

Can the Bhutan Yak Federation Revitalize Waning Yak Herders' Enthusiasm and Rejuvenate the Declining Yak Farming in Bhutan



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ABSTRACT: Yaks, native to Bhutan and other Himalayan regions, play a crucial role in the livelihoods of highlanders, serving as sources of milk products, meat, transportation, fiber, and even dung used as fuelwood for cooking. Concerned about the perceived decline in the country's yak population, the Bhutan Yak Federation (BYF) was established in 2019 to support highlanders. Presently, the BYF consists of 268 males and 203 females, representing 1067 yak rearing households. Its primary objectives include advocating for policy and investment support and promoting yak farming as a vibrant and sustainable enterprise. To gain a deeper understanding of BYF's roles and functions, this study focused on the Lingshi and Sephu yak cooperatives under the Thimphu and Wangduephodrang districts, conducting phone interviews with 40 cooperative members. The study revealed that highlanders primarily generate income through the sale of cordyceps, followed by yak products, portering services, and medicinal plants collection. However, the income from yak product sales is only sufficient to cover the cost of feed resources for the yaks. Lack of adequate feed resources, especially during winter (n =40), and wildlife predation without compensation were identified as significant challenges faced by the herders. On average, each family loses 7 to 8 yaks annually due to wildlife predation, with additional issues of depredation by feral dogs and gid diseases in the Lingshi block. The BYF is an innovative initiative of the Department of Livestock, Ministry of Agriculture, and Forests, aimed at empowering herder communities to shape their future. Recognizing that herders nationwide face similar drivers of change, including socio-economic factors and the impacts of climate change, the BYF emphasizes the need for collective and united action among yak herders and various stakeholders involved in highland research and development. Currently, BYF is in the process of preparing a five-year strategy that will provide valuable guidance and direction for multi-sector engagement and partnerships, intending to revive and sustain the diminishing yak farming practice in Bhutan.

KEYWORDS: cooperative, farmers, federation, highland, yak

INTRODUCTION

Yaks (*Bos grunniens*) are native species to the Himalayan range and the Qinghai-Tibetan Plateau, thriving at altitudes ranging from 2,500 to 6,000 meters above sea level, in a cold, semi-humid climate (Wangda, 2018). In Bhutan, the communities of the high-altitude areas are comprised of sedentary farmers and nomadic pastoralists (Ura, 1993). However, the majority of yak herders are transhumant pastoralists who move with the yaks to higher altitudes in the summer and migrate to lower altitudes when temperatures become extreme. Similarly, yak herders in Nepal also practice both sedentary farming and transhumance pastoralists (Paudel, 2018).

Yaks are primarily raised for their milk products, meat, transportation, and fiber. Additionally, yak dung is used as fuelwood for cooking by the nomads. Typically, yaks are raised under a free-ranged system in the high mountains, where the air, water, and pasture are free from pollution. Therefore, their products are considered organic and natural, opening many untapped opportunities to uplift the economy of yak herders. Despite low yield, yak milk is appreciated for its fat content.

Yaks are widely distributed across the Hindukush Himalayan Region (HKH), stretching from China in the north, India in the south, and Nepal in the west. China counts the highest yak population in the region, followed by Mongolia and Bhutan. According to the livestock census of 2020, Bhutan had a yak population of 40,897. Yaks are distributed across 11 highland districts and 27 blocks within Bhutan. Thimphu district has the highest yak population (10871), while Samdrup Jongkhar has the lowest (235). Among the blocks, Lingzhi has the highest yak population (3908), while Lauri has the lowest (16).

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In general, both the number of yaks and yak herding households are declining in the country due to inadequate feed supply during cold winter, wildlife predation, limited market for yak products, and limited policy support (Dorji et al., 2020). Recognizing these ongoing issues, the Department of Livestock 2018 initiated the concept of the Bhutan Yak Federation (BYF) to support the highlanders. Consequently, 12 yak cooperatives were established in seven districts within three years (2019-2021). Currently, BYF comprises 268 males and 203 females, representing 1,067 yak-rearing households. The goal of BYF is to promote yak farming as a vibrant and sustainable program. Therefore, this study focuses on the status of the BYF, examining its roles and functions in-depth. Thus, Lingshi and Sephu yak cooperatives under Thimphu and Wangduephodrang districts were identified as study areas.

METHODS

To conduct this study, a methodology that involved literature reviews using search engines such as Google Scholar, Research Gate, Research for Life, and Science-hub platforms were employed. These platforms allowed us to access a wide range of relevant sources. Additionally, both qualitative and quantitative data were collected from the relevant sources.

