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SOCIO-ECONOMIC IMPORTANCE OF YAK HAIR PRODUCTS IN BHUTAN

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ABSTRACT: Yak milk products are gaining popularity amongst the people due to their nutritional content and health values. However, the development and promotion of yak hair products did not receive much attention despite having a huge potential to contribute to the socio-economic status of the highlanders. This study was carried out to understand the perception of herders about yak hair and its socio-economic importance to the livelihood of highlanders. The study was conducted in three districts namely Tashigang, Haa and Bumthang representing eastern, western and central regions, respectively. The data was collected using semi- structured questionnaire from 121 herders selected purposively out of 175 registered members from four cooperatives. Based on the current survey, every year herders are able to produce 1314 kg of yak hair from 6979 heads of yak. It is estimated that the current yak population of approximately 40,987 heads in the country has capacity to produce about 8MT of yak hair annually. While there is a huge potential to produce yak hairs, 99.7 percent of the herders reported that harvesting yak hair is difficult. Almost all of respondents (99 percent) reported that yak hairs are harvested once every year during the months of June to July. 92.5 % of herders are willing to harvest and make yak hair products provided the government supports them with a good market and yak processing facilities. While, 7.5 % of herders are still not confident to continue yak wool processing business owing to lack of human resources. The finding indicated that gender had a significant effect ($p < 0.05$) on their attitude towards venturing into producing yak wool products and marketing. More females are willing to continue with producing yak wool products compared to men. From the study, it is evident that 81% of the respondents' highlighted challenges with labor shortage, however, there was no significant difference ($p > 0.05$) of labor shortage on the future of yak hair production. Besides, 12.4 % of respondents responded that their maximum income from yak fiber annually account to Nu. 10000. Capacity building of yak herders and providing yak hair harvesting, processing facilities and avenue to sell yak wool products for better returns should be the focus of the government to retain the highlanders in yak farming.

Keywords: Annual income; labor shortage; Women empowerment; yak hair.

1. INTRODUCTION

About 1.3 billion poor people living in the developing countries are dependent on livestock for their livelihoods directly or indirectly (Sansoucy 1995). Globally, livestock contributes about 40 percent to the agricultural Gross Domestic Product (GDP) and constitutes about 30 percent of the agricultural GDP in the developing world (Mahmood et al. 2014).

Yak (*Poephagus grunniens*) is the most remarkable and multipurpose domestic animal that thrives in extreme climatic conditions at altitude between 2500 to 5000 meters above sea level (Joshi et al. 2020). It feeds on alpine pastures that are covered with frost year-round (Krishnan 2016) and provides livelihood to the highlanders (Wiener et al. 2003). Yaks and yak-hybrid provide milk, milk products (butter and milk residues), meat as the important food source, hair and hides as textile and leather materials, and dung as the fuel for herders. They are also used as pack and drought animals and for riding (Dong et al. 2007). Further, the yak is integrally associated with the culture, religion and social life of its herders, their families and communities (Slavto 2018). China has the highest yak population, with 94% of the population comprising of yaks and their hybrids

(Joshi et al. 2020). The yaks are the fundamental means of subsistence for people living in these harsh areas.

The yak is considered the backbone of nomad life, with this animal being important to the economic and personal well-being of the family. From the products crafted from yaks, the nomad family is able to clothe, shelter, and feed their family, so it is little wonder that some say their yaks are treated with similar importance as members of the family. There are 41,463 heads of yaks covering 10 highland districts (Department of Livestock [DoL] 2018) in Bhutan. The ethnic groups involved in yak rearing are known as the *Dakpas* and *Brokpas* in central and eastern Bhutan, *Bjops* in western Bhutan, and *Lakhaps* in the west–central regions (Joshi et al. 2020). Yak-herding communities are scattered, marginalized, isolated with no access to roads and electricity, and have limited access to education and healthcare services, benefiting very little from the modernization of the economy (Derville & Bonnemaire 2010). The herders seasonally migrate with the yaks, following the traditional migration routes covering vast alpine grasslands mainly guided by feed availability and the necessity to avoid extreme climates (Wangdi 2016).

