazing land, and not available to migratory or sedentary cattle of the village.

Productive pasture within some hours' distance is set aside as oxen pasture or grazing land where draught animals may regain strength following intense energy expenditure during peak agricultural seasons. Oxen grazing lands have virtually disappeared on the ground because of forest regeneration, although they are intact on *khram* (land register). The disappearance of nutritive grasses in pastureland for oxen is perhaps accompanied by a corresponding deterioration in their general powers of endurance.

Migratory Cattle Pasture (*bla*)

At the furthest radius from the villages are the *rtsa 'brog* or *bla* for migratory cattle and yaks. The furthest *bla* or *rtsa 'brog* from a village, that I know of, lies at a distance of 15 days, but most of the migratory routes taken by herds belonging to the people of Paro, Haa, and Bumthang stretch for about ten days in one direction. If a herd moves at the speed of 15 km per day, this means that most of the migratory herds loop back on their pre-determined course after travelling 150 km or so in one direction. Some herds pause for varying durations, from ten to 30 days, in different places along a route. Other herds, which do not have their own rangelands along the way, travel without a break to their destination-rangelands.

Privately Owned or Individually Owned Rangeland (*Rang dbang* or *sger dbang gyi rtsa 'brog*)

Having shown the range of distance of grazing land from the owner's village, a typology of grazing land according to the regimes of property ownership, ranging from the individual to the institutional, is now described.

Firstly, there are grazing lands in the name of individual holders, which means that these are *rang dbang* or *sger dbang*, meaning privately owned rangelands, distinct from group, or institutional rangelands.

Rangeland of Specific Group Members (*mThoen Mong gyi rtsa 'brog*)

Secondly, there is multiple holders' rangeland described usually as *mthuen mong gyi rtsa 'brog*. This is not the same as a holding of an entire village. Here, the multiple holders are named individually, and may be a subset of all the households in a village.

Community Rangeland (*dMang spyi rup gyi rtsa 'brog*)

The third category of grazing land owners are villages as corporate entities. In contrast to the ownership of *sger dbang rtsa 'brog* by private individuals or *mthuen mong gyi rtsa 'brog* by a group of individuals, there are *rtsa 'brog* which are owned by the village as a whole, without going into the names of the owners in the village. These are qualified as *dmangs spyi rup gyi rtsa 'brog*. This definition leaves open the possibility that any new household established in the village will have access to the *rtsa 'brog* by virtue of being a member of the village.

Royal Family's Rangeland (*sKu khor gyi rtsa 'brog*)

There are two other categories of grazing land owners which transcend the tax paying households: the royal family and the monastic community. Thus, the fourth category of *rtsa 'brog* owners are aristocracy or *sku khor*. There are some such

grazing lands in western and central Bhutan, but none to my knowledge elsewhere.

Monastic Communities Rangeland (*sDra tshang mgon sde gyi rtsa 'brog*)

The fifth and last category of *rtsa 'brog*, by ownership, is that of the monastic establishments. Monastic establishments such as retreats (*mgon sde*), colleges (*sdratshang*), and lamas' estates (*bla drang*) possess rangelands, for their religious estate-cattle (*chos nor*). They also have agriculture land called *chos zhi*. These properties were donated to them as offerings (*yo byed*) or bought from their corporate resources. One vivid recent example was a successful bid put by a monastic establishment, in 1997, for a rangeland auctioned by Bhutan National Bank. The Land Act (1979) exempts the need for obtaining license for grazing in rangelands for herds owned collectively by monastic establishments, although the rangelands must be theirs.

Summer and Winter Rangelands (*dGun 'brog dbyar 'brog*)

Rangelands can be further categorised on the basis of seasonal usages. Many peripheral *rtsa 'brog*, that is, those which are not local commons, can be seasonal grazing lands for two different owners. They can be winter grazing land (*dgun 'brog*) for some and summer grazing land (*dbyar 'brog*) for others. The right of access is season-specific, resulting in dual access rights on rangelands in temperate and alpine regions. A grazing land registered as summer pasture in a cattle owners' *khram* (land register) appears simultaneously as winter pasture in, say, a yak herdsman's *khram*. Synchronization of migration of cattle and yaks enables such pastures to be grazed without conflicting use of resources. As cattle vacate their summer pastures in autumn, yaks start descending from their pastures in elevations as high as 5000 m and conversely, as cattle reach temperate regions in May, yaks go upwards to forage on very high mountains.

Taxes Related to Cattle and Yaks

At present cattle tax amounts to Nu 5 per head. Cattle tax should yield over Nu 1.5 millions, but only a fraction of this is collected, due to reasons not yet clear enough. A feature of tax administration in pre-modern Bhutan was that there was no tax on grazing land, whereas there were taxes on cultivated land with a great deal of variation within the country. In the past, before in-kind taxes were abolished, high rates of tax was imposed on pastoral communities on the basis of ownership of cattle or yaks, which might be closely correlated to communal, institutional or individual ownership of grazing land. This obviated the problem of identifying who actually owned communal or institutional grazing land, since the grazing land property regimes were complex from the point of view of taxation. A substantial part of grazing land was communal holding characterised as *mnyam za myam mthung* (equal grazing and equal drinking).

There was a form of cattle or yak tax known as *martrel* (butter tax) in certain areas like La Gongsum, Dagala, Bumthang and Kurtoe, where pastoralism predominated. Other districts paid taxes depending on their specialization of production, whether it was cereals or textiles. In the case of Bumthang, which was predominantly pastoral before forest regeneration changed the land's productive capacity, and before the third king reformed the tax system, there were two types of butter taxes, namely, annual and monthly butter taxes. The monthly butter taxes were further divided into two types: *benda* and *khodrup* butter taxes. The annual butter tax was levied according to the number of milking cows in the herd. 1.5 kg (five *sang*) of butter was paid as taxes for each cow in a year. It was three *sang* a cow in Kurtoe. For the two monthly butter taxes in Bumthang, the tax-paying households had to collectively pay one hundred *sang* of monthly butter levy as *benda* butter tax, and another one hundred *sang* of monthly butter levy as *khodrup* butter tax.⁴