The study area is marked with green colour, pink for yak cooperatives, and blue for the highland blocks on the Bhutan map (Figure 1)

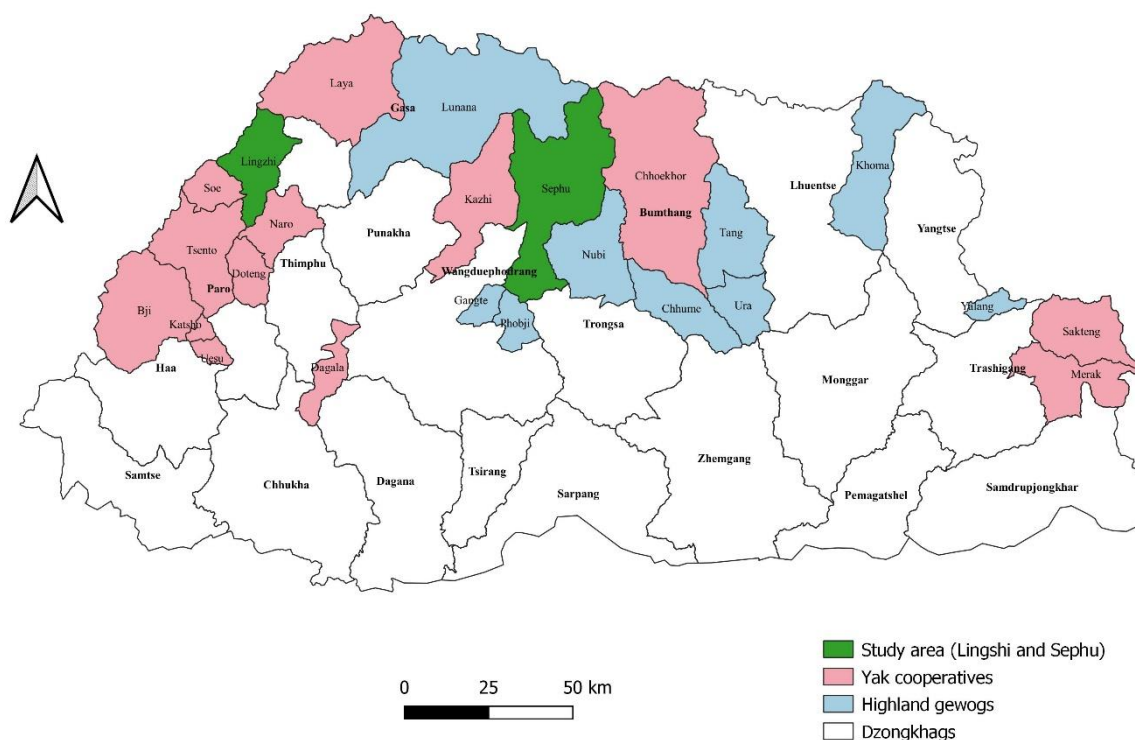


Figure 1. The study area

Primary data

The primary data for this study were collected from 40 yak herders from Sephu and Lingshi blocks under Wangduephodrang and Thimphu districts. Then, using a semi-structured questionnaire, the information from the individual yak herders was collected via phone interviews. The questionnaire consisted of 28 questions, covering various aspects such as demographic information and factors related to yak farming. Each interview lasted approximately 20 minutes and in total, it took approximately 40 hours to complete all 40 respondents to gather detailed information.

To ensure the accuracy and reliability of the data, a few Livestock Production Officers and the block in charge were consulted for data validation. Additionally, the existing chairman of the Bhutan yak federation was intimated to obtain updates on the ongoing activities and prospects of the BYF.

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Secondary Data

The secondary data for this study was obtained from two main sources: the Department of Livestock and the National Statistics Bureau. These sources provided valuable information regarding population dynamics, milk production, and the number of livestock-rearing households. Those data served as a foundation for analysis and allowed us to examine trends related to the yak population.

Data analysis

The collected data were processed, organized, and analyzed using Microsoft Excel, 2013. Filtering and compilation techniques were employed to prepare the data for analysis. A pivot table, a simple statistical tool, was used to examine household information, including parameters such as gender, family size, and age. The quantitative data were presented in the form of tables and charts.

For geographical representation and mapping of the study areas, Quantum Geographical Information System (QGIS), version 3.18 Zurich, was used. This software allowed us to create a visual representation of the study areas, enhancing the understanding of the spatial distribution of the yak cooperatives, highland blocks and other relevant features.

LITERATURE REVIEW

Importance of yak

The yak, renowned as the most ecologically sustainable genetic resource of the Himalayas, holds immense importance in providing livelihood support and nutritional security for highlanders, especially impoverished tribal farmers residing in remote hilly regions (Smith et al., 2021). These tribal communities practice yak rearing within the pastoral system, taking advantage of the unique ability of yaks to adapt to high-altitude environments where conventional livestock husbandry and or crop production are unviable (Jones & Wang, 2018). Yaks exhibit exceptional resilience, enduring severe cold temperatures (up to – 50°C), navigating snow-bound steep hills and thriving in hypoxic conditions (Brown, 2019). As versatile animals, they contribute to multipurpose facets of livelihood, offering milk, meat, fiber, dung and other household essentials (Gupta, 2020). Consequently, the well-being of yak rearers is intricately tied to these animals. Traditionally, yaks are raised under a free-ranged system in pristine highland areas characterized by unpolluted air, water, and pasture (Wang & Li, 2022). The organic and natural products derived from yaks hold significant potential for uplifting the economy of yak herders. Therefore, yak husbandry presents untapped opportunities that can be harnessed through collective efforts and scientific interventions, paving the way for further development in this field (Li, 2019).