A rapid socioeconomic development is taking place with a government thrust to attain equitable and sustainable development across the country. As a consequence, young mountain pastoralists are exposed to more economic and livelihood opportunities, which subsequently discourages the continuation of yak farming (Wangdi & Wangchuk 2018)

It was found out that declining forage availability in the rangelands, wild animal predation on yaks and low level of interest from future successors were factors contributing to declining yak farming beside prevalence of diseases, parasites and poor access to veterinary services (Dorji et al. 2020). Climate change is one of the major factors that affect the decline in the number of yaks and herders (source). The warming of temperatures causes illness and discomfort to the yaks. The declining health of the yak and a shift in timing of the migration has made herding more difficult to Bhutanese herders.
A warmer and longer summer grazing does not necessarily benefit the yaks as it causes physiological stress. In addition, deteriorating rangeland resources due to encroachment by the upslope proliferation of warm-climate plants like the rhododendron are other challenges (Dema 2019). The policy makers are aware of the declining trend in yak farming although this industry has received the least government policy attention both in the past and at present (Dorji et al. 2020) However; the decline in the contribution of the yak-farming industry to the nation has become a policy concern for Bhutan. In order to gain the importance, the government is putting effort by developing markets for the yak products (Wangdi 2016).

Yak products can be exploited for entrepreneurship development among the poor yak herders. Yak products like hair can be value added to develop different products. Yak has lots of potential for entrepreneurship development in the highlands. This will boost the economy of the yak herders and will help to improve their income from yak farming. Motivating and training local entrepreneurs for the start-ups and in the long run will also help in increasing the yak population of the country.

The development of the pastoral economies is the key to poverty alleviation and to improving food security, as well as to the wider goal of creating sustainable livelihoods. Most important development intervention for promoting pastoral survival might be to reduce isolation and to consolidate links between the pastoral ecosystem and external resources. This involves encouraging the movement of goods and livestock through trade or marketing systems and linking the pastoral area to external economies both for consumption and distribution of products (Ellis et al. 1991).

In China, due to improved outlets for yak products, the number of yaks doubles every year and 34 percent of the animal fibre (including fine wool) comes from yak (Wiener et al. 2003). The fiber obtained from the yak's hair is an excellent substitute for wool and spontaneous fur loss of yak allows the creation of a fine fabric similar to cashmere with beautiful natural color (Riccio 2015).

Yak hair is largely unknown, but a very special fiber. The wool produces soft, breathable, durable and non-moulting products. Living at such high altitudes, the yak's coat has developed to block wind, shed snow and store body heat, so

it is naturally the warmest clothing material on the planet. Yak hair is as strong as camel hair. The strength of yak wool comes from the high levels of amino acids contained within the fibers (Jarman 2015). Yaks produce two kinds of hair. The downy under layer is extremely soft and ordinarily sheds once a year in the spring, meaning it can be collected without having to shear the yak. The outer layers are long, strong and waterproof (Mak 2012).

The quality of the hair depends on procedure during shearing along with genetic, environment and nutrition. Lack of nutrition and change in environment affects the length of the hair resulting in the breakage of the yak hair. The basic causes of breakage, tenderness and totting are due to temporary reduction in the growth rate of the hair fibers, this in turn being associated with thinning and shedding of some fibers from the follicles (Wickham 2003).

Yak products are popular amongst the people due to concern for the health and nutritional values of the products. However, harvesting yak hair is still backward compared to other products. Before, herders used to shear the yak hairs and turn them into goods. But now the shearing of yak hair is declining. Total population of yaks with 40,987 heads has the capacity to produce about 8 MT of hair annually (RNR-SD 2020). Although yak hair has a huge scope of generating income yet it is still under explored. Till today, only a few herders make yarn from yak hair. There are no proper classification of hairs and products made from it. There is lack of proper documentation on the production capacity of yak hair in the country. Therefore, this research is aimed to record empirical evidence concerning pastoralists' interest and perceptions on the yak hair and the future of yak farming with focus on yak hair products. The study is also expected to generate baseline information on the amount of yak hair produced from the four yak cooperatives and the total yak population in the country.

2. MATERIALS AND METHODS

2.1 Study areas

The study was carried out in the four yak cooperatives located in Haa, Bumthang and Trashigang districts. These four cooperatives were selected, based on the functional status of the cooperative and highest number of members present in the group. Trashigang was selected because of the location of two yak cooperatives of Merak and Sakteng gewogs within the same district. The cooperatives were selected for the study because it is expected that all these cooperatives to come together and will form a yak federation in the future.