⁴ Tshewang Darjay gave a different quantity paid as butter tax. According to him, in Bumthang, Kurtoe, Merak Sakteng, seven *sang* of butter tax was

Butter tax was not the only form of direct taxation on cattle or yak wealth in Bumthang. It was estimated that a tax of approximately 40 live cattle was paid as beef animal tax to the meat master of Jakar dzong from the district as a whole. This meat tax was meant for a hierarchy of officials: Tongsa *Ponlop*, Jakar *zimpon* (chamberlain), Jakar *gorap* (gate master), *tsa gnyer* (fodder keeper), and of course the *sha nyer* (meat master) himself. These live animals were not slaughtered but exchanged for carcasses of cattle that had died through natural or accidental causes. To enable this exchange to take place, it was mandatory for the people of Bumthang to declare the death of their cattle. During butter tax collection, there was an informal fee that had to be paid directly to the official known as *nortsi sgar pa* (official for cattle census), who came to collect butter taxes and assessed the cattle tax base. He pocketed one *shiki* (25 paise) levied on every *yarma* - a cow below fourth year - that did not yet have a full set of teeth.

Butter and meat taxes were probably prevalent under every *ponlop*, though not under every fort-governor (*dZongpon*). The administrative organization of the country was on a regional basis controlled by the *dZongpons* in Punakha, Wangdue and Thimphu; and three *ponlops* in the rest of the country. Each region ran on a north-south axis, which allowed it to cover all agro-ecological zones. Whether the north-south axis arrangement could have been motivated by the aim to have a diversity of tax base, including taxes on cattle and yaks, remains an interesting question.

levied for every cow which had turned *so-nyis* (two-teeth). Further, one extra *sang* had to be paid for every seventh cow, as a kind of progressive tax on cattle holding. This butter tax was paid on the first day of the 8th month every year. He also said that *benda* butter tax for *Lhamoi Domchoe* in Punakha amounted to four *sang* on every third cow and it had to be paid on the 9th day of the 10th month. This must have been the individual liability for collecting 100 *sang* a month in Bumthang as a whole.

Choice of Breed Based on Mobility: 'tha steng and 'tha skyong

Based on whether a breed of cattle is highly mobile over a long distance, or forages around the village, travelling only a short distance from it, cattle breeds are broadly divided into mobile (*mtha steng*) herds and sedentary (*mtha skyong*) herds. The term *sgo nor* (domestic door cattle) is also used for *mtha skyong* herds because they are cattle who live, so to speak, by the door, often penned in the ground floor, immediately at the main entrance.

Choice of breeds which can wander and forage on their own is extremely important for migratory livestock. Jersey and brown Swiss crossbreeds are part of the sedentary *mtha skyong* herd - though not native - and an increase in their numbers will have immense implications for the nature of cropping patterns and also increase pressure on neighbourhood commons (*nye 'khor rtsa 'brog*).

The classical breeding system, on the other hand, has focussed on rearing *jatsham* by crossbreeding *bamin* with *khram*. Mobile or migratory herds consist mainly of *jatsham*. *Jatsham* have strong appeal to the herdsmen because of several noteworthy traits they possess. *Jatsham* display relative immunity from diseases; this is a vital consideration for risk-averse small farmers. They are not only disease resistant but also have a longer life span. There was, in 2001, a *jatsham* in Pema Gatshel which was already 31 years old and had calved 21 times⁵. The comparative longevity of *jatsham* and their fecundity are significant considerations. The butter fat content of *jatsham's* milk is the highest among all breeds of cattle. They have skilful foraging capabilities in jungles or different terrain. When they are in jungle, they cruise with their nozzles at a height of four feet, gobbling creepers and foliage. They have a fine instinct, as though developed by training, to set out foraging in the morning and

⁵ For this information I thank DASHO PHUNTSHO WANGDI, a well known *jatsham* breeder, of Chungkhar, Pema Gatshel.

to return to *bla* or camp in the evening without the necessity for the herds men to round them up. This is highly advantageous for a herdsman who usually has to manage a herd of 50 to 60 heads of cattle in jungles and thickets. While milk yield and fat contents have been examined as parameters for comparisons of one breed against another, other criteria have rarely been taken into account in any comparative analysis. Comparisons of performance of different breeds on selected parameters are summarized in the table below.

Table 1: Average productive and reproductive parameters of different breeds according to farmers from Chaskhar and Tsakaling gewogs of Mongar dzongkhag.

Parameter	Siri (<i>Thra Bam</i>)	Jatsham	Jatsham X Jersey Cross	Jatsham x Nublang (<i>Yangkum</i>)	Jersey Cross
Weight Gain	Slow	Fast Under Nutrition of Free Grazing	Same as Jersey Cross When Well Managed	Slow	Fast Under Nutritious Grazing
Age at Puberty (Years)	2.9	2.4	2	2.8	1.9
Age at First Service (Years)	3.3	2.8	2.4	3.2	2.3
Age at First Calving (Years)	4.2	3.6	3.4	4	3.2
Length of Lactation (Months)	10	8	8 - 9	10	8
Average Milk Production Per Day in Litres	1.3	2.5	4.8 - 5.2	1.5 - 1.9	5.3

Parameter	Siri (<i>Thra Bam</i>)	Jatsham	Jatsham X Jersey Cross	Jatsham x Nublang (<i>Yangkum</i>)	Jersey Cross
Lactational Yield Per Litre	390	600	1350	519	1272
Butter Yield Per Litre of Milk	Low	Highest	Second Highest	Second Highest	Third Highest
Inter-Calving Period	2 Calvings in 3 Years	Yearly Calving Under Good Management	Yearly Calving with Good Feeding and Management	2 Calvings in 3 Years	Yearly Calving

Source: Temsina, M.P., Dr. 1999. Farmers' Views on Cattle Breeds and Breeding: A Survey, RNR Khangma: MoA, RGOB, p. 6.

Note: Although gestation period of cattle is on an average nine months, the difference between age at first service and age at first calving is sometimes more than nine months. This can be explained by the fact that not all cows conceive at the first service.

Table 2. Average productive and reproductive parameters of different breeds according to the farmers from Menji and Menbi gewog of Lhuentse dzongkhag.