Yak Population dynamics

In 1997, the livestock census counted 3,37,900 yaks in nine districts of Bhutan (Gyamthso, 1996). However, the yak population drastically dropped by 2,97,003 in the last two decades. Despite this decline, the yak population remained relatively stable over the previous five years (2015 to 2020), fluctuating around 40,000 (Figure 1). Table 1 provides a comparison of the number of yak rearing households in 2016 and 2020. In 2020, there is a slight increase yak population with a slight decrease in yak rearing households. In 2016, the study observed 29 blocks, whereas, in 2020, the number of blocks was reduced to 27. Based on the linear forecasts, it is predicted that the yak population will continue to remain stable with a slight increase in the coming years. This stability could be attributed to the initiatives and motivation provided by the BYF. As of 2020, the average household and yak population stood at 38 and 1414, respectively.

In 2017, Nepal reported 48,875 yak population, including yak crossbreds with 6235 households rearing yaks (Nepal Livestock Statistics, 2017). In India, there were 24. 7 % decrease in yak rearing households in 2019 compared to 2012 with a recorded number of yaks declining from 77,000 in 2012 and 58000 in 2019 (Indian Livestock Census, 2020).

The declining trend in the yak population in the Himalayan region is generally attributed to limited access to essential services such as motorable roads, and reliable electricity, as well as limited economic activities. Moreover, the scarcity of grazing resources during freezing winter is considered a key factor contributing to the decline (Dorji et al., 2020; Wangchuk & Wangdi, 2015).

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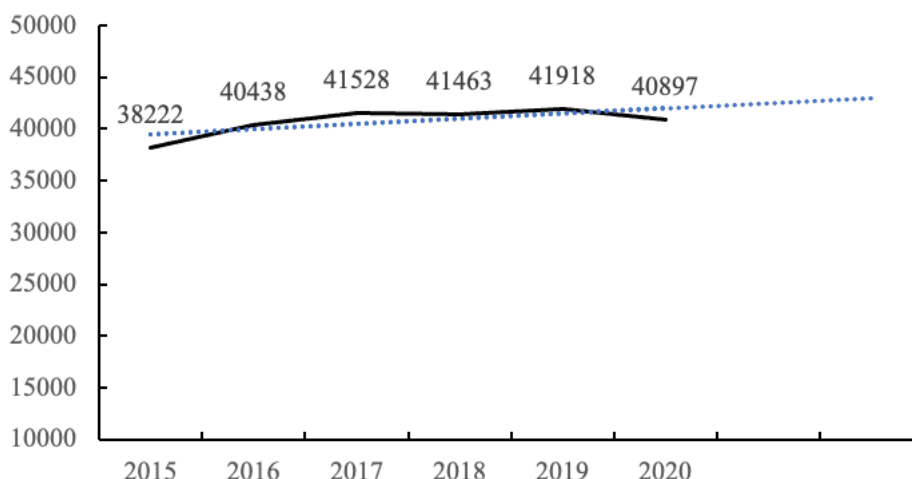


Figure 2. National yak population trend from 2015 to 2020 over six years

Table 1. Household information of yak herders in a country

Year	2016	2020
Total blocks	29	27
Households	1104	1078
Total yaks	40438	40884
Maximum households (Merag)	244	244
Minimum households (Lauri)	1	2
Average households	38.07	39.93
Standard deviation in households	58.07	58.9
Standard deviation in the number of yaks	1464.72	1459.43

The decline in yak populations and yak herders

Wangdra (2018) reported a decline in the yak population in the Himalayan region including Bhutan, India, and Nepal. In India, there were 132,000 yaks in 1977 and 51,000 in 1997 based on the livestock census while in Nepal, the yak and yak hybrids population was reported as 65,980 yaks in 2013 and it is believed that the yak population was around 200,000 in 1961. These indicate a significant decline in the yak population and herders over the years. Bhutan also experiences a similar trend of decline in the number of yaks and yak herders. The livestock statistics in 2006 recorded a yak population of 52,911, which dropped to 40,897 in 2020, reflecting a decrease of 12,014 yaks over 14 years.

Shrinkage of grazing areas

Rangelands serve as the primary source of grazing for yaks. However, these rangelands are currently experiencing various forms of degradation due to a lack of management interventions. Rangelands are used on a free-for-all basis without management practices or regulations, and the prohibition of the traditional practice of rangeland burning since the 1970s has led to the proliferation of unpalatable shrubs species and reduced grazing land available for yaks (Chophyel, 2009).

In the traditional yak husbandry system, the transhumance form of management predominates and in this system yaks experience weight loss due to inadequate fodder during the winter. However, compensatory growth occurs during the summer months, when they have access to alpine pastures with abundant fodder. To overcome the challenges of weight loss and low milk production during winter, future efforts focus on developing low-cost feed technologies to improve yaks' productivity throughout the year, irrespective of the season (Indian Council of Agricultural Research, 2015).

Gid Diseases

Coenurosis, commonly known as gid, is caused by a tapeworm called *Taenia multiceps*. It is a disease that affects small ruminants worldwide and particularly large ruminants like yaks in the Himalayas. Gid primarily affects young yaks below three years of age, and infected animals exhibit circling movements with the head tilting towards the tapeworm cyst on the cerebral surface of the brain. Wangdi & Wangchuk (2021) conducted a study on the practices of yak herders in managing Coenurosis in the Laya administrative block of Bhutan and found that Gid has negative economic implications for the herders.

