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## Yak rearing practices by (Brokpa) pastoralist of Tawang Arunachal Pradesh

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### Abstract

Yaks are being raised along with the border high altitude terrains of Arunachal Pradesh, Jammu and Kashmir, Himachal Pradesh, Sikkim and West Bengal. In Tawang districts Brokpa are the pastoralist belongs to Monpa tribe, whose profession and livelihood is dependent on yak rearing and use resources like high mountain pastures characteristically by migratory patterns. Brokpas have a base, usually in a traditional winter area, and make well-established moves with their livestock to seasonal pastures. The present study was conducted in district Tawang Arunachal Pradesh during 2016-2017; two blocks were Jang and Zemithang. Purposively 12 Villages were randomly selected in each village with five respondent's surveyed (total 60). The study revealed that yak rearing and related traditions are losing their charm in the recent era due to the modernization; in-breeding and unavailability of pure yak germplasm, climate change threats, diseases incidences and declining of forests and shrinking of grazing pastures in high altitudes some of the reasons in the decline of yak rearing. To promote sustainable yak rearing work and interventions should focus on developing pastures and grazing rangeland, introducing high-yielding fodder species, supplementary nutritional feed, establishing initiating free yak breeding center services, highly subsidized yak breed improvement schemes, improving through animal and veterinary healthcare facility.

**Keywords:** Brokpa, yak crosses & hybrids management, livelihoods, pastoralism, yak rearing

### Introduction

Arunachal Pradesh is that the largest in area among North – Eastern states and is that the second largest forest-covered state next to Madhya Pradesh within the country. It is bounded on north long international border with Bhutan to the west (160km), China to the north and north-east (1,080 km) and Myanmar to the east (440km) on the south by the state of Assam and on the east by Nagaland. Tawang is a land of Monpa tribes, is a small district blessed with breath- taking natural beauty. Tawang is situated is the north-western extremity of the state of Arunachal Pradesh. The Brokpa, the nomadic herders they live during the harsh winters, in the lower regions, and in summer they migrate to higher altitudes moving between 9,000 and 15,000 feet. All Brokpas have links with agricultural communities (ungpa) at lower elevations to offer them with grain in exchange for livestock products. And they all raise the same type of animals: yaks, yak-cattle hybrids and sheep. They also share a similar language which belongs to the Tibeto-Burman group of languages and culture; across the region, they can usually communicate with each other in Tibetan, even though their local dialects differ. The Brokpas are all ardent believers of Buddhist practices and their religious and cultural practices are also similar<sup>[8]</sup>. Yak farming is a sustainable enterprise and sustains the livelihood of rural communities in the high Himalayan Mountains. The yak (*Bos grunniens*) may be a unique and multi-purpose animal of high mountain areas of Himalayas. As per livestock census 2019 that yak population in Arunachal Pradesh has jumped to 24,075 in 2019 from 14,061 in 2012, an increase of 71.22%<sup>[1]</sup>. In Arunachal Pradesh, yaks are mainly found in West Kameng and Tawang districts. Unique Arunachali Yak breed reared by Monpa community for milk, meat, fibre, transportation and manure. The Monpas who are inhabiting within the highland of those two districts are mainly trusted livestock for his or her livelihood and it's also reported that 62 per cent of their livelihood requirements is fulfilled by yak (*Poephagus grunniens* L.)<sup>[24]</sup>. Present study has been undertaken to address yak rearing practices by (Brokpa) Pastoralist of Tawang Arunachal Pradesh.

## Materials and Methods

The present study was undertaken in district Tawang Arunachal Pradesh during 2016-2017. Two blocks were Jang and Zemithang selected purposively in each block 6 Villages were selected under Jang (Lhou, Jang, Thingbu, Shyro, Jangda and Kharsa) under Zemithang HQ block; (Zemithang, Lumpo, Kharman, Muschut (Kharakpu) Shoktsen and Gorsam). In each village five respondents were selected and surveyed (total 60), list provided by the Village Extension Workers and personally interviewing with questionnaire developed Informed consent has been obtained from the Gaon Burha (Gram Pradhan) for sharing and publishing their knowledge system. Focus group discussions (FGD) were made with selected Brokpa people to know about the information regarding yak rearing and other management practices. Secondary information was collected from line departments, professional researchers and officials to cross-check the primary data. Moreover, the literatures, reports and documents related to this study are reviewed as the references to testify the information we obtained and collected.

