

## **SUSTAINABLE FUTURE FOR A THREATENED LIVELIHOOD: A CASE STUDY OF THE PASHMINA GROWERS OF LADAKH**

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### **ABSTRACT**

Changpas are the nomadic pastoralists of the Changthang plains of Ladakh. Their livelihood revolves around herding the Changthangi and Chegu goats for producing the world's finest woolen fabric called Pashmina. This prime form of livelihood has deep impact on the social, economic, environmental and ecological aspects of the region. However, lack of developmental activities in the plains has led to a poor quality of life for the Changpas, leading to out migration of the young generation. If this traditional form of livelihood is to be sustained, then major intervention is required in improving the production systems as well as the overall socio-economic conditions of the Pashmina growers. This paper analyses the present status of Pashmina production in the Changthang region and some possible solutions for its sustainable future. These include the possibilities of developing pastureland through artificial glaciers, rearing pashmina goats at lower altitude, stall-fed farming and so on.

**Key words:** Changpa, Sustainability, Pashmina, Animal Husbandry, Livelihood

### **1. The Changthang Plains of Ladakh**

Ladakh, originating from the word *La-dags*, means the land of passes. Ladakh is a cold desert surrounded by the Himalayas, Zaskar and Karakoram mountain ranges and is situated in the North Western tip of India. The elevation of the region varies from 2900 to 5900 meters above sea level. The region experiences very scanty rain fall averaging 9-10 cm per year and temperatures varying between +30 and -30 degrees celsius with a high wind speed of 40 to 60 kilometers per hour. The northern plains of Changthang are situated in the Tibetan plateau and are a subdivision of the Leh district of Ladakh. The Changthang pastures may be described by

the harsh environment, grazing lands divided by rugged mountain ranges, deep river valleys and large lake basins resulting in limited accessibility. Villages in this region are scattered with a population density of 3 persons per square kilometer. This region is classified as a high-altitude desert and is one of the highest, coldest as well as the driest inhabited places on earth (District profile 2017).

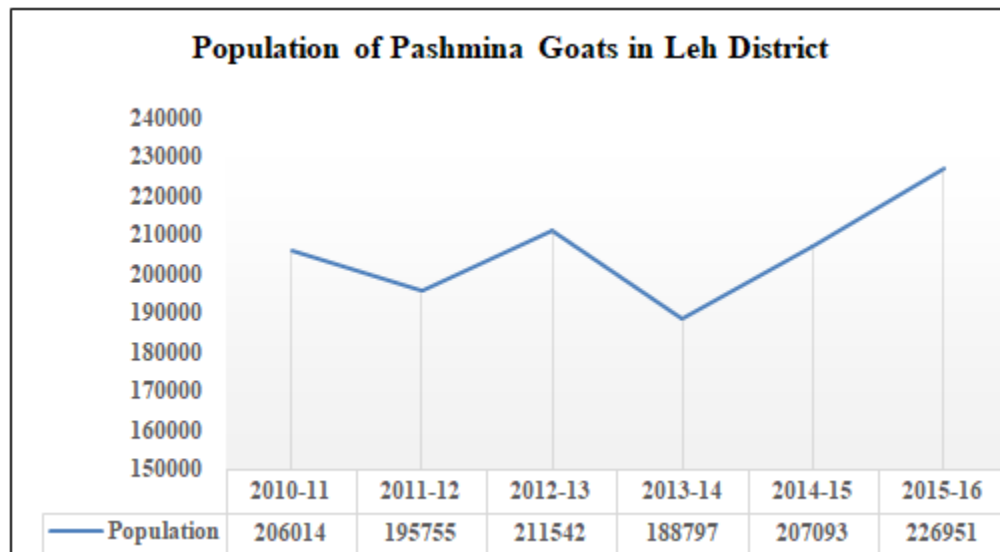
The people of this region have thrived for centuries despite the harsh topographic and climatic conditions which in turn results in difficult living conditions. The inhabitants, known as the Changpas, are largely nomadic pastoralists who practice limited or no farming, according to seasons and availability of the family members. The only suitable occupation in this rangeland given this extreme climate and the limitation of natural resources is pastoralism.(Goldstein 1981; Goldstein 1990).The Changpas maintain a distinct form of food-producing economy with extensive mobile pastoralism and periodic migration. Cultivation is limited to the production of grain for subsistence and fodder for the cattle. Mobile pastoralism is the primary economic activity for subsistence and trade of animals and animal products in this region. Agriculture is a subsistence activity, carried out according to seasons over and above pastoralism. Different members of the family get engaged in both activities. The nomads keep moving their herds over large areas in order to avoid uncertainty and risk associated with pastoralism. All the households of the community move with their herds throughout the year in the pastures that are regulated communally. The Changpas rear the Pashmina goats in these pastoral lands from which they produce some of the finest Pashmina wool in the world(Bhasin 1999;Namgial 2007).

