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Management of rangelands and forests for sustainable Mithun farming by Chakhesang tribe of Nagaland

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Introduction

Mithun (*Bos frontalis*) belonging to the family Bovidae is a unique bovine mainly found in the North-Eastern hilly region of India and neighbouring countries (Dhali *et al.*, 2009). The animal has an important place in the socio-economic life of the tribal communities and primarily reared as sacrificial animal during religio-cultural ceremonies. Feeding habits of Mithun differs from their domestic counterparts cattle; like they prefer browsing as compared to the grazing behaviour of the later. Mithun forage on forest grasses, shrubs and tree leaves available in the jungle and they nibble them like goats (Gupta *et al.*, 1996). As mithun prefers browsing, so they are reared in demarcated forests and rangelands under natural conditions by the tribal communities and during the course of rearing, these communities manage both, the mithun and forest ranges.

Land owning pattern in Nagaland is different and most of the land is owned by the community that gives right to use and manage the resources to mithun owners. Forest departments owns certain category of forests classified as Reserved forest, Protected forests, Wildlife sanctuaries, National Parks and Botanical gardens that comprises of about 16.7% of the total available forest area. Remaining around 83.3% of forests are owned by the villagers and Government has no control over these (Singh *et al.*, 2009). Since the Government has very limited role, so management practices largely varies with the communities residing there. Communities have their own way of exploiting resources and to replenish them and that differs with the communities. The farmers who owns mithun has more proximity with forests and rangelands so management practices adopted by them is being presented in this paper.

Materials and Methods

Study site: The study was conducted in the Phek district of Nagaland, India, which is the home tract of Chakhesang tribe. The district is inhabited by Chakhesang and Pachury tribes and according to the 2011 census district has a population of 163,294. Three Chakhesang villages *i.e.* Porba, Middle Khomi and Thetsomi villages were randomly selected to study the management practices adopted by Chakhesangs for sustainable mithun farming.

Sampling: Group discussions and key informant interview was carried out between August 2013 and September 2014, however individual survey and responses on structured questionnaire was conducted between October 2014 to January 2015. There are 14 development blocks in Phek, three of them namely Meluri, Phokhungri and Phor are dominated by Pochuries so these blocks were excluded. As per 2012 livestock census, 4665 mithuns are available in Chetheba, Chizami, Chozuba, Khuza, Raziaba, Sakraba, Sekruzu, Phek Sadar and Zuketsa blocks and three villages were selected from these blocks randomly.

Questionnaire: We conducted a structured questionnaire with open and closed-ended questions. Questionnaire design was based on regular discussion with the community elders and inputs from field observation and key informants' interviews. The questionnaire was pretested and adjusted to suit the situation in the field. All the interviews were conducted with translators fluent both in English language and Chakhesang tribal dialect.

Statistical analysis: Simple statistical analysis using IBM SPSS Data Editor Release 21 was carried out to determine the frequencies and percentile of the responses obtained from the subjects.

Results and Discussion

Like other tribal state of India Nagaland has a typical land ownership. Most of the available land belongs either to village community or to clan and in some cases to individuals. The individual's right is exclusively determined by tradition which is also referred to as "customary laws" (Singh, *et al.*, 2009). Demographic profile of the participants presented in table 1. Shows that out of total 102 participants surveyed 3.92 % were female and 96.08 % were male. Average ages of the respondents were 47.52 years with a range of 20 to 90 years. The educational status has been recorded as 3.92 % Graduate and above, 4.90 % Intermediate, 47.06 % Matric and 44.12 % Primary to no education. This indicates that the

participation of highly educated group in mithun rearing and management of the forest and ranges is less likely as only 8.82 % of the respondents are having qualification above matric.

Table 1: Demographic characteristics of the survey participants

Characteristics of participants	Frequency	Percentage (%)
1. Gender		
	Female	4
	Male	98
2. Average age	47.52 years (range 20–90)	
3. Education		
	Graduate and above	4
	Intermediate	5
	Matric	48
	Primary to no education	45
4. Ethnicity	Tribal	102
		100

Socio-economic profile of the respondent presented in table 2 indicate that all the respondent are land owners and 60.78 % of them own cropping land more than 5 ha, whereas remaining 39.22 % have cropping land less than 5 ha. Majority of (76.47 %) respondents have average annual income less than Rs. 1,00,000. Most of the farmers (63.73 %) owns 1-4 mithuns, whereas only 7.84 % owns more than ten mithun.