## Results and Discussion

**Socio-Economic Status** The pastoral nomad of the Monpa tribe is popularly known as Brokapa (tenant herdsman) and transhumance system of livestock rearing is their main source of livelihood. The future of transhumant pastoralists depends on the way they will manage their stay and livestock in overstocking winter grazing land [22]. The family system is patriarchal, patrilineal and patrilocal. Adoption of son / daughter by childless couple or those who have not blessed with son is also prevalent in the society. Polyandrous marriage system is common among the Brokpa due to their hard economic nature of other people by paying different form of grazing fees like Lamrin, Purin, and Tsarin. The grazing grounds are mostly belonged to the community, clan, personnel and monastery. In case of community pasture, a particular revenue rate is priced by the village council (Mangma) which generally coincides with a ritual performed in respective village Gonpa. The fee which is paid in form of butter and cheese are usually donated to the Lamas (Monks/Buddhist priest) for use in the Gonpa of life. Diversity of this district is congenial for commercial cultivation of both tropical and temperate fruits, Orchid species, Potato, Ginger, Species, Medicinal and Aromatic plants etc [20]. They practice both permanent and shifting (*Jhum*) cultivation. Maize, paddy, millets, wheat, buckwheat, barley, soybean, chilli, French bean, cabbage and potato are major crops grown by this tribe [2, 6]. The Monpas have generally three meals in a day, the first meal taken in the early morning before going out to the fields, forest or other business, While going to the forest fields, cooked items taken for lunch in a bamboo basket third meal is consumed at home in the evening [21]. The main food of Monpa is rice and millets. Monpas are traditionally dependent on nature and natural products for food and medicines [21].

## Breed and Breeding

In Arunachal Pradesh a unique yak breed named Arunachali found in West Kameng and Tawang districts. The phenotypic characteristics are coat colour is predominantly black with middle sized and compact body, Legs are short and stocky, and horizontal ear is typical characteristic of Arunachali Yak. Brisket, belly, ribs, lateral parts and legs were covered with long hair. Adult body weights ranges between 206 to 416 kg,

males are massive and aggressive [19]. Milk has high fat content in milk up to 7.45%. Arunachali yak produces an average of 1.3 kg milk per day, which is comparatively poor quantity, but it is remunerated by high fat content for producing different milk product [7].

## Yak Crosses and Hybrids Management

Yak and its crossbreeding play an essential role in Brokpa's livelihood not only as the food source but also as the material for cloth or religious tool, and bride-price. The "Yak Dance," indicating the legend of introducing Yak into this region long time ago, and performed at "Lossar Festival (Monpa's New Year Festival)" in February, is also reflecting such an importance of Yak and its crossbreeding [28]. The problem of inbreeding has also affected the Brokpa yak herds Wakhan Corridor was closed, leaving no possibility for Wakhi and Kyrgyz herders to urge new yak germ plasm [32]. The wild 'pure breed' yak population, estimated at no quite 10,000 to 15,000 peoples, is now in China's Tibetan Autonomous Region (TAR), where border control is strict and free-crossing of yaks and their herders from the surface area has been restricted. The closure of the 'pure yak region' in Tibet has given rise to a significant problem of inbreeding within the yak herds within the rest of the Himalayas. Past few decades, and the resultant practice of prolonged use of the same bull within herds," are according to [32]. The hybrids are extensively used as milch animal. The history of crossing yak with local cattle dates back 3,000 years [30]. The genetic make-up of *B. grunniens* (60 chromosomes) is analogous thereto of *B. taurus* and *B. indicus* and their interbreeds. The hybridization of yak with cattle is common practice in several parts of India. Dzo (male) and dzomo (female), is that the first generation hybrid between cattle and yak. From economic point of view Dzomo is the best livestock for Brokpa as this animal can survive on moderate climatic condition and gives highest milk and milking period [27]. In Bhutan zom is a cross between a Yak (*Poephagus grunniens*) and a Tibetan bull (*Bos taurus*). The zom is report to have longer lactation length and produce higher daily milk of lower density as compared to a yak, which could be linked to heterosis resulting from crossbreeding [29]. Brokpas are bound to keep varieties of animals in their herd as some animal of low quality cross with yak. These cross hybrids are one of the best qualities for milking purpose. But the F1 male hybrid (dzo) cannot produce sperm, which prevents the heterosis from being inherited, Castration practice is done to some specific animal such as Dzo which are usually kept for transportation. If population is more selected castration is more done. The cross breeding/hybridization can benefit from the higher performance of hybrid vigor and the crosses are better adapted than the parents to various range of altitudes/ecological zones [9]. Brokpa have a congenial relationship with their neighboring villages and even with the people of neighboring country (Bhutan). They have a reciprocal social institution which plays an important role especially in the exchanging the male and female yak breed.