Parameter	Siri (<i>Thra Bam</i>)	Jatsham	Jatsham X Jersey Cross	Jatsham X Nublang (<i>Yangkum</i>)	Jersey Cross
Weight Gain	Slower than <i>Jatsham</i> Hybrid	Fast Under Local Conditions	Depends Upon Management and Feeding	Slower than <i>Jatsham</i> Hybrid	Depends Upon Feeding and Management
Age at Puberty (Years)	3	2.5	2.5	2.7	2.6

Parameter	Siri (Thra Bam)	Jatsham	Jatsham X Jersey Cross	Jatsham X Nublang (Yangkum)	Jersey Cross
Sexual Maturity/ Age at First Service (Years)	3.5	3	3	3.2	3.1
Age at First Calving (Years)	4.4	3.9	3.9	4.1	4
Length of Lactation (Months)	8 – 9	10	10 -11	9.5	9 – 10
Average Milk Production Per Day in Litres	1.75	2.8	4.2	2	3.3 - 3.5
Lactational Yield in Litres	446	840	1260	534	1020
Butter Yield Per Litre of Milk	Low	Highest	Second Highest	Second Highest	Low

Source: Temsina, M.P., Dr. 1999. Farmers' Views On Cattle Breeds and Breeding: A Survey, RNR Khangma: MoA/RGOB, p. 7

Table 3: Body size (in cm) of mithun, native breeds and crossbreeds

	Mithun Cow	Jatsham	Sechen Jatsham	Siri Cows	Jerseyx Siri Bulls	Indian Zebu*
Wither Height	144.0	122.5	120.5	117.3	121.6	97.6
Heart Girth	203.0	162.9	177.3	153.6	151.0	130.4

Shoulder to Hoof	102.8	86.8	96.4	88.9	96.5	71.6
Rump Length	44.5	38.3	39.9	37.2	35.0	30.0
Metacarpus Circumference	0	16.2	16.5	14.6	17.0	11.8
Radius Length	0	32.3	33.1	31.5	34.0	27.2
Between Eyes	0	16.6	18.5	16.1	18.0	0

Source: C. G. Hickman et al. The Classical Breeding System in Bhutan. The Journal of Animal Husbandry, Volume 5, (Thimphu: RGOB, 1982).

Its productive and reproductive capacities place the *jatsham* breed on a very high preference level. The *Jatsham* breed was central to the traditional pastoral production system. However, *jatsham* breeding is threatened by the decline in pure female *siri* (*thrabam*).

In this context, particular attention needs to be drawn to two short but important articles: "The Classical Crossbreeding System in Bhutan" and "The Present Cattle Breeding Structure in Bhutan" both of which were contributed by C. G. Hickman and Dorji Tenzing to the *Journal of Animal Husbandry*, Volume 5, September 1982. The authors were the first to work out conceptually and mathematically the interdependence of numbers of *jatsham* and pure *siri*. To breed best *jatsham*, pure *siri* is needed to crossbreed with *bamin*. They worked out mathematically whether the population of *siri* would be stable. The question they raised was that if majority of the pure *siri* are crossbred with *bamin* to produce *jatsham* or *jatsha*, "there will not be enough female *siri* replacements and the *siri* population will decline." This problem is not resolved by obtaining *thrabam* as replacement by backcrossing because "continuous backcrossing ... does not even come close to substituting for the internal *siri* population replacements." The change in the

status of Sombay district in the early 1990s, where no crossbreeding with *siri* was allowed to protect pure *siri* breeding, further increased the risk to the instability of good *jatsham* breed which depends on pure *siri* cow population.

Migration Towards Sub-tropical Forests

With this brief discussion of rangelands and breeds, the ground is laid to discuss the movement of cattle and yaks between summer and winter rangelands, with particular attention to the forage availability in each place and ecological reasons why they migrate seasonally. Examples are drawn from herds migrating from Bumthang to Kheng and Mongar and herds migrating from Paro and Haa to Samtse.

There are four *gewogs* in Bumthang: Choskhor, Chumey, Ura and Tang. Winter pastures for Chumey *gewog* are in Mongar, Zhemgang, and Tongsa; winter rangelands belonging to Choskhor *gewog* are in Mongar and Tongsa; winter rangelands of Tang *gewog* are in Lhuentse and Mongar; and winter rangelands of Ura *gewog* are in Mongar and Kheng.

The migration of herds from Paro and Haa to Samtse follow three routes. One route goes to Samar *gewog* by the Selega route: through Pangtsakhar, Zhigokha, Nyintsa Dongko, Togchena, Jeluna, Denchukha, Machuparkha Dophuchen, Zamkhar and Yawala. It takes ten days to reach Yawala from Pangtsakhar. The Jabana route goes through Tsip Lakha, Domtsho, Shingphukha, Namnana, Kharina, Do Zholmo, Gyango, and Namthakha, taking seven days. This route is taken by seven herds. The Zurtsuna route goes through Tshopaga, Kyabzhi, Bazhikha, Chumgo, Zushji, Cholegkha, Pajikha, Zula, Tshochena and Dolepchen, taking ten days. Five herds come up to the two Zurtsuna villages of Jungzhikha and Jago. Another five herds migrate further south as far as Dolepchen.

Winter grazing areas exclusive to migratory cattle of the people of Haa consist of Lamtsa, Gangsekha, Guchey and Shingkatang. Winter grazing areas, which belong jointly to

Haa and Paro, include Nugathasa, Dorithasa, Benphentona, Kadoree, Dumthodu, Yabala, Bumtaringu and Samtseringu (mountains above Samtse).

The rhythm of migration follows the rhythm of plant growth processes that vary between temperate and sub-tropical regions. The cyclical movement of cattle between their summer and winter pastures take place to optimise foraging opportunities. The concept of grazing land is not limited to grassland, as is the case elsewhere, but include forest floor grazing in lower elevations in chir-pine, broad-leaf and sub-tropical forests. Migratory cattle spend roughly seven to eight months in sub-tropical region. Summer pastures in the temperate region are grazed for relatively shorter duration, giving more time for grasses to recover, as the growth period in summer grazing land is short.