Table 2: Socio-economic profile of the respondents.

Parameter	Frequency	Percentage (%)
Cropping area available (≥ 5 ha)	62	60.78
Cropping area available (< 5 ha)	40	39.22
Annual income less than Rs. 50,000	32	31.37
Annual income Rs. 50,001 to 1,00,000	46	45.10
Annual income Rs. 1,00,001 to 1,50,000	11	10.78
Annual income more than Rs. 1,50,000	13	12.75
Possessing more than 10 Mithun	8	7.84
Possessing 5–10 Mithun	29	28.43
Possessing 1–4 Mithun	65	63.73
No Mithun	0	0

The management of rangelands differs from one village to other but few practices are common. All the mithun ranges are fenced with either barbed wire fencing or with locally available materials like bamboos and timber and non-timber trees. Majority from Porba (95.83 %) and Thetsomi (100%) opined that they practice regulated grazing during June and July, however 95.65 % respondents of Middle Khomi said they don't practice regulated grazing. All the villages practice ban on hunting but timing of ban differs. Porba and Thetsomi villages observes ban of hunting in mithun ranges from January to November, however M. Khomi practices ban from February to July. All the villages shift their mithun from one range to other when there is scarcity of fodder grasses and trees leaves. Farmers of Middle Khomi and Thetsomi village carry out community tree plantation in the forest and ranges annually and cost of saplings and labour in managing the saplings both is shared by beneficiaries only. However such mechanism is absent in Porba, but when they cut trees for fire wood then replanting is mandatory from the village council.

Table 3: Measures applied for managing Ranges and forest (Percentage value are given in parenthesis):

Parameters	Middle Khomi			Porba			Thetsomi		
	Yes	No	No Opinion	Yes	No	No Opinion	Yes	No	No Opinion
Fencing of Ranges	46 (100)	-	-	48 (100)	-	-	8 (100)	-	-
Regulated grazing	2 (4.35)	44 (95.65)	-	46 (95.83)	2 (4.17)	-	3 (37.5)	5 (62.5)	-
Control of hunting	46 (100)	-	-	48 (100)	-	-	8 (100)	-	-
Community tree plantation in the forest and ranges carried annually	44 (95.65)	2 (4.35)	-	2 (4.17)	46 (95.83)	-	3 (37.5)	5 (62.5)	-
Sapling cost and labour both is shared by beneficiaries	44 (95.65)	-	2 (4.35)	2 (4.17)	46 (95.83)	-	-	8 (100)	-
Whether grazing of animals is charged by village council	44 (95.65)	2 (4.35)	-	2 (4.17)	46 (95.83)	-	-	8 (100)	-

In the opinion of 28.43 % farmers access to firewood is open to everyone but quantity is restricted, however 71.57 % expressed that the area is defined for the particular families. In general they classified forest and rangelands in different categories as 5.39 % reserve, 25.29 % as protected for livestock, 50.29 % for jhum, and 19.02 % for other purpose. The other economic benefits from mithun ranges they are getting includes recreational and hunting opportunity, cultivable land as jhum, timber and non-timber wood, watershed catchment benefits for zabo cultivation, availability of ethnobotanical and medicinal plants, animals of zoo-therapeutic value, fuelwood, honey, wild fruits, mushroom, employment opportunity, and others valued wildlife products for aesthetic reasons of traditional tribal culture.

Conclusion

Rangelands and forests not only support sustainable mithun farming but also provide variety of other benefits to mithun reares. As the custodian of these ranges they practice certain sanctions like regulated grazing, banning of hunting, prohibition of indiscriminate felling of trees etc. and avails number of other benefits from the forest and rangelands like medicinal plants, animals of zoo-therapeutic value, fuelwood, honey, wild fruits and mushroom.

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