## Impact of Climate change

Global warming may cause a variety of risks to mountain habitats by affecting the distribution of plant and animal [4]. The gradual increase of environmental temperature in yak tracts may affect the thermo-neutral zone of yak which ranges from 5° to 13°C [31]. Restricted mobility of Yaks has adapted to high altitudes, but not to human-made lines on the map

Indian Himalayas Yak also facing threat of climate changes<sup>[10]</sup>. Transhumance system of livestock rearing is a source of livelihood among the Brokpa pastoral nomads inhabiting in the climate sensitive yak tracts of Arunachal Pradesh<sup>[16]</sup>. This primitive pastoral nomad has their own traditional coping mechanisms as adaptation strategies<sup>[16]</sup>. This transhumance pastoralism provides almost same ambient temperature round year which is also one of the important practice to lower the heat stress in yak<sup>[13]</sup>.

### Shelter Housing and Management

Brokpas make their houses usually in traditional style; living standards are tough due extreme cold and harsh climate, houses are constructed by using stones, wood and other local available materials. During migration houses are open and kutcha type, tents were also seen. Shelter for yaks are entirely separate during migration, housing is 100 percent with kutcha flooring. Most houses are full walled but some of also have half wall structure. Houses are without ventilation and drainage facility with poor hygiene condition.

### Reproduction and production

Yaks are well adapted to the extremely harsh alpine condition and play a vital role in the economy of pastoral communities. Depending on breed, site and sort of management, the productive and reproductive traits of yak are found to differ (Pal 1993). First mating age were view in yak bulls around 3.0 years were female first calving age is noted 3.5-4.0 years. In central Asia, a mature female yak weighs within the range of 200-320 kg while males are heavier by 30-50%<sup>[31]</sup>. The average milk yields range from 200 to 400 Litre for the first six months following calving. The sign of first estrus in central Asian yaks occurs around two years age and first calving seen at age of 4 years. However, these traits of central Asian yaks differ from those of the yaks in the Himalayas<sup>[31]</sup>. Yak breeds within the warmer months with gestation period of nine months generally like cow and provides birth to young calf during April to July. Most yaks give birth to young calf at 4 to 5 years of age. The working life of Arunachali yak is about 10-12 years<sup>[25]</sup>. The alpine pasture decreased in vegetative above ground biomass and composition which ends up in starvation or loss of body condition seemed to be manifested as reduced fertility in yak with low milk yield<sup>[14]</sup>.

### Feeding behavior

Very scanty facts are known about the feeding behavior of yaks. The grazing time normally varies from 34-80 % of the total time available for grazing. The remaining time is spent in walking, resting, drinking and mastication. Grazing time: During hot and humid season when lush growing pasture is available they spend relatively less time to satisfy their appetite because in winter they spend much more time in search of feed. Herbage cover and season are main factors affecting the grazing behavior. Indian yaks lose 25-30 % of their body wt. during winter due to inadequate fodder. They generally avoid poisonous or thorny plants. But during lean period due to acute shortage of green pasture they graze on poisonous weeds and suffer from poisoning<sup>[18]</sup>. During winter season, pasture is roofed with thick layer of snow; yaks mostly use hoof, horn, head and muzzle for digging the snow layers, due his strong sensitively developed olfactory organs. In early summer when the pasture is covered with lush growing long grasses, tongue is more actively used for ingestion whereas on pasture of short grasses, lips and incisor

teeth are active.