In Bumthang and Haa, as in other areas of temperate region, grasses flower between late July and August, and wither in October. It is crucial for the cattle to leave the summer pastures well before grasses stop growing. If the withdrawal of cattle is delayed, grazing undermines the pre-winter nutrient storage of grasses, and their growth in the following summer can be adversely affected. This is the reason behind the departure of cattle before the autumn has fully arrived. Some herds' start leaving for warm places in August and all are gone by the end of September. Frost falls soon after migratory cattle leave; migratory cattle cannot tolerate the frigid night temperature, unless they are penned deep in insulated ground floor, as it used to be done in the past for a few heads of cattle that were detained.

The furthest grazing land of a herd going away from its owner's village lies roughly at a distance of 15 days. Most of the migratory routes, taken by herds belonging to, say, the people of Paro, Haa, and Bumthang take about ten days in one direction. The migration of herds from Paro and Haa to Samtse follow three different routes: the Selela route takes ten days to Samar, ending at Zamkhar and Yawala; the

Jabana route takes seven days, ending at Gyango and Namthakha; and the Zurtsuna route takes ten days, ending at Tshochena and Dolepchen. If a herd moves at the speed of 15 km per day, this means that most of the migratory herds loop back on its pre-determined course after travelling 150 km or so in one direction. Some herds pause for varying durations, from ten to 30 days, in different places along a route. Other herds, which do not have their own rangelands along the way, travel continuously, to their destination rangelands.

At the height of winter, cattle reach the furthest point in their southerly migration toward broad-leaf or sub-tropical areas. These places may be somewhere in Mongar, Kurtoe, Samtse, Sarpang, Kheng or Chukha. What can be foraged by cattle depends exactly on the type of forest. A winter pasture, say in Mongar, consisting of chir-pine or broad-leaf forests has numerous fodder trees. Cattle are fed lops of *omshing*, *phoseng*, *les*, *moram*, *guli* (wild avocado), *zho rufi* (a creeper), *domzim*, *karsingla* (hard wood often used as pillar timber) *cha lampa*⁶, *tekar* and *tshartung* (two creepers that flower and die out once in 12 years). Fodder trees and creepers, which are the main sources of forage, give more shoots if they are headed back every year. In open patches in broad-leaf winter pastures in Mongar, cattle graze on many kinds of grasses: *posola*, *laptang*, *clamtor*, *ngoseng*, *ja chagpa*, *khari kang kong* and *koi* (nettle).

If a herd is kept near any sub-tropical hamlets, cattle feed on crop residues in *kamzhing* (rain-fed fields) in autumn, and on crop residues in wetland in winter. Cattle manure is a vital input into the farming system, and allowing cattle to graze in fields after the harvest is reciprocated by direct manure delivery to the fields. The economic and social benefits that migration promotes are not only limited to herdsman themselves, but extend to a multi-layered symbiotic

⁶ The names of fodder plants are given in the dialects of Bumthang and Kurtoe.

relationship between sub-tropical and temperate communities.

While the cattle forage on foliage, grasses, shrubs, creepers, and crop residues, herdsmen extract from forests various kinds of cane (*rey*, *craat*, *wawa*) - to make household goods for barter and sale. Herdsmen support their families through handicraft production like *rung*, *thakpa* (rope), *ju zhai* (bucket), *tshang* (basket), rattan shoots, *damparu* (vegetable), *paan* etc. even when there is little income from diary production during the winter. A herdsman is able to supply a stream of edible forest produce to his relations, and markets the surplus, especially in alpine region where perishable foods are scarce for half a year. And while attending to all of these tasks, a prayer-oriented herdsman profits spiritually from keeping his mind focussed on prayers in the tranquillity of wilderness.

Forage and Cattle Population Decrease

A herdsman is often not a family member as it used to be. A sibling or patriarch of the family was the principle herdsman, and his or her superintendence helped to maximise output from a herd. Hired herdsmen, who are not kinsmen, are a cause of lower dairy output. A hired herdsman can falsify output by under reporting diary produce, to divert it elsewhere. Therefore, there is a tendency among herd-owning families to sell off their herds due to lack of herdsmen whom they can trust. The population of migratory herds have, thus, declined.

Grazing land maintenance, or *'brog gsal*, to keep up the quality of the rangeland and avert its constriction by vegetative growth is an important routine for herdsmen while they are at the winter pastures. Grazing land and its network of routes will otherwise be overtaken by unpalatable plant regeneration. Hence, a herdsman spends a good portion of his time on *'brog gsal* to improve it, by repairing tracks, bridges and felling non-palatable fodder plants. Yet, forage has been getting progressively scarce over the decades, in spite of the

decrease also in the number of cattle. Livestock Master Plan (1995) noted that cattle population is almost static at 0.5 percent annual growth rate. Protection of forest by the Department of Forest has prevented effective maintenance of grazing lands in traditional ways, resulting in the deterioration in quality and carrying capacity.

The overall shrinkage of grazing land is caused by several factors. Rangeland clearing activity has decreased due to its prohibition, coupled with shortage of labour to free grazing lands from clogging by undergrowth and canopies that screens out sunlight. Pasture used to be burnt once a year through a practise known as *brogshed* around January in both temperate and sub-tropical regions. Undergrowth in chirpine (*thingdo shing*) forest used to be regularly cleared by fire. There is no periodic burning to sterilize the soil and stimulate new grass growth. Certain species of plants and animals whose habitats depend on periodic fires for clearing are dying out due to cessation of burning. In alpine region, there is a well-founded suspicion that diminutive annuals - floral and medicinal plants - are becoming less abundant due to colonization of the meadows by coniferous forest. Although forest fire is prohibited, a Royal Edict issued in 1981 makes exception to yak herdsman who are permitted to burn alpine pastures under the supervision of the Departments of Forest and Animal Husbandry. This is, however, rarely done: supervision is difficult to provide. The last contributing factor to deterioration of forage potential of grazing lands is the change in migratory routes. Attracted by the ease of walking along motor roads, herdsman are re-routing their journeys to stay close to motor highways, quickening the reversion of far-flung grazing lands to forests.

Return to Temperate Grazing Land

At the end of the Spring, forage resources gets exhausted in the winter grazing lands and this becomes obvious from several indications, most of all from the agitated behaviour of cattle. Cattle return early in the evening to the *bla* or camp and stray further from the grazing boundary during the day.