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Local institutions for sustainable yak management

In Nepal, pastoralists in the community have formed groups and civil associations comprising of 11 to 12 members. These associations function as local institutions and organizations responsible for governing rangeland management, including transboundary rangelands, as well as livestock production, particularly yak, at the local level. The members of these associations serve as leaders, key decision-makers, and representatives of the entire community. Civil associations are self-identified groups of individual households with common interests or resources such as livestock, crops, or forests and make decisions specific to their interests. During the migration period, the yak association assumes the responsibility of determining grazing places and herd movement times.

These two sets of local organizations, the groups and civil associations, have a more significant influence on pastoral communities than governmental organizations and political institutions in terms of rangeland management and cattle production. Despite the limited institutional support for sustainable rangeland management and livestock production, these local institutions are actively engaged in guiding local people to access, comprehend, and apply the policies and techniques related to rangeland management and livestock production that have been designed by policymakers and professionals (Wangda, 2018).

RESULTS

Information on Sephu and Lingshi block

Sephu block lies between 2300 to 3500 meters above sea level and is considered one of the most significant blocks in Wangduephodrang district of Bhutan. It comprises Buso-Zeri, Rukubjee, Longtoed, Bumilog, and Nakha. The block is equipped with basic amenities such as electricity, rural water supply, farm road, and telecommunication. It is home to 331 households with a population of 1550 people, who are known as Sephups. They speak a local dialect similar to *Mangdip*, the local dialect of the Trongsa district. The villagers believe that the name of the block, Sephu, originated from Dorji Lingpa, a great *terton* who discovered a golden dragger (*Phub*) from a lake called *Omta Tsho*. Since then, the place has been known as Sephu, a village, meaning "village with a golden dragger".

Lingshi block, located in the Thimphu district of Bhutan, lies between 3800 to 4200 meters above sea level within Jigme Dorji Wangchuk National Park. It is situated in the northwestern part of Bhutan and is approximately a four-day walk from the nearest road points. The block consists of five sub-blocks: Chebesa, Gangyul, Shayul, Mesayul, Zangpo, and is home to 11 villages. Lingshi has 75 households with a population of around 700 people. The residents, known as *Lingship*, speak a local dialect similar to the national language. Despite its remoteness, basic facilities such as electricity, Basic Health Unit (BHU), primary schools, and telecommunication are available to the residents.

Agriculture and Livestock farming at Sephu and Lingshi

The weather pattern in the area is conducive to agriculture and livestock farming, making it an ideal source of income. Large-scale cultivation of potatoes and cabbages is carried out for commercial purposes. In addition to these crops, *cordyceps* and dairy farming also contribute significantly to the community's livelihood. Vegetables such as cauliflower, spinach, broccoli, and carrot are primarily grown for self-consumption. The community of Longtoe and Longmoe sub-block specializes in knitting various bamboo products, including baskets, strainers, and butter containers known as "*cipa*". These products, along with dairy and yak items, are sold to generate income.

Dairy and yak herding have been a longstanding tradition in the community. Cattle are mainly raised for milk production as well as butter and cottage cheese. As per livestock Statistics 2019, the community owned 2517 Yaks, 631 Nublang-Thrabum, 451 Jersey Cross, 111 Brown Swiss, and 11 Jatsha and Jatsham. To support dairy farming in the community, the Wangdue livestock sector has established two milk processing units in Rukubjee and Busa sub-blocks, aiming to assist local farmers. Five herders in the community own both yaks and dairy cattle. During summer, the cattle are allowed to graze in the pasture freely, while in winter, they are confined to nearby pasture lands.

In Lingshi, all the communities rely on yak herding and spend the freezing winter in their villages. During the summer months (May to October), at least two family members move to high-altitude rangelands and live in temporary makeshift huts with their yaks. The main crops cultivated in their kitchen garden are potatoes, turnips, and radishes. The yaks are mainly raised for butter, cheese, hair, dung, and meat, and as draft animals. Previously, male yaks were slaughtered for meat purposes until 2015, but due to religious beliefs, this practice is no longer allowed in the community. However, meat from accidental and natural deaths of yaks is still consumed. Horses are also kept for transportation purposes and serve as an additional source of income.

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Socio-cultural values in Sephu and Lingshi

In Sephu, yak and sheep farming used to be practiced two decades ago, but sheep farming gradually declined over time. As a result, they now purchase wool from their neighboring blocks like Gangtey and Phobjikha to process wool products. The wool is processed and used for knitting their unique attire known as *Chaka Yathra*, as well as hats called *Nyengachem*, traditional dress (Gho and Kira, Kara), mats, and ropes. The Wangduephodrang district livestock sector is actively working to revive sheep farming in the area.

They celebrate a distinctive festival called *Wangdi Goenpa Tshechu* once in three years, usually held in January and lasting for three days. During the festival, women wear their unique Chaka Yathra attire, while men wear *Charee Gho* woven from wool. However, there has been a noticeable decline in this tradition and fewer people now value these cultural practices, according to the elder man named Ap Sithup, who is a cooperative member.

