

## Cattle Management Systems in Humid Subtropical Areas of Western Bhutan

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### **Abstract**

A study was undertaken to improve understanding on management system of Mithun (*Bos frontalis*) x Siri (*Bos indicus*) cross-bred and Siri cattle, as reared in typical Bhutanese farming system. Eighteen households of Jumja, Gedu and Chasilakha villages under Bongo geog of Chukha district having over hundred milking cows of different breed types were purposively selected and interviewed. All farms were also visited to observe their management practices. Results indicate that majority of farmer-herders periodically migrated their cattle and managed them under traditional "low input-low output system", allowing them to graze freely for most of the year in the natural grazing lands (tshadrog) in and around the broadleaf forests, while few farmer-herders with few heads of cattle or with cattle of higher Jersey inheritance open grazed in the vicinity of the homestead. The majority of the farms lacked proper cattle housing and feeding equipment, and the rudimentary nature of cattle management practices soon becomes apparent. Lack of Mithun breeding bulls, fodder scarcity in certain areas, labour shortages on some farms, deficient management and disease and predator attack were identified as the main management constraints. Nevertheless, farmers-herders in far flung villages may continue this simple cattle management system involving Mithun-Siri cross and Siri cattle because of their adaptability, hardiness and other significant factors.

*Key words:* Mithun-Siri cross (*Jatsham/Yangkum*), Siri, cattle management, free grazing systems

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## **Introduction**

Cattle have long been a central component of many Bhutanese farming systems. They are used for the production of milk - most of which is converted to butter or cheese for consumption and trade - draught power, income and a store of wealth. Most of the country's 320,000 (RNR statistics, 2000) cattle are *Bos indicus* types, known locally as *Thrabam* which is a Siri breed, but there is also a strong interest in the Mithun (*Bos frontalis*). For over a century, and probably longer, farmers in Bhutan have been crossing Mithun bulls with Siri cows for hybrid vigour in progeny generations (Roder *et al.* 2001). From long time, Mithun-Siri cross and Siri cattle have been grazed in the broad leafed forest (Norbu, 2000). However, there is relatively little documentation done to understand the management of these cattle types plus a dearth of general information on Siri and Mithun-Siri cross cattle husbandry practices in Bhutan (Burgois Leuthi, 1999, Phanchung *et al.* 2001). This study aimed to improve existing information on Mithun-Siri cross and Siri husbandry practices in free grazing system in selected area of West Bhutan.

## **Materials and Methods**

### **Criteria used in selection of study area**

Selection of the study area was guided by the following criteria: (a) Reasonable access to study area, and (b) cattle were to be an important component of farming systems in the selected area; Mithun-Siri cross and Siri cattle are to be available in appreciable numbers.

### **Location of study area**

The study area was in Bongo *geog* (smallest administrative unit) in the Chukha District of Bhutan. Bongo comprises 15 widely scattered villages of which three were selected for study: Gedu Trashigang, Chasilakha and Jumja. The villages fall under humid subtropical zone and share similar physical and social environments and comprise 89 households, with relatively high populations of Mithun-Siri cross and Siri

cattle.

#### **Sampling of households for interviews**

The sampling frame in this study was the entire list of households keeping cattle; the sampling unit was households with Mithun-Siri cross and Siri milking cows. A list of households owning Mithun-Siri cross and Siri cattle was obtained from livestock census records maintained by extension agents. A preliminary visit was made by the researcher and an extension agent to locate the farm, and brief the farmer-herder on research objectives and potential benefits of participating in this research. Herders willing to participate voluntarily were selected in three strata: small herds of 1-5 milking cows (eight farms) medium herd of 6-10 milking cows (four farms) and large herds with more than 10 milking cows (two farms). In total, eighteen households (20 percent of total of 89 households) with at least one type of milking cow were purposively selected for informal interview/discussions. A few farmers-herders with Jersey cross cattle kept in the villages were also included to check if there were any differences in management systems.