Shoots of grasses disappear. Milk yield decreases but butter yield decreases faster than milk yield. All of these signify the time to leave for temperate region so that the sub-tropical pastures can have a spell of regeneration. Moreover, by April, the air begins to buzz with teeming insects and flies, falling dreadfully into milk, water and food kept in any storages in the camps. Flies and insects like *fuyongma*, *brocktula*, *sheybrang*, and *nyongkha* feed on cattle making them restless and driving them away in the direction of cooler places. In extreme cases, herdsmen resort to smoking out the insects and flies by burning greens beneath the twitchy cattle. Not only flies, tick vectors clamp on the tender parts of cattle. There are four types of ticks, which are carriers of diseases, of which *boophilus microplus* is the main tick prevalent below an altitude of 1000 feet above sea level. More severe threat appears in the form of leeches - both *zaang paat* and *sa paat* - that multiply exponentially in wet conditions and cause external haemorrhage by boring into cattle. The weather becomes too hot and milk goes off every day; curdling prevents milk from being turned into butter and cheese unless it is churned instantly. An average herd has only five to six milking cows: that means the quantity of milk is not sufficient to be churned into butter daily. At the same time, planting season commences for summer crop while winter crops are ready to be harvested in sub-tropical places. Migratory cattle's continued presence is a nuisance and a source of conflict when they stray into mellowing fields.

There are other reasons for cattle to move away from settlements in the sub-tropical areas by May or June. Grazing is stopped by customary practices in local commons (*nye 'khor rtsa 'brog*) in many villages in sub-tropical region. Ladam (mountain-closure) is imposed, for example in Digala and Langdurbi (550 to 1100 metres above sea level) in Zhemgang in the fifth month corresponding roughly to June. Similar suspensions of grazing are prevalent in several districts including Tashi Yangtse and Tashigang. For instance, *ridam* (mountain-closure) is observed from late March onwards in Gortsham village in Metsho *gewog* in

Kurtoe. This kind of embargo stops people and cattle from interference in the germination and sprouting, and enhances natural regenerative capacity of forest fodders.

By May, all the migratory herds move up from Samtse to Haa and Paro; and from Kheng, Mongar and Lhuntse to Bumthang. All over the country, herds move from many other hot places to cool mountain zones, whence it came some eight months ago, last October. Grasses in the temperate region becomes most palatable and nutritious by this time, reaching a height of 5-10 cm by April in altitude ranging from 2500 to 3500 metres. Grasses reach the same stage of growth only a month later, in May, in altitudes above 3500 metres. If cattle reach their summer pastures earlier, it will damage the pastures, for they can be grazed before they reach their full potential. However, this is the right moment, we noticed, when the herds arrive in temperate areas, for example, of Bumthang and Haa.

For the next four months (fourth to seventh Bhutanese months), coinciding roughly with June, July, August and September, herds graze in summer pastures. Numerous nourishing wild fodder trees are found in summer pastures in Bumthang. Cattle are fed foliages of *zhaoku* (yoke timber - tree), *leksengma*, *takpa*, *gokham*, *thrangluwa*. They graze on several species of grasses and bushes: *dyalma* (resembles spinach), *dyalchen*, *dyalchung*, *tsigar* (the most nutritive grass), *singmi tewa*, *jamtewa*, *wantewa*, *zhingkham tewa* and *clam*. Grasses grow continually during this period, in response to rain and warmth. It is a period of abundance of grasses, foliages and water and is known among herdsmen as the time of *tsa 'bot chu 'bot* (abundant grass, abundant water). A cycle of migration is completed by September, and it is time again to head south.

The processes of migration described above pertain to transboundary migrations, involving different districts and different ecological zones. But on a scale of shorter distance, it happens throughout Bhutan, because of the foraging

opportunities offered by vertical micro-climatic variations. Over a year, livestock are moved to different ecological zones for a fixed duration.

There are mini-migrations of cattle travelling a shorter distance from their villages. For example, in Tama, Kyekhar, Berti, Buli, and Dakpai in Kheng, cattle are grazed in chirpine forest from May to June to partly avert infestation of leeches and ticks found in broad-leaf forest. Chirpine forest offers lemon grass, spear grass, *bauhinia*, *pochongla*, *brangdula*, *saguncha* (broom grasses), and *karmala*⁷. In June, cattle migrate to the bed of the Mangdechu. In July and August, cattle are let out in *kamshing* (dryland or rainfed fields growing maize, wheat or millet) and *tseri* (swidden cultivation field) to feed on crop residues and stubble. And later on, cattle are let loose into the forest floor, which forms part of grazing lands. This pattern is followed in many sub-tropical regions, but the distance involved is very short.

There are several reasons for cattle to be away from settlements in the sub-tropical areas by June. Grazing is stopped by customary practices in neighbourhood pastures or local commons (*nye 'khor rtsa 'brog*) in early summer in some villages. Ladam (mountain closure) is imposed in Digala and Langdurbi (550 to 1100 metres) in the fifth month corresponding to June. Nimshongpa are barred from going up the Malaya slopes, Shingkharpa are barred from crossing Kuji temple, and Wamlingpas are barred from going beyond Purji hill. These embargoes probably stop the people and cattle from interference in the germination and sprouting of forage, and enhance natural regenerative capacity of the forest fodders. Similar suspension of grazing is prevalent in many places including Trashi Yangtse and Trashigang. For instance, *ridam* (mountain-closure) is observed from late March onwards in Gortsham village in Metsho gewog in Kurtoe.

⁷ The names of these plants are given in the Kheng dialect.

How Communal Rangelands are Divided

Grazing land owned collectively by a village need fair rules of access and utilization to be devised. How this is done is illustrated through two cases. One among herdsmen of Ura, Bumthang and the other among herdsmen of Haa. The procedures for dividing communal pastures are different in each of these two places, partly because the livestock species are different in each place.

The Mongar Omdaar Model

The allocation of summer pastures belonging to Ura *gewog* in Bumthang is not carried out according to any rules. Herdsmen can camp wherever they prefer in any of the communal rangelands. This latitude is explained, according to a well-known herdsman⁸, by the fact that there is no forage constraint in summer. The herdsmen see no reasons for allocating pastures according to any strict rules. They are free to take their herds wherever they want.