Similar to Sephu block, Lingshi also celebrates the annual *Tando* festival, usually held in April. This festival serves as an occasion for family members to come together. Unlike the Wangdi Goenpa Tsechu, the Tando festival is celebrated for a single day. Lingshi benefits from the tourism sector, particularly from portering services, as two high mountains trail pass through this area.

Bhutan Yak Federation

The Bhutan Yak Federation (BYF) was established in 2019 at the national level to advocate for the rights of yak herders. Its primary goal is to promote, preserve, and protect yaks, rangelands, and the livelihoods of herders through sustainable yak farming practices. The federation also facilitates the collective marketing and processing of yak products, as well as the procurement of and production of farm inputs. Currently, the BYF consists of 12 yak cooperatives comprising 408 highlanders (268 males and 202 females) across the nation, as shown in Table 1.

However, this study specifically focuses on two yak cooperatives located in Sephu and Lingshi blocks, which fall under the Wangduephodrang and Thimphu districts. The selection of Lingshi and Sephu was based on convenient sampling and direct interaction with the herders. In Sephu, there are 55 yak-rearing households, all of whom are members of yak cooperatives. In Lingshi, out of 72 yak herders, only 53 are included in yak cooperatives. For this study, interviews were conducted with 20 yak-rearing households from Sephu and Lingshi to gain insights into the current status of yak farming and the role played by the BYF.

Socio-demographic characteristics of Sephu and Lingshi yak cooperatives

The study covered 12 villages and involved a total of 40 respondents, comprising 19 females and 21 males from the yak cooperatives of the Lingshi and Sephu blocks. The respondents had an average age of 37, ranging from the youngest at 21 to the oldest at 57, with a median age of 35. The majority of the respondents in both blocks were found to be illiterate, accounting for 70% of the total.

In terms of family size and number of yak herders, Lingshi had slightly higher averages compared to Sephu. The average family size was 4.9 in Lingshi and 4.7 in Sephu, while the average number of yak herders was 2.5 in Lingshi and 2 in Sephu.

Sephu block benefits from its connection to the motorable road, providing opportunities for additional activities. On the other hand, Lingshi is located far from the urban areas and is officially a four-day walk from the Thimphu districts.

Income sources of respondents

The study revealed that the primary source of income for the highlanders in Lingshi and Sephu is yak farming. Milk and its products are mainly used for household consumption, and any surplus is sold to generate income, similar to the finding reported by Dorji et al. (2020).

In Lingshi, the yak cooperative households own an average of 19 milking yaks, producing around 1.5 liters per day/yak and a total of 2513 litres over five months. However, during the winter season, they do not milk their yaks due to harsh weather conditions and limited grazing resources.

On the other hand, the yak cooperatives in Sephu block own an average of seven milking yaks, producing approximately one litre per day/yak and a total of 2371 litres over nine months. Due to a comparatively lower elevation (ranging from 2300 to 3500 meters above sea level), the herders in Sephu are able to milk their yaks for a longer duration compared to Lingshi, where the altitude is higher (4,613 masl).

In Lingshi, herders provide supplementary feed to their yaks during winter, including concentrated feed (karma feed), wheat and maize flour, oil, mustard oil cake, and salt. On average, they spend about Nu.36250 annually on feed resources. In Sephu, the highlanders milk their yaks for nine months and spend Nu. 26450 on yak feed resources each year.

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The highlanders expressed that the income generated from the sale of yak products is only sufficient to cover the expenses of buying feed resources.

Table 2. Annual income generated from the yak products in two yak cooperatives of Lingshi and Sephu (n = 40)

Mean	Milch	Milk yield(l)	Butter (kg)	Income generated	Hard and soft cheese	Income generated	Total income	milk yield /day	milking duration	milking time
Lingshi	19	2513	36.15	18075	159	39750	57825	1.5	5	summer summer and
Sephu	7	2371	23.09	11545	117	29250	40795	1	9	winter

*Farmgate price for butter and cheese @ Nu. 500 and Nu. 250

The primary source of income for the highlanders is the harvesting of "*Cordyceps Sinensis*", a valuable fungus. In Lingshi, the average annual income generated from the Cordyceps harvesting was Nu. 0.18±0.07 million (mean ±SD), with ranges varying between 0.40 million and 0.35 million. Similarly, in the Sephu block, the highlanders earned Nu. 0.12±0.04 million, with income ranges of 0.30 million and 0.03 million. Additionally, they also earned extra income by collecting medicinal plants and providing portering services. However, the highlanders' economy has been adversely affected in the past two years due to the COVID pandemic.

SPECIFIC YAK FARMING ISSUES AT SEPHU AND LINGSHI

Inadequate grazing resources

Highlanders face challenges in their yak production systems due to competition with wildlife and other livestock grazing resources. Inadequate grazing land results in feed shortages, especially in during the winter from October-March. The scarcity of forage has negative consequences for the yaks, including poor nutrition, slow growth, health-related problems, and reduced fertility. One of the main issues identified by the respondents is the ownership of Tsamdro, which refers to traditional grazing land. It is crucial to address this issue and restore the rights of domiciled herders to access and utilize Tsamdro. Resolving this matter would help alleviate the grazing land constraints faced by the highlanders.