### Fodder resource and Feeding management

Yak prefer fresh, high-quality forages, rise in temperature can reduced the voluntary feed intake, varies with the season and sward heights, from 18 to 25 kg of fresh forage in summer, whereas 6-8 kg per day, depends on wilted grass and cold-season grazing conditions<sup>[3]</sup>. The periodic feeding pattern is common in yak herders includes the normal migratory feeding system. The alpine pastures (4500 m and above) are graze for the four months of June to September. The center hills (3500 4500 m) are grazed from the month of March to May because the animals migrate up to the high pastures and again on their return during October and November. The winter (December to February) is then spent on grazing below 3000 m. The herders and families stay within the village during the three winter months, and their Yak graze pastures with other animals like cattle, sheep etc<sup>[5]</sup>. Some of the edible grass species found within the yak rearing tracks of NE-India: – *Kyllinga monocephala*, *Poa annua*, *Fimbristylis squarrosa*, *Eragrostis spp.*, *Alopecurus spp.*, *Pogonatherum crinitum*, The locally available tree fodder are: *Phrengpa (Quercus wallichiana)* – *Dudhilo (Ficus nemoralis)* – *Chiple (Reevesia pubescens)*, *Zimbu (Ligustrum myrsinitis)* Pasture Grasses Tree Fodder: *Syluli (Acer campbellii)* *Matekpa (Quercus fenestrata)* orchard grass white clover<sup>[23]</sup>. Shrinkage and degrading high altitude pastures might be rejuvenated by introducing suitable temperate grasses and legumes species like orchard grass, perennial ryegrass and white clover for sustainable yak husbandry practices. Lower altitude pastures might be rehabilitation by establishing silvo-pastures with suitable fodder trees to supplement feed for yaks during winter scarcity period<sup>[23]</sup>. During fodder scarcity supplementary feeding of animals offered cereal grains maize, barley, rice polish, flour, wheat bran etc. roughages paddy straw and barley straw. Yaks have great looking for salt. This habit has been use to focus for animals returning from pasture to get their salt on fixed day and salt is offered at weekly or twice in month. Yaks normally drink water directly from stream/river and in scarcity or absence of water they usually lick snow in winter.

### Products from Yak and their Utilization

Brokpas and Monpa tribes are widely consumed yak milk and their products like cheese, butter etc, fill a crucial niche in lifestyle and are a resource for livelihood. Different utensils are used for specific purposes in several stages of processing milk products which are made from bamboo and wood. Chhurpi a well staple chew type food prepared by Yak milk, consumed round the year. Yak fat is well known as ghee is usually used in chhurpi and other different dishes<sup>[21]</sup>. Yak meat mostly used by Monpa tribes on various festivals and occasionally, surplus amount of meat cured in sun light which is used during the off-season. Wool of yak has some special characters like warmth, odour resistance, breathability, softness, and strength, immune to static. Yak horns are sign as holy and used for decorative purposes. The tail also has religious value. They're washed properly and tied with a rope tightly during a wooden handle to form Chawar (yak tail fan) used for deity worship mostly seen in Sikh gurudwara. The tails also are used as a fly whisker in some areas of India. Yak skins mostly used for decorative purposes and also to organize hide, tents to resist cold, and Mura (stool)<sup>[11]</sup>.

### Disease incidences

Foot and Mouth disease is that the most serious but seasonal, with highest incidences recorded, other incidences followed were diarrhea and babesiosis. Infections of Endo-parasites are common cause heavy mortality seen especially in calves. Protozoa and helminthes infections were prompt during spring followed by rainy, autumn and winter seasons. Viral diseases, some diseases like foot and mouth, brucellosis, infectious bovine *rhinotracheitis*, *hemorrhagic septicemia*, *chlamydiosis*, *salmonellosis*, gid, and tick-borne diseases are causing death of yaks which successively minimize yak productivity also reported by [12]. Toxic plants eaten by yak is common during scarcity of fodder, Consequence of overgrazing, the intake of toxic weeds - pyrrolizidone alkaloid in *Senecio* especially - has created problems [17].

### Ethno-Veterinary Practices

Monpa Tribes are curing different diseases and disorders by using ethno veterinary medicines by their informal experimentation, site specific observations and locally available medicinal plants. They are using different types of plant and their parts e.g. bark, leaves, root, meat, fish, egg and alcohol as medicine for treatment of yaks and crossbreds. Tribes also using alcoholic beverage called rakshi made of millets in different ailments and disorders. Mixture of corns & stem of colocasia and shishnu leaves are boiled given during weakness and pregnancy in yak. Minangmose (*Gymnocladus assamicus*) an endangered vital tree species is useful for diverse needs, the ripe pods warmed cure for inflammation, soaking the pods in water, treated as disinfectant for cleaning wounds. The extract from the ripe pods is also use to remove leeches from animals [26]. Nyan thub a plant (*Thalictrum Foliosum*) roots were used for treatment of inflammation and ephemeral fever in yaks [15].

### Conclusion

To encourage yak rearing, first of all recognize the impact of climate change on yaks and their habitats. Urgent action is needed for minimize these natural and human challenges to conserve the traditional pastoral systems work and interventions should also focus on nutritional aspects, establishing yak breeding centers, initiating free or highly subsidized pure germ plasm yak breed, improving animal healthcare and veterinary services, improvement schemes, development of grazing pasture and rangeland, Emphasis more on focusing value addition through promotion and establishing the market linkage network for use of yak products.

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