However, winter pastures in sub-tropical and broad-leaf forests have to be divided fairly because the herds are in a smaller grazing area for a longer period. To divide communal pastures located in Mongar, but owned by the herdsmen of Ura village, the herdsmen will take into account only milking cows (*zhoma*). All others type of cattle are excluded when grazing lands or pastures are allocated so that unproductive cattle heads are not given any weight in the division of grazing lands or pastures. There are five main pastures and each rangeland has a predetermined stocking rate, which is 40 lactating cows for Namling; 40 lactating cows for Samdang Yajadi; 80 lactating cows for Gorzombi; 40 lactating cows for Mongleng Medchiri; and 50 lactating cows for Lingmethang. A fixed stocking rate for each range land suggests knowledge of the carrying capacity of each rangeland.

Herds are amalgamated to form the right number according to the stocking rates given above, so that the herdsmen

⁸ Tshewang Darjay of Ura, Interview, August 22, 2001.

forming a particular group can bid for a rangeland the group wishes to get. An excess of five milking cows is accommodated during the division of rangeland. These pastures are, as far as possible, allocated by consensus. But allocation can rarely be determined through discussion when it comes to good pastures, which are vied for by many herdsmen. Then, the herdsmen resort to allocation by lottery. The names of pastures are written on pieces of paper and thrown in a jumble in a bag. Who gets which piece of pasture depends on blind chance. The allocation is valid only for a season. A large number of herdsmen from central Bhutan, who own communal pastures, are said to use an allocation mechanism relying on the drawing of lots.

The Haa Gyechukha Model

Another model of division of pastures for yaks occurs in Gyechukha village in Haa ⁹. In this version, both the summer and winter pastures of yaks are taken into account. A winter pasture is paired with summer pasture as shown in Table 4 after the ranking of pastures has been done individually by consensus in a meeting. Twinning of winter and summer pastures aims to equalize the access to pastures in all seasons and among all herdsmen in a systematic way. The best summer pasture is paired with worst winter pasture and the second best summer pasture is paired with fourth best winter pasture and so forth. Individually ranking both summer and winter pastures and then pairing the most preferred summer pasture with the least preferred winter pasture is a mechanism which compensates the loss a herdsman may find in winter by gains in the summer.

⁹ For full text, see Karma Ura (1995), "Nomad's Gamble", *South Asia Research Journal*, Vol. 13 No. 2, pp. 81-100

Table 4: Paired ranking of summer and winter pastures communally owned by Gechukha village in Haa.

Summer pastures ranked by preference	Winter pastures ranked by preference
1.Jatekha	5. Richey
2.Lungkhamekha	4.Shungkhatho
3.Pamling	3.Phodeytshang
4.Jangbana	2.Hingtho
5.Chala	1.Yangathangkha

Source: Communication with the late Jow Thinley Tshering, a noted herdsman from Haa, Talung.

Pairing is done prior to allocation of a pair of pastures. During the pasture ranking and pairing stage, all are ignorant about who will get a particular pair of pastures. Anonymity of the recipient at that time ensures that there will be no personal incentives to mismatch the summer and winter pastures in a biased way.

Since there are five patches of summer pastures and five patches of winter pastures for the Gyechukha community, for the purpose of allocating pastures, the yaks of Gyechukha community are also grouped into five equal sized herds. Thus, five groups of herdsman are formed. When the allocation was done in 1993, the size of each herd was about 300 yaks. The size of each herd in any given year is dictated by the total yak population in Gyechukha since total yak population of the Gyechukha community must be divided into five groups corresponding to the number of pastures. A household usually does not have as many as 250 yaks, so several herdsman join together so as to be able to fulfil the numerical requirement of yaks and be eligible for the allocation of a pasture. Herdsman who are related to each other or have some other basis of solidarity with each other form a group to compete in pasture allocation. This does not mean that they

will merge their yaks together to form one large herd or that they will put up together in *jaa* (black tents of yak herdsmen). It means that they will camp in the neighbourhood of each other and move their herds together to the allocated pastures. With the formation of five groups of yak herdsmen and five pairs of winter and summer pastures, a day long ritual is conducted in the community shrine. At the end of the ceremony, dice are cast to randomize the allocation of pastures. One member of each group of herdsmen (usually the one who has the greatest number of yaks) is given the privilege of throwing dice on behalf of his group. Each of the five selected group representatives casts three dice at a time in turn. The herdsman who scores the highest can pick up the best paired winter and summer pastures. The second choice is given to the herdsman who scores the second highest dice and so forth. The allocation is valid for three years in Gyechukha, but the duration has been increased to 11 years in certain parts of Haa.

Lease of Rangelands and Herding Arrangements

It is to be expected that distribution of cattle, pasture and family-labour are not correlated perfectly. Those who own rangelands may not necessarily have labour to tend and manage them. Those who have cattle may not necessarily have any pastures. A family may possess two of these resources but lack the third. In theory, eight different combinations are possible, from having all three resources to none of the three resources. Such deficiencies and mismatches in asset portfolios of households emerge particularly in a dynamic situation when resources can shift both within and between households. Therefore, institutional solutions develop to mediate these disequilibriums.

Privately owned pastures are, like any capital or resource, able to be taken on lease for a fixed period of time. Those who do not own any patch of rangelands, or find their holdings insufficient, rent rangelands. The fee paid to the *khram* holder is known as *rtsarin churin* (forage charge water charge). A written lease contract is rarely drawn up and fees do not

seem to be based on herd size, or duration of stay in a rangeland. Rangelands are leased for lump sum payment, for labour services, or for in-kind payment like dairy goods. However, the renting out of rangeland is now legally forbidden (though this is not heeded) except among pastoralists, such as those living in Laya, Lunana, Merak, Sakteng, Sephu, Soi and Naro, who do not own any other type of land.

Where a family owns rangeland and cattle, but is without manpower for herding, the whole herd is handed over for management and grazing by another family on the owner's rangeland. Two types of arrangements exist between the contract herdsman and the herd's owner in such a case. These arrangements are known as *skyesmed chimed* (no birth, no mortality) and *skyesyod 'chiyod* (birth and mortality present).