## **2. The Pashmina Goat Farming**

Animal husbandry has been the traditional and self-perpetuating economic cycle and source of livelihood for the rural people of Ladakh. This accounts for the largest share of the income of the region and meets the major nutritional requirement of the inhabitants in the form of meat and dairy. The Changpas raise herds of mixed livestock comprised of sheep, goats, yaks and horses. The products from animal husbandry include various items, such as milk, meat, wool, skin, dung, etc. While yak is useful for its *khulu* and hair, horses are used as pack animals. Goat rearing is an economically viable and feasible option for the Changpas as it forms the base of the pashmina-based activities. The Pashmina goat provides the softest, warmest and costliest woolen fabric known as Pashmina all over the textile world. The two breeds of Pashmina goats found in India are Changthangi and Chegu. The Changthangi breed is domesticated in Ladakh while the Chegu is found in certain regions of Himachal Pradesh and Uttarakh and. These goats have the highest Pashmina production in India with an average of 250g/animal/year. Changthangi and Chegu

goats are considered to have evolved from a common gene pool because of the geographical contiguity in their habitats. (Acharya,1982; Mazumder et al, 1980,1983).

The dominant Changthangi breed is a medium sized goat with long lustrous hair coat, weighing around  $29.8 \pm 0.3$  kg when fully grown. The goats have a compact body with a slightly bulging chest, indicating large pulmonary organs that help in adapting to a low-oxygen environment. The white or light brown coloured Pashmina wool, is collected from the undercoat that grows close to the body surface of the goats. The survival rate is higher in this breed than the Chegu (Singh et. al., 2008). The population of the Pashmina goats during 2010- 2016 has been estimated to be around .02 million of which the approximate size of the Changthangi and Chegu breeds are 0.1 million and .006 million. respectively (Figure 1).



**Figure 1:** Population of Pashmina Goats (Source: District statistics, LAHDC)

### 3. The ‘Pashmina’ Livelihood

Besides being a variety of goat or wool, Pashmina is part of a regional culture. It is the story of a sustainable livelihood around pashmina for a rural nomadic pastoral tribe of the highest inhabited cold desert. It is the story of the lives of the local Changpas of the Changthang plains who have survived the extremely inclement climate and produced the world-famous Pashmina wool and fabric. From the economic conditions to the social customs, all are governed and guided by the Pashmina cultivation and production systems.

### **3.1 The Pashmina Fabric**

Pashmina, the Persian word for ‘made of wool’, refers to a hand-woven fabric made from the soft wool of the Pashmina goat. It is the down fiber derived from the hair of domesticated goat that is indigenous to the region... Although Pashmina wool is also produced in Tibet, Mongolia and parts of Central Asia, it is believed that the Indian variety is the finest, coming from Ladakh and woven by the master weavers of Kashmir.