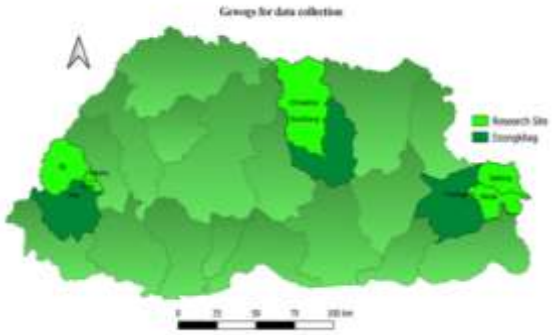

Figure 1: Study sites

2.2 Sample size and sampling methods

A total of 121 members were purposively selected amongst 175 registered members from four cooperatives. The purposive sampling involved identifying and selecting individuals or groups of individuals that were knowledgeable and experienced in yak herding.

2.3 Data collection and analysis

An open ended semi- structured questionnaire was used to gather data on the perception of yak hair. Additional data such as amount of hair produced from different age groups of yaks were collected to complement the data gathered through the interview. Descriptive data analysis and Pearson's Chi square tests were carried out using SPSS version 23.

3 RESULTS AND DISCUSSION

3.1 Respondents' socio-economic characteristics

Total of 121 herders out of 175 registered members of four cooperatives were interviewed. The average age of the herders interviewed was estimated at 44 years, representing 51% women and 49% men. Majority (98 %) of the herders interviewed were uneducated, the rest had at least attained primary education. Their interest and family situation had made them choose yak

herding over education. They shared that everyone was doing work for a living, without much education they were still able to earn and help their families to sustain their livelihood. Although, they feel that they lack knowledge about world affairs, they do well with yaks and their herding practices.

3.2 Yak hair and its importance to herders

The survey recorded 99% of the respondents harvesting yak hair once in a year from the months of June to July. The harvested hairs are used to make the required products such as rope, bags and blankets. The respondents who did not harvest yak hair reported that all materials and products required for the herd are readily available in the markets and it is also much cheaper to buy than to process. Further, they reported that harvesting yak hair was cumbersome and required more labor. Wangchuk et al. (2013) reported that the goods made from yak hair are the main source of clothing for herders. Although yak herders produce an ample supply of yak products each year, they are not able to make them easily accessible to people. 99.7% of the herders mentioned that harvesting of yak hair was a tough job. They shared that the non-availability of good quality shearing equipment, no proper processing unit for yak hair were some of the challenges for losing interest in processing yak hair. As per Gyamtsho (2000), yak products could earn more income and sustain the product supply if good markets are available for the herders to store and sell their products.

3.3 Continuation of yak hair products

The survey recorded that about 92.5 % of herders are willing to harvest and make yak hair products but only if the government supports them with a good market. As per the findings, 7.5 percent of herders are still not sure whether to do fiber works as they lack manpower. According to the findings from (Wangdi 2016), 70% of the respondents were elderly people and fully dependent on yak farming of which 50% of the elderly family members live in villages looking after the school-going kids. This shows that there were actually 20% of herders who were there looking after yaks every day. According to Dorji et al. (2020) there will be a decline in yak farming families by 58% in the next 10 years because young and adult family members will continue to migrate to towns looking for better economic opportunities and easy lifestyles. This was in concurrence to the findings reported by Dorji (2015), where 50% of the respondents had hired labor looking after their herd and 47% of the herders mentioned that labor for yak herding was not available at all.

3.4 Contribution of women herder in future of yak hair production

It was observed that 92.5 percent of the herders are willing to continue producing yak hair products. There was a significant difference within gender ($p<0.05$) on their attitude towards continuing with producing yak hair products. More females were willing to continue with producing yak fiber while men were not much interested into it. According to the World Bank report (2009), women entrepreneurs comprise half of the human resources in developing the economics of the country. Further, World Bank report highlighted that although women are good at innovating and at marketing, they do not have equal playing field unlike the men in terms of other development activities including decision making process. According to the World Intellectual Property Organization (2018), one-third of all international patent applications filed in 2015 included women inventors. There was a 12% increase in international patent applications with women from 1995 to 2015. According to Ulaanbaatar (2015), women took the lead, spending 11.3 hours in summer and 10.1 hours in winter, with a higher workload in all seasons. Also in the market economy, women have assumed more roles and duties, thereby increasing their workload.