According to *skyesmed chimed* herd management, a fixed quantity of dairy produce is paid to the owner on the basis of the original number of cattle handed over to the contract herdsman, irrespective of increase or decrease in the number of cattle when the herd is handed back. For instance, 20 *sang* (6 kg) of butter is usually liable to be paid to the owner for each milking cow at the time of handing back the herd to the owner. The balance of the produce accrues to the contract herdsman. At the end of the management term, the herd is returned in original size by making up the loss, while the herdsman retains the increment in herd size. However, in *skyesyod 'chiyod* management, allowance is made for fluctuation of herd size within a certain percentage range, say, one-tenth of the original number of the cattle per year. If the loss within a herd exceeds the limit, the contract herdsman has to give substitute cattle to make good for the missing cattle.

There are other variations between the two main schemes of management, in which herd management is carried out on contract. A herd is managed completely by a contract herdsman on the owner's rangeland, in which case his only

obligation is to pay a fixed quantity of butter, say, 20 *sang* for each milking cow or yak, in addition to giving up the meat of dead animals to the owners of the rangeland. This is more popular than other arrangements because the risk is less biased against a herdsman.

Lastly, there is an arrangement prevalent in Haa, Paro, Chukha and Samtse known as *normthus*; it is close to a rotational herding scheme between households located near summer and winter pastures. The management of a herd alternates between certain households, say, of Haa in summer and of Sambay in winter. For the period a herd is in summer pastures, it is managed by a Haa household and for the period the herd grazes in winter pastures in Sambay, it is tended by a household in Sambay. It will be noted that the herd management period of a household in Sambay is twice as long as that of its Haa or Paro counterpart. This obviates the need for the people from Haa or Paro to stay with a herd in sub-tropical places. The produce of the herd is shared equally between the two households. Initial investment to purchase the herd is made by the households of Haa or Paro.

Nature of Disputes Over Rangelands

There are a variety of disputes and conflicts in rangelands. Conflicts are now mostly resolved in courts of law, but a number of minor disputes are settled by intermediaries (*barmi*), out of court. Verbal sanctions may be meted out to minor defaulters. In serious cases, defaulters have to compensate the owners of rangelands in cash or kind.

A brief description of the nature of disputes about rangelands follows. Rangelands are delineated by natural landmarks. For example, the rough coordinates for a *rtsa 'brog* (rangeland) around Kyekyela pass between Choskhor and Chumey is described as: this side of Kyekyela, below the central trunk road, this side of Pharzhur stream. These coordinates presume other reference points, by which 'this side of' and 'below', which are not explicit in *khram*, can be understood.

Coordinates of rangelands are also defined in relation to other rangelands and so on, forming a chain of references in a mosaic of rangelands. However, for the purpose of herding, the landmark boundaries help to restrict the movement of livestock. Cattle, especially *jatsham*, retain memories of forage boundaries after repeated seasonal cycles of herding and do not overrun into adjacent rangelands. Nevertheless, there are occasional grazing overlaps along the borders of two rangelands, described as 'overreaching legs and hands' (*rkangthel lagthel*), which are taken in good faith among the herdsmen.

The second instance of letting others use a rangeland is when their herds are in transit. An area specified in a *khram* and owned privately is occasionally not under the exclusive domain of the owner, because of the temporary right of way that has to be provided. This happens when the rangeland is on the migratory routes of the herds of others. Herds in transit can usually stay between one to three nights at a place on the migratory route. But a breach of this limited duration of stay in a rangeland belonging to others on a migratory route is considered an offence.

The third instance when some one else's herd is allowed, by custom, to use a rangeland is for grazing on residual forage. When a sub-tropical rangeland on the fringes of a village is owned by a herd-owner from the alpine or temperate region, its accessibility to the local cattle combined with the absence of the rangeland owner's herd for four months or so, makes it highly tempting to the local cattle. In many parts of the country, local cattle owners have customary right, although not reflected in a *khram*, to graze on residual forage (*rtsa bshul*), after the rangeland owner's herd has departed from these pastures. However, disputes have often arisen because of the illegal grazing by local cattle before the arrival of migratory herds. Illegal grazing on first sprouting (*rtsa ngo*) is considered theft of rangeland.

The fourth kind of conflict, which often led to serious litigations in the past, results from the establishment of swidden cultivation (*rtseri*) or permanent settlement in rangeland. This is different from a threat to grazing land from illegal entry of others' cattle, without paying water charge and grass charge (*rtsarin churin*). The threat arises from expansion of the frontiers of land for illegal occupation by settlers.

The fifth and last kind of dispute concerning rangeland is international or transboundary in nature, with its resolution dependent on bilateral negotiations. Substantial parts of rangelands in Haa, Trashi Yangtse, and Kurtoe, which were accessible to Bhutanese herds, are now grazed by Chinese herds. In Haa alone, several pastures such as Tsegangkha, Sinchong, Nangjumo, and Phartoe, which were originally owned by the herdsmen of Haa, are no longer accessible to them.

Impact of Land Law and Forest Act on Pastoral Institutions

With the enactment of the Land Act, 1979, which drew heavily from 1957 Thrimzhung, rangelands became the asset of the nation, i.e. state property. Herdsmen were given right to graze only. Burning of rangeland had already been prohibited long before this Act came into force. Thus, there was a shift in property relations between individuals and the state. This was further reinforced by forest legislation, which defined forest in a vague way. Tree cover was not a condition for forest: forest was any land, including rangeland, where private individuals have only right to graze. The Land Act, 1979, includes a number of principles related to rangeland:

Registration Principle. The validity of rangeland ownership depends on recognition by official land register (*sa khram*).

Usufruct Principle. There is no ceiling over usufruct rights over pastureland, woodlot (*sogshing*) for collection of leaves and roofing material plants (*kharbari*).

Exchange and Transaction Principle. Rangeland may not be bought or sold, since the owner has only usufruct right.

Land Conversion Principle. Land registered as grazing land, cash crop, *sogshing* and *kharbari* should not be converted to another category. Other types of land may be converted to specific categories for land use.