### **Results**

#### **Milking practices**

During the first three to four weeks calves are allowed to freely suckle their dam, to get sufficient colostrum and milk. Thereafter calves are subjected to restricted suckling before and after milking. During every milking calf suckle the dam for few minutes to encourage milk let-down after which calves are separated from the cows, which are hand-milked, usually from right side. After milking, calves are allowed to suckle the remaining milk.

The number of quarters milked varied between farms. The frequency of number of quarters milked—two, three and three/two (three in mornings and two in evenings)—was observed and confirmed with the herders. The expected frequencies were calculated and a Chi-squared test conducted.

Results revealed a significant association between farm size and the number of quarters milked ( $p<0.001$ ). Most medium-level farms milked two quarters completely; the remaining two quarters are left unmilked for the calf. One large farm milked three quarters in the morning and two quarters in the evening. A few herders milked three quarters, leaving one quarter to be suckled by the calf. The proportions of cattle types which are milked for two, three, and three + two quarters differed (Fig. 1), but differences between number of quarters milked and cattle types were not statistically significant ( $p=0.062$  or  $p> 0.05$ ). Within a farm the same milking regime is followed in most cases, irrespective of cattle types.

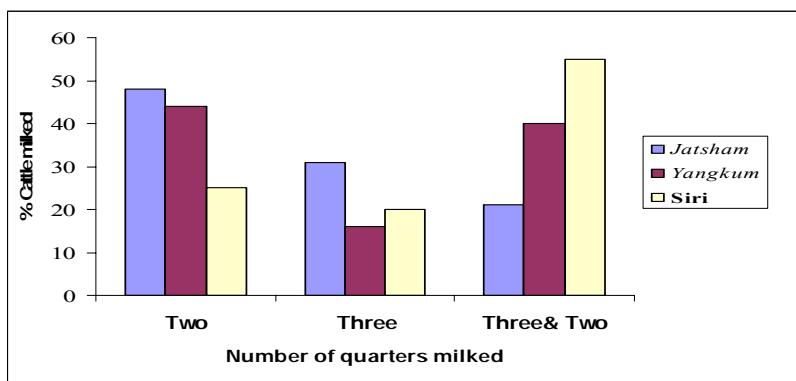


Fig. 1 Number of quarters milked, by cattle type

## Cattle Management

### Cattle migration and grazing management

Mithun-Siri cross, Siri and Jersey-cross with low exotic inheritance are generally migrated. The seasonal pattern of cattle management involves upward migration from lower valleys (homestead) of 1600-1700 m asl to 2000 m asl, where many farmers had access to natural grazing lands (*tshadroq*) in the higher altitudes in the vicinity of broad leaf forest. Cattle are kept there for about two months or until grass and

tree fodders are no longer available nearby. Each section of *tshadrog* is quite distinct, being separated by ridges, rivers, gorges or cliffs. These boundaries are respected by herders, who confine their animals within their own areas.

If herders do not have access rights to grazing lands, or small areas inadequate for their herds, they usually hire additional areas from others. Annual hiring charges were five to six kgs of butter or 40 *dre* (a standard *dre* contains 1.68 kg rice) locally grown milled rice per season. Some herders were also reported to be paying cash (*Nu.900*) for a season's access.

During migration, cattle are allowed to roam freely in the designated grazing areas. In May or June cattle are migrated further up the hillside, to altitudes of about 2500 m asl and kept there until July. By August the herd will start to descend, halting at about 2000 m asl until late October. By November-December the days gets colder, the principal crops are harvested and the herd is migrated to the village. Similar cycles are repeated every year.

Shortage of fodder is the principal cause of migration but other reasons include the utilization of available land, improve health and production of the animals and avoid damage to cultivated crops. Most herders (67 percent) follow traditional patterns of cattle migration within the district boundary. The other 33 percent have either completely stopped or reduced migration of their cattle.

Near the town and also in villages, herders who only had few heads of cattle with higher exotic (Jersey) inheritance were managed under sedentary system. Cattle are kept near the home throughout the year, grazing them in nearby scrub forest, fallow and barren lands and road side during the day and tethering them at the homestead at night.