Limited policy support

Several studies on yak farming have consistently highlighted the lack of a clear policy for the sustainable use of rangeland as a significant issue. This has caused inconvenience for yak herders and contributed to the deterioration of rangeland quality (Ura 1993; Gyamtsho 2000; Banjade 2008; Derville and Bonnemaire 2010; Dorji, 2020). Despite more than two decades having passed, the policy regarding rangeland utilization remains unchanged, and the issues persist.

Since the enactment of the 1969 Bhutan Forest Act, there have been several policy changes that have affected the utilization of rangeland resources. For example, in 2007, the parliament approved and recommended that all yak herders, regardless of the number of livestock they possess, should receive their share of grazing land. They were also supposed to have the option to rent or lease out their portion of grazing land. However, in reality, these provisions were not implemented as intended.

Before the Forest Act of 1969, yak herders used to practice periodic controlled burning of rangelands to promote the growth of palatable fodder species and suppress unpalatable ones. However, this practice was prohibited by the Forest Act of 1969 and the Land Act of 1979, resulting in the proliferation of unpalatable species such as juniper, rhododendron, and berries. This has led to a decline in the production of palatable grasses (Gyamtsho 2002) which was also highlighted by the respondents of Lingshi and Sephu as rangeland issues.

Yak diseases

Gid (*Coenurosis*) is a prevalent disease primarily affecting yaks in Bhutan. It is characterized by the loss of balance in the animals. This condition usually occurs in young yaks while they are grazing on grasses contaminated by dog tapeworms (Dorji, 2016; Wangdi & Wangchuk, 2021). Gid disease is a significant health issue in both the Lingshi (70%) and Sephu (65%) blocks, leading to a negative impact on yak production and calf mortality. Consequently, it poses a threat to the overall yak population. Despite the respondents' efforts to deworm their yaks twice a year, the yaks still suffer from gid disease.

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In addition to Gid disease, plant and water poisoning also pose health risks to yaks in the Sephu area. Overmore, other animal diseases are emerging among yaks, such as Foot and Mouth Disease (FMD), which typically affects cattle in lowland areas. In 2020, a considerable number of yaks in the Sephu block (35%) were affected by FMD.

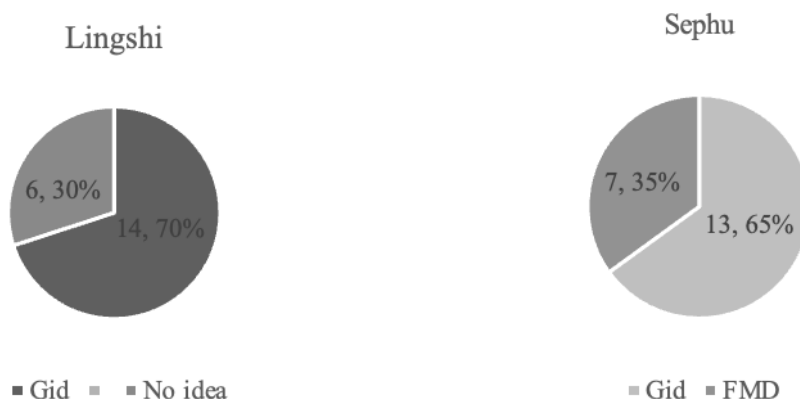


Figure 3. Animal diseases

Wildlife predation

Wildlife predation on yaks is a significant issue faced by herders, and they do not receive any compensation for the loss of their animals. Annually, highlanders experience losses of yaks due to wildlife predation. Table 3 provides detailed information on the yak losses in both blocks in 2020, along with the estimated monetary value of these losses. The value is determined based on the bodyweight of the individual yaks, which ranges from Nu. 0.09 million and 0.1 million. The Sephu block has a higher number of yaks lost to wildlife predation compared to the Lingshi block. The Sephu block lost yaks worth of Nu. 15.75 million, while the Lingshi block lost yaks worth Nu. 13.32 million. Wildlife predation mainly occurs during the winter season when the health of the yak deteriorates due to a lack of feed resources. This could potentially be a reason for the declining interest in yak farming.

Furthermore, feral dogs in the Lingshi block are causing problems by attacking young. One of the respondents mentioned that the increased number of feral dogs is attributed to the construction of Lingshi dzong, which led to inconvenience to the highlanders. Wild dogs, tigers, bears, and leopards are the main predators of yaks in these blocks. The fear of losing their essential food and fuel resources during the cordyceps collection season adds to the challenges faced by the herders in the Sephu block.

Table 3. Yak lost to wildlife predation

In,2020 (n:40)	Lingshi	Value of yak (in million)	Total value loss
Total yak loss	148	0.09	13.32
Mean	7.4	0.67	
Mode	6	0.54	
	Sephu		
Total yak loss	175	0.09	15.75
Mean	8.75	0.79	
Mode	8	0.72	

Inbreeding in the yak population

The respondents express their belief that the deterioration of yak quality is attributed to unsystematic breeding practices. They highlight the lack of access to high-quality breeding bulls as a contributing factor. The absence of a nationwide exchange of bulls exacerbates the issue, resulting in inbreeding and a decline in breed quality. However, it is worth mentioning that the Department of Livestock has already drafted yak breeding strategies and guidelines to address these concerns.