The nomads of the Changthang plains climb to the highest Himalayan regions at the elevations of 4500 meters or above to collect the fine woolen undercoat from the underbelly of the Himalayan mountain goat, when they shed their warm winter coats during the summer. Their underbellies are covered with two different types of wool. One is the fine soft inner coat which is called Pashmina and the other is the thick and coarse outer layer. The wool is gathered by the locals who comb it to separate the Pashmina from the thicker and less luxuriant wool. Reared at very low temperatures, the yarn has a soft feeling and is incredibly fine, measuring 11 to 14 microns approximately. One shawl requires about 680g/24 ounces of wool equaling the annual output of about 3-4 goats. The superfine Pashmina retains its intense softness and fineness only because it is cleaned by natural cleansing agents instead of chemicals and is spun by handloom. Due to the expertise of human skill involved in the process of making genuine Pashmina textile, each piece is always one of a kind. The techniques for producing fine Pashmina products have been passed down through generations since the times of the Mughal empire. It is often the women in the family who have carried out the practice (Von Bergen 1972;Mishra et al 1998).

### **3.2 The Pashmina Trade**

China is the largest producer of Pashmina in the world with a share of 70% followed by Mongolia with a share of 20% in international trade. The remaining 10% of the total production is from other countries including India. Although India produces the best quality, its share in volume is lower than 1% of the global production. The global production of Pashmina has shown a steady increase from 4500 to 10000 tons between 1990 and 2004. However, the production of Pashmina in India has remained static during this period due to several constraints threatening the viability of this economic activity. The Pashmina growing Changpas are the socio-economically deprived nomadic tribes. The economic backwardness of the region and community may be traced in the lack of opportunities and government initiatives for a long time resulting in an overall social backwardness for years. Low productivity, low output and low remuneration thereof have made this region economically backward and created a vicious cycle of low performance in the Pashmina production and trading sector.

### ***3.2.1 Poor Socio-economic Conditions***

Several actions have been taken at the local level in order to improve the marketing and trading conditions, such as the Pashmina Cooperative Marketing Society, Pashmina Dehairing Plant, Goat Farms at Khuril and Upshi, initiated by the Government of India, the United Nations Development Programme (UNDP) and the Ladakh Autonomous Hill Development Council (LAHDC). These have resulted in some marginal improvement for the Changpas in terms of the quality of life, possession of land and animal husbandry. However, it is only two to three members of the family who stay to tend to the herd during the winter and the rest move out of the region. The physical quality of life in the Changthang plains is devoid of the basic needs required for a decent living, such as, health, education, sanitation, drinking water and so on. This has resulted in large scale migration to areas in and around Leh for alternative jobs. They have started to join the defense sector through military enrolment and work as guides, porters etc in the tourism sector on daily wage basis in recent years (Wani and Wani, 2007; Koul 1990).

### ***3.2.2 Deficiency in the Production Chain***

Although attempts have been made to improve the marketing conditions, the production of Pashmina has remained low. High degree of inbreeding, mortality due to diseases, malnutrition, poor husbandry practice, scanty surface grazing along with inadequate animal health facilities and improper shelter are some of the reasons for low productivity. The average survival rate of these goats has been reported to be 60%. Moreover, the harvesting techniques are primitive and laborious (6-7 man-days/goat). The flocks of each village are closed due to absence of emigration and immigration of germplasm maintained elsewhere for the purpose of breeding.

Pashmina is woven by hand on primitive looms (Figure 2).



**Figure 2:** Changpa Women using Primitive Looms (Source: Dolma, 2017)

The hand spinning in Ladakh does not achieve the same fineness as that of Kashmir and thus makes the Ladakhi Pashmina shawls thicker. The thick shawls are suited for cold climates like Ladakh and are not exported unless a few curious tourists buy it from the local handicraft stores. The region lacks in skill enhancement and training to make the end-products more valuable.

Recently, the Department of Sheep Husbandry, Leh has identified some areas of deficiency that needs immediate attention. These include genetic upgradation of the animals, ideal management techniques suitable for controlling production, reproduction and mortality, improvement of pasture and production of fodder, provision of better healthcare facilities to livestock etc.

#### **4. Sustainability of the Pashmina Culture**