3.5 Income from yak hair

Yak fiber has not contributed much to the economic growth of the herders in comparison to other products like butter and cheese (*chugo)* as of date. In this study, 57 % of the total respondents mentioned that the yak fiber products are for self-consumption, and 12.4 % of the respondents shared that their annual income from yak fiber was Nu. 10000. Herders have shared that yak herding is a profitable job with annual income earnings from the yak products including hair products worth of about Nu. 80,000 (Dorji 2015). As per Gyamtsho (1995), the annual income of the herders from the yak was 40% which includes 30% from yak products and 10% from yak pottering. This shows the

income from yak hair was not significant during the 1990s. As per the findings of Joshi et al. (2005) in Nepal, each yak yields 1.2 kg of hair and also a good quality tail. Each yak gives about Rs. 800-1200 as annual income. However, in Bhutan, a male yak yields 1kg of hair and a female yak yields 0.3 kg of hair. On an average, the hair yield was reported to range from 1.7 to 13.9 kg in males and 0.5 kg to 2.9 kg in female yaks (Li and Wiener 1995).

3.6 Impact of labor shortage on future of yak hair production

The labor shortage has been one of the major problems in yak farming. Due to this, less herder is engaged in yak hair production. Labor shortage and lack of machine facilities is reported as one of the major problems in the development of yak hair products by 98 of the total 121 herders interviewed. Development of hair products is also labour-intensive business. Although 81% of the respondents have mentioned that there were labor shortages, there was no significant difference ($p > 0.05$) on the labor shortage on the future of yak hair production. This may be due to their expectation of support from the government. They have clearly mentioned that provided the government supports them with machines and markets, they were going to continue with yak hair production. The current result is similar to the finding of Wangdi (2016), where it was mentioned that there would be a continuation in yak farming as there is more scope and income generation from it.As per Walcott (2009), it was found out that labor shortage will not be a problem provided the government makes a good policy on youth out-migration from villages. The authors also mentioned that provided the government support with good facilities, most of the youth will take up an interest in yak farming and will not leave their villages. According to Dorji et al. (2020), there will be a continuation and will increase in yak farming in the future because of the traditional practices of dividing the yak herd among the family members along with governmental support which might encourage yak farming.

3.7 New technologies for better production of yak hair products

As per Great learning (2020), marketing holds the key to attracting and generating leads in business. But the market and new technology in making and selling the products have been an issue for the highlanders for a long period now. Total of 114 herders out of 121 shared that herding of yak is tough job whilst harvesting, carding and lack of machine facilities makes work of yak hair even more tough. This was similar to Wangchuk et al. (2013), who mentioned that herders produce ample products but these products were not accessible to the buyers. According to Dompnier (2007), the herders of Merak and Sakteng barter 70% of their products and sell only 30%. As per Sea Coast Bank (2021), new equipment, as well as leading-edge technologies, enables businesses to be more agile and responsive as business needs change.

3.8 Future estimates of yak hair production

Every year some of the herders are able to produce 1314 kg of yak hair from 6979 heads of yak. As per the DoL (2019), there are 41,918 heads of yak in the country. This shows that every year, there is a possibility to harvest about 8MT kg of yak hair. According to Joshi et al. (2005), yak produces on average 12 kg of hair. The amount of hair produced depends on the physical characteristics of the yak. Bhutanese breed of yaks weighs at the maximum of 400 to 500 kg for matured males and 250 to 300 kg for matured females (Wangdi & Wangchuk 2018). This was in contrast to the Chinese breed of yak, where the highest amounts are obtained from Jiulong yak which weighs 594 kg for males and 314 kg for females and it gives 25 kg of fiber in a year (Wiener et al. 2003).

4 CONCLUSIONS & RECOMMENDATION

Yaks are the main source of livelihood for those highlanders residing in the harsh climatic conditions where there is limited scope for other agricultural practices. Although yak hair has a huge capacity in generating income, yet lack of resources and markets are the major problems for the herders. However, it is expected to minimize the marketing challenges through the formation of yak cooperatives and federation. The formation of such herder institutions will drive its focus to increase economies of scale hair production and establish proper value chain for marketing of products from yak wool. Building capacities of the herders on the use of labor-

saving machines, proper harvesting, processing of yak wool and producing quality products and linking them with niche export markets could help them get better prices and sustain the value chain in the long run. The increased demand for yak wool products could also help to sustain the business and attract more youths to rear yaks and join the herding culture for its sustainability.

Declarations

It is to declare that the research paper submitted is my original work and no part of it has been published anywhere else in the past. The author takes full responsibility, that if in future, the paper is found invalid according to basic rules, the last decision will be of the authorities concerned. Any form of plagiarism will lead to the disqualification of the paper.

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