Limited product diversification and marketing

Product diversification and marketing pose significant challenges for transhumant pastoralists, primarily due to their constant migration, especially during the summer months from May to mid-October). This constant movement hampers their ability to establish stable marketing channels. Additionally, the lack of modern processing facilities and cold storage equipment further

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hinders maintaining product hygiene and quality. Moreover, the long distances from accessible roads create additional challenges for the highlanders in reaching markets and customers.

Nevertheless, it is interesting to note that highlanders of Sephu block, comprising 20 respondents, do not face issues in marketing their products. But they are experiencing a shortage in production, indicating a potentially higher demand for yak-based products.

PROSPECTIVE ABOUT BHUTAN YAK FEDERATION

Reviving Yak culture and values

According to the respondents of Lingshi and Sephu yak cooperatives, the unique and age-old culture and traditional practices are rapidly fading as the older generation grows older, and the younger generation shows little interest in taking up these practices. For instance, the art of weaving *Bja* and other yak wool products is on the verge of disappearing. However, BYF is actively working towards the revival and promotion of yak culture and values, as stated by the chairman. In particular, the highlanders of Sephu have benefited greatly from joining the BYF as it provides a platform for discussions and exchanges of views among the 12 Yak cooperatives members. Furthermore, the members can advocate for policy and investment support and promote yak farming as a vibrant and sustainable enterprise. Recently, the Sephu yak cooperatives received support from the government, including 13 breeding bulls, milking equipment, and pasture development seeds. According to the chairman, such support services serve as a motivation for highlanders to continue their involvement in yak farming. Similarly, the respondents from Lingshi Yak cooperatives shared similar stories, noting that the government provided five breeding bulls in 2019 to improve yak breeds and address issues of inbreeding.

Empowering Bhutan yak herders through the Bhutan yak federation

Challenges and issues impede the sustenance of highland communities and yak farming, the Yak Federation provides a platform for yak herders to innovate, optimize utilization, and manage the vast rangeland resources. Some of the opportunities enshrined in the 5- year strategy of BYF include:

- Facilitating cooperation, collaboration, and coordination among mountain communities to achieve their common shared goal of prosperity.
- Introducing Payment for Ecosystem Services (PES) for the protection of upper water catchment areas and the sustainable utilization of vast mountain resources.
- Diversifying yak products and targeting niche markets for highland products, such as yak milk products and wool products, to high-end hotels and markets within and outside the country.
- Developing and promoting yak-based ecotourism, including activities like a homestay, rich mountain tradition, cultural festivals, resource center and offering yak riding experiences. This aims to generate income and create job opportunities (such as porters, cooks, and guides) for the youth in highland communities, in collaboration with the Tourism Council of Bhutan, and forging relationships and networks both within and outside the country.
- Involving the private sector in the promotion and development of yak enterprise.
- Conserving, promoting, and exchanging yak genetic resources for breeding within and at the regional level to enhance genetic quality.

STRATEGIC INTERVENTIONS OF BHUTAN YAK FEDERATION – TOWARDS REVIVING YAK FARMING GOVERNMENT

Bhutan's rural development approach has traditionally been centered around a government-driven supply model, which has sometimes resulted in dependency among the beneficiaries. The establishment of BYF offers an alternative model that can serve as a crucial community institution, partnering with the government and development agencies to sustain highland research and development interventions. The following strategic interventions are highlighted as ways to contribute to the sustainability of yak farming systems in Bhutan.

Creation of enabling science-based policy and legal frameworks for the operation and sustenance of mountain communities' livelihood through yak federation

The BYF serves as a dedicated institution with a well-defined governance system that represents all the yak herders of Bhutan. It operates under a two-tier system, consisting of primary cooperatives at the district level and a national-level federation. The cooperative/federation is governed by appropriate legislation, rules, and regulations that ensure effective governance within the framework of the Cooperative Act of Bhutan.

Can the Bhutan Yak Federation Revitalize Waning Yak Herders' Enthusiasm and Rejuvenate the Declining Yak Farming in Bhutan

Protect and promote traditional, socio-cultural practices to support livelihood and enhance mountain community vitality

Highland communities inhabit mountainous regions, where they lead unique traditional lifestyles, while harmoniously coexisting with the highland environment. In addition to their reliance on these areas for their livelihood, yak husbandry holds socio-cultural importance for these communities. The BYF shall:

- i) Showcase mountain culture and traditions on various platforms, establishing connections with the Bhutan Tourism Council.
- ii) Recognise and promote local customary systems and knowledge that are integral to yak husbandry.
- iii) Support the establishment of yak festivals in all highland dzongkhags (districts) and localities.
- iv) Encourage yak-based ecotourism to showcase the traditional and cultural practices of highlanders, the magnificence of yaks, and the beauty of mountain rangelands.