Tree Ownership Principle. The government owns all trees found growing on private land with the exception of fruit trees growing in the orchards. This provision was deleted from the Forest Act, 1991. It is still part of the Land Act, introducing a certain degree of inconsistency between the two.

Crop and Rangeland Depredation and Compensation Principle. Although not directly bearing on rangeland, the Land Act has a whole section on crop depredation by livestock and compensation. The rates of certain compensations have not been revised since 1979, and that has been perhaps one reason for the high level of out-of-court settlements. The livestock owner is liable to pay back the value of a destroyed crop in full, after mutual assessment of the field. Deliberate grazing of livestock in a field is punishable by a fine amounting to Nu 400 per animal, plus three months of imprisonment for the livestock owner with compensation for the destroyed crop. This penalty provision is equally applicable to deliberate illegal grazing in other people's rangeland. If a field is rented out, the compensations accrue to the lessee. In case of share-cropping, compensation likewise accrues to both the sharecropper and the landlord. Leaving livestock to range freely without concern for crop depredation, in spite of reminder, is liable to a fine ranging from Nu 50 to Nu 300.

The declaration and expansion of protected areas represent another shift in rights over rangelands. Protected areas now comprise more than a quarter of the country's total land area. And a large part of protected areas are also rangelands where

herdsmen have legal rights to graze. Conflict between courses of action that may be taken to effectively manage the protected areas within the framework of western conservation, and continuation of grazing rights cannot be ruled out in future. The potential for conflict can be avoided only through introduction of a new management system for protected areas that recognizes that total protection is never to the advantage of conservation. Failure to act now may well lead to complete dominance of a few species in the course of time. Controlled grazing, which largely characterizes current practices, will contribute to the maintenance of balance between plant species for a very long period of time.

Draft Livestock Policy, 1985

The Draft Livestock Policy, 1985, is titled as such though its content constitutes an act in the sense that it will overwrite the Land Act. The Policy not only lays down the goal and objectives but also defines the broad strategies, implementation methods and enforcement mechanism. The main objectives of the Draft Livestock Policy, 1985, are to sedentarise the migratory cattle by giving tenurial or lease rights to improved pastureland for a duration of 30 years. The Policy states that leased pastureland is to be improved by the planting of exotic grasses over a period of five years, or else it will revert to government ownership and a fine will be imposed.

The salient features of the Draft Livestock Policy are as follows:

Nationalization and Compensation Principle. All registered private and community pasturelands will be nationalized. Registered private pastureland will be acquired at the rate of Nu 200 per acre and registered community pastureland (nye 'khor rtsa 'brog) will be acquired without compensation.

Tenurial Redistribution Principle. Pastureland will be reallocated to farmers on lease for a period of 30 years at a time. The allocation will be made at the rate of 10 acres per

livestock unit in the alpine region; one acre per livestock unit in the temperate region; and half an acre per livestock unit in the sub-tropical region. One adult head of cattle is considered one livestock unit. Two calves below two years or five sheep or eight lambs are considered equivalent to one livestock unit.

Ceiling Principle. Maximum leased pastureland per household will depend on the altitudinal zone to which the household belongs. The upper limits are: 1000 acres per household in alpine regions; 50 acres per household in temperate regions, and 10 acres per household in sub-tropical regions.

Mixed Holding Principle. Alpine herdsmen will be allocated 50% pastureland in alpine areas and 50% pastureland in sub-alpine areas. In the livestock priority areas, a farmer who owns less than 15 livestock units will be given 300 acres in the alpine region, or 15 acres in the temperate region, or 3 acres in the sub-tropical region.¹⁰

Allotment of Open Grazing Land Principle. Surplus land in an area that remains after allotment will be made into open grazing land to which access will be given by licensing.

With the exception of alpine herdsmen, whose livestock migration is recognized as unavoidable and natural, a rigorous implementation of the Draft Pasture Policy is envisaged to sedentarise the herdsmen and change them into western style dairy farmers.

The Draft Pasture Policy opts for a 'hands off' approach to the forest so that migratory cattle, and hence the herdsmen, and the forest will eventually have no interdependence. The Draft Pasture Policy is meant to be conservation oriented by keeping highly productive animals near the homestead and providing pastures to produce enough forage and feed for them.

¹⁰ Ministry of Agriculture & Forestry Animal Husbandry Department. 1985. Draft Pasture Policy, p. 5.

Yet it is now very clear that a strategy for promoting a new livestock policy needs to be considered more on its own ground, rather than in terms of environmental conservation. The Livestock Master Plan, 1995, noted that, given the data, the average annual rate of increase for cattle was 0.5% for 1986-1990. This implies that the cattle population is almost static. It is tempting to speculate that the over 10,000 heads of cattle slaughtered yearly in border towns are actually cattle from our own herds being recycled as beef, demand for which has shot up with income growth. And a static population raises the question whether cattle really are an increasing threat to the environment in general.

The Livestock Master Plan further noted that an average family needs two draught animals, two milking cows, a dry cow, and as many cattle as possible for manure purposes. It concluded that "any programme to reduce cattle numbers in line with grazing resources cannot be introduced among small holders, who need all the cattle they have"¹¹. The spillover effect of shortage of manure that changes the organic farming into high input chemical fertilizer-based farming will fundamentally impinge on our consumption of naturally grown foods, and the hazards of chemical-based farming will be much more acute in mountainous areas.

Despite all the childhood experience we have of tending cattle, pastoralism is indeed a difficult topic to understand in its totality. Pastoralism is a vivid example of "interdependence across spatial, ecological, sectoral and institutional boundaries"¹², as it has been aptly described. Any activity that cuts across as many borders as migratory herding involves - spatial, ecological, sectoral and institutional - is bound to be complex. Any activity that is imperfectly understood can provoke measures to clarify and simplify it by the development planners. However, pastoralism in Bhutan

¹¹Ministry of Agriculture. 1995. Livestock Master Plan, RGOB: Thimphu.

¹² See Miller D. J. Rangelands and Pastoral Development in the Hindu Kush-Himalayas. Kathmandu: ICIMOD, 1997

seems to be a highly sophisticated and symbiotic land and animal management system.

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