#### **Supplementary feeding**

Most herders (61 percent) provided supplementary feed to milking cows and calves while 39 percent of herders fed only

the calves. Breeding bulls were given special care and periodically fed with raw eggs, butter and milk, in addition to supplementary feed. Feeds given were mostly wheat flour mixed with whey. Some herder also mixed mustard oil cake, maize flour, crushed maize, rice bran and local brew residues, depending on availability. The feed was cooked into porridge and salt generally added. Dry cows are not offered supplementary feed but occasionally are given salt.

### **Housing**

Most farms (67 percent) had temporary housing for adult cattle and calves made of wooden poles, singles (crudely-made planks) with bamboo mat and plastic sheet for roofing. Sixteen percent had semi-permanent houses made of roughly finished timber, with stone or plank flooring. Rooves were made of bamboo mat or banana leaf, which were invariably covered with plastic sheet (Fig. 2). The external plastic sheets were clamped with poles, tree branches and stones. Seventeen percent of farms did not have housing for adult cattle but had temporary sheds for calves.



*Fig. 2 Temporary housing of cattle at the village farms  
Breeding management*

Natural servicing was widely used in the study area. More than 50 percent of herders managed their own breeding bulls. Most had one or more Siri bulls; some had Jersey-cross bulls and one herder had a *Mencha* (Mithun-Siri, 75:25). Bulls were locally bred. At least three herders were reported to have had Mithun bulls but these had died in recent years, probably of

old age. Use of AI services was uncommon.

Herders with no breeding bull (44 percent) hired them from neighbours and relatives. If service of pure Mithun bull is utilized, herder had to pay Nu.500 for every *Jatsham* (Mithun-Siri 50:50, female) born and Nu.400 for a *Jatsha*(Mithun-Siri 50:50, male). The services of a *Mencha* (Mithun: Siri, 75:25) are also used: the owner expects to collect Nu.200 for a female and Nu.100 for a male calf if mating is successful. In addition, herders are usually obliged to take mustard oil and eggs to feed the Mithun bull and a bottle (750ml) of alcohol locally brewed from grains (*ara*) to please the owner. Services of other types of bull are reported to be free.

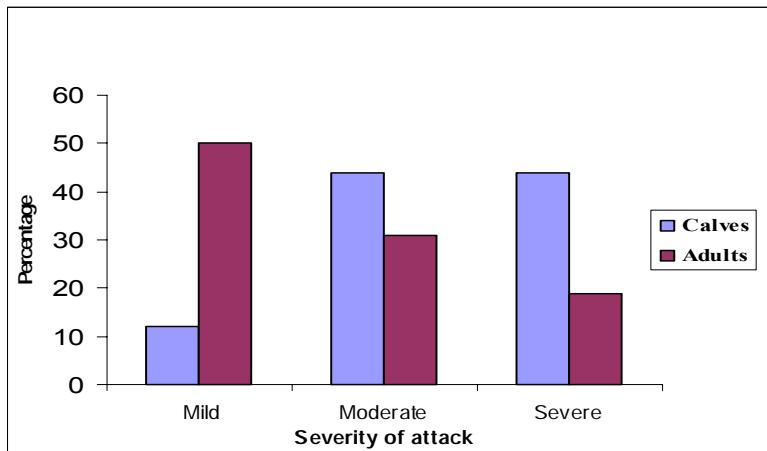
Tradition of back-crossing for several generations with Siri bull are also not regularly followed. Backcrossing is stopped at the *Yangkum* (Mithun-Siri 25:75, female) generation in most cases. Some farmers have also started crossing *Jatsham* with Jersey bulls and their progeny is known as Jersey-*Yangkum*. Emphasis from Government agencies is for introduction of Jersey blood and farmers' curiosity on improving milk yield were reasons for trying the scheme.

#### **Animal health**

Herders in the sample reported that some 13 adult cattle had died in the previous year. Causes included accidental falls, being caught in hunter's traps, attacked by predators, Enzootic Bovine Haematuria and bloat. Around 33 calves had died in the same period. Calf mortality rate was estimated at 24 percent. Highest incidences (31 percent) of calf mortality were due to attack by wild dogs, and diarrhoea (25 percent). Bloat, weakness, coccidiosis, accidental fall, liver flukes, and natural calamities such as hailstorm also killed some calves.

Severity of wild dog attacks on cattle was estimated by noting the observed frequency of severity (severe, moderate, mild) on calves and adults. The expected frequencies were calculated and a Chi-squared test applied. It revealed a significant association ( $p=0.04$  or  $p<0.05$ ) between wild dog attack and

age of cattle. Attacks on adult cattle were generally mild to moderate but severe in calves (Fig. 3).



*Fig. 3 Severity of predator attack on cattle*

#### **Management constraints**

Most herders believed that a good Mithun bull is preferred over other breeding bulls and have requested the government agencies to supply them one. Many herders however had their own breeding bulls other than Mithun bull. Herder narrated that some locally available bulls sired undesirably small calves and in other cases cows failed to conceive after the services probably due to the use of young or infertile bulls.

Fodder scarcity is reported to be a problem in the vicinity of the town and areas where there is commercial logging. Over the years there had been increase in the time required for fodder collection.

Many herders said that labour shortage is an emerging issue. Changing expectation and lifestyles of young people often means they are not keen to remain farmers. They prefer to live in towns and look for easier jobs. Most children who help the family in herding must also attend school. Thus, the

limited labour available in small isolated communities strongly affects management options.

## **Discussion**

### **Milking practices**

Calf survival strongly affects milking practices of village farmers. Cattle are very significant items of capital and wealth: death of calves often leads to cessation of lactation. Ensuring survival of calves dominates the suckling regime of village farms for sustained milk production, especially in early lactation. The conventional wisdom among Bhutanese herders is to not milk cows for about three to four weeks, allowing calves to suckle freely and gain a healthy start. Calves with free access to the dam's milk have better weight gain than calves which are subject to restricted suckling (Coulibaly and Nialibouly, 1998). Such a healthy start is essential for survivability of calves because they do not get extensive care afterwards, due to constrained resources and inadequate knowledge of herders on modern husbandry practices. Once calves are about one month old they are subjected to restricted suckling: typically two quarters are milked if the calves are less than five months of age and two quarters are left for calves to suckle. The dam's milk provides the major share of supplementary nutrition because herders cannot provide appropriate replacement feeds. By about six months of age calves are considered mature and able to graze and manage their own feed; one quarter is left available to suckle until lactation ceases.

### **Cattle management**

The most common cattle management practice is though periodic migration. But unlike high-altitudes herders, mid-altitude herders in the study area did not migrate their cattle over long distances but manage them within the periphery of the villages, and the forest and natural grazing lands in the same district. This might be a result of congenial weather conditions, especially rainfall and temperatures adequate for grass growth in nearby forests, plus favourable weather for cropping in the lower valleys.

The majority of the farms lacked cattle housing and feeding equipment and the rudimentary nature of cattle husbandry practices soon becomes apparent. For farms with no housing, adverse weather such as rain stressed the animals and there were reductions in milk yield. Damp and narrow sheds resulted in overcrowding of calves, making them vulnerable to diseases.

Fodders grazed under forests are coarse and could have lower nutritive values than pasture grasses. Supplementary feeding is necessary to meet nutritional requirements if farmers are aiming for increased production levels. But the low milk yields of local cattle do not encourage farmers to offer adequate quantities of protein-rich feed stuff such as mustard oilcake. The diet remains largely unbalanced with high proportions of roughage and fibre, low levels of protein, and no vitamins and minerals except salt. The poor performance and early drying-off of cattle is inevitable when the availability of good quality fodders is low and nutrient demand is high.

Breeding is mostly undertaken through the natural service. Artificial insemination is not used because of the distance from AI service centre. The traditional breeding practice of successive backcrossing for several generations appeared not to be common in the study area. In the word of 60 years old herder Ap Khandu of Gedu Trashigang village, "*progeny generation after Yangkum is useless and has no economic value*" (Ap Khandu, *pers. comm.*, 2004). The small number of milking cows in the sample villages between the *Yangkum* to *Siri* generations also supports the views.

Many herders still prefer Mithun bulls for crossing with local *Siri* cattle at the village farms. The low output from Government Mithun breeding farms has made it difficult to meet herders' strong demands for Mithun bulls (MoA, 2001). As an alternative, the importation of Mithun bulls continues but it is becoming more difficult to obtain good quality Mithun from their home tracts in India. As a result of the

destruction of habitat through uncontrolled hunting and slaughter during periods of elections and religious ceremonies, the Mithun is believed to be under threat of extinction in India (Gupta *et al.* 1999). Uncertainty about the availability of replacement stock for the government's Mithun breeding farm and the lack of quality breeding Mithun bulls at the village level is becoming a cause for concern.

Calf mortality in particular was seen as causing double loss, *i.e.*, for families with small capital reserves, the death of a young calf represents a two-year investment gap plus the loss of food and income from one season's milking. The high mortality of calves could be attributed to poor management and lack of proper care. In the tropics, Williamson and Payne (1965) mentioned that mortality of calves can be as high as 50 percent due to poor management.

Herders frequently mentioned predator attacks but other major diseases of calves are diarrhoea and coccidiosis, which probably result from inadequate housing and sanitation. Young calves were more vulnerable to predators such as wild dogs because they cannot defend themselves or escape, as adults do. Though adult cattle especially *Jatsham* and pure Mithun according to farmers are very self defensive and predators cannot attack them easily, they cannot protect their calves as they are grazed in different area to prevent suckling. Traditional approaches to cattle management are inevitably changing. A number of herders have now stopped migrating cattle to their family home in the north during the summer and to the lower areas in winter. They have been permanently settled in the study area for about a decade. The reduction in the transhumant system is an indication of herders' gradual shifts in attitude, now favouring a more modern, market-based production system. Such changes are welcomed by development agencies, as they ease the introduction of cross-breeding programs and health monitoring.

Some herders have also begun diversifying their range of economic activities, establishing shops at the roadheads and

towns, while others are involved in contract and other off-farm work. It is very likely that the traditional systems of cattle herding and management will decline as alternative economic opportunities emerge in the future.

#### **Farm labour shortage**

Limited labour availability is one of the key issues faced by the herders. As most farms are family managed and part of very small communities, family size largely determines labour availability. With the high priority now given to education, most children who would have helped in farming—especially animal herding—are now enrolled in schools and only available to help the family during vacations. Some educated children are employed in government and private organizations away from home and their ageing parents are unable to extend their range of activities. Herders now face options such as hiring labour, changing farming practices or leaving land fallow and renting out cattle to tenant herders.

#### **Conclusion**

Traditional free grazing practices involving mostly Mithun-Siri cross and Siri cattle is a dominant cattle management system at the village farms with only few farmers practising sedentary system. Limited labour availability could have contributed to the continued practice of conventional "low input—low output" cattle management systems, with slow adoption of intensive cattle management practices in the far flung villages.

In the vicinity of town, farmers are increasingly rearing few but higher yielding Jersey-Siri cross cows which are better fed and housed. Close to the town there is real demand for liquid milk and also the price incentives. Their access to a ready market for liquid milk seems to be a driving force in restructuring the traditional herd. It is forecast that traditional cattle management system may not continue long near urban milk markets. However, most Bhutanese rural families live some distance from urban communities. For these people, the tradition of Mithun-Siri cross cattle will

continue because of real benefits obtained from combinations of milk yield, draught work, adaptation, hardiness, market value and other significant factors. It is therefore becoming clearer that promotion of high yielding exotic breeds in remote rural areas is unlikely to be successful if no substantial market for liquid milk is available. The cattle development interventions should be designed to benefit both peri-urban and rural households.

There are indications that changes are occurring in traditional cattle herding lifestyles. There is a gradual reduction in transhumant systems in some areas and some farmers are diversifying their economic activities such as opening shops for additional source of income are some of the examples. In future, some farmers may also invest more on cash which has high market value, such as cardamom. It is likely that, as more alternate economic opportunities emerge, traditional cattle herding systems may continue a slow decline although not disappear completely.

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