Enhance the resilience of yak farming communities to the environment and climate change

Rangeland grazing serves as the primary source of fodder grasses for the yaks. However, the adverse effects of global warming and climate change have led to the degradation of rangeland in various forms. Additionally, inadequate rangeland management and insufficient support from governmental institutions have further exacerbated the depletion of fodder grass species.

In light of these challenges, the BYF proposes revisiting specific policies concerning rangeland burning. Controlled burning practices can contribute to the sustainable utilization of rangeland and enhance animal productivity. Furthermore, the BYF aims to introduce best practices in rangeland management, including co-management concepts, through south-south cooperation.

To address acute winter fodder shortages, the BYF will also pilot the use of technologies such as complete feed blocks. These innovative approaches will help alleviate the challenges faced by yak herders during the winter season.

Strengthen and maintain national and international institutional linkages

The BYF should focus on developing connections with other cooperatives and federations at the national and international levels to facilitate the exchange of information, experiences, and expertise. In order to achieve this, the BYF should:

- i) Foster transboundary cooperation and maintain regional and international institutional partnerships to exchange expertise and technological knowledge among the involved parties.
- ii) Forge alliances with countries facing similar challenges and neighbouring nations in collaboration with relevant stakeholders.
- iii) Establish a national supply chain network that connects yak producers to consumers with consumers across the entire country.

REFERENCES

- 1) Banjade, M.R (2008). Mobile pastoralism in crisis. *Journal of Forests and Livelihood* 7: 49–55
- 2) Bhasin, V (2011). Pastoralists of Himalayas. *Journal of Human Ecology* 33: 147–177
- 3) Brown, A (2019). Yak Adaptations to High-Altitude Environments. *Journal of Himalayan Ecology*, 5(2), 123-136.
- 4) Chophyel, P (2009). Rangeland management in Bhutan, a Consultancy Report. Thimphu, Bhutan: IMS Consultancy.
- 5) Derville, M, Bonnemaire, J (2010). Marginalisation of yak herders in Bhutan: Can public policy generate new stabilities that can support the transformation of their skills and organizations? Montpellier, France: *Innovation and Sustainable Development in Agriculture and Food*.
- 6) Dorji, K (2013). Rangeland tenure transfer: An analysis of policy and legal issues in Bhutan. Thimphu, Bhutan: *The Centre for Bhutan Studies and GNH Research*.
- 7) Dorji, N., Derks, M., Groot Koerkamp, P. W. G., & Bokkers, E. A. M (2020). The future of yak farming from the perspective of yak herders and livestock professionals. *Sustainability (Switzerland)*, 12(10). <https://doi.org/10.3390/su12104217>
- 8) Gupta, M. (2020). Versatility of Yaks in Highland Livelihoods. *International Journal of Yak Studies*, 15(3), 45-58.
- 9) Jones, P., & Wang, L (2018). Yak Rearing Practices in Remote Hilly Regions. *Journal of Sustainable Agriculture*, 27(4), 321-335.
- 10) Indian Council of Agricultural Research (2015). Vision 2050. *Angewandte Chemie International Edition*, 6(11), 951–952., 2013–2015.
- 11) Indian Agriculture Research Council, 2015. <https://icar.org.in/node/10826> (Accessed June 12, 2022).
- 12) Li, Q. (2019). Yak Husbandry for Economic Upliftment. *Journal of Highland Economics*, 10(1), 87-102.
- 13) Nepal Livestock Statistics (2017). *Livestock Statistics of Nepal*. July 1–170. <https://nepalindata.com/resource/LIVESTOCK-STATISTICS-IN-NEPAL-2017/> (Accessed July 20, 2022).

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- 14) Smith, J., et al. (2021). Genetic Resources of Himalayan Yaks. *Proceedings of the International Conference on Livestock Biodiversity*, 78-89.
- 15) Ura, K. (1993). *The Nomads Gamble. October 1992*.
- 16) Ura, K. (1993). The Nomads' Gamble pastoralist of northern Bhutan. *South Asia Research* Vol. 13, Issue 2, p.81-100
- 17) Wangchuk, K., & Wangdi, J. (2015). Mountain pastoralism in transition: Consequences of legalizing Cordyceps collection on yak farming practices in Bhutan. *Pastoralism*, 5(1). <https://doi.org/10.1186/s13570-015-0025-x>.
- 18) Wangda, P. (2018). Yak and yak herding: Challenges and opportunities in the Bhutanese Himalayas. In *Mountain Research and Development* (Vol. 38, Issue 2, p. 184) <https://doi.org/10.1659/mrd.mm222>.
- 19) Wangda, T. (2018). Local Organizations' Influence on Rangeland Management and Livestock Production in Pastoral Communities. In *Community-Led Resource Management: A Focus on Pastoral Societies* (pp. 45-67). Sustainable Publishing.
- 20) Wangdi, Y., & Wangchuk, K. (2021). Are current practices of yak herdsman adequate to combat Coenurosis in Laya Bhutan? *Veterinary Medicine and Science*, 7(4), 1191–1198. <https://doi.org/10.1002/vms3.466>
- 21) Wang, X., & Li, Y. (2022). Traditional Yak Husbandry Practices. *Himalayan Journal of Agriculture*, 14(2), 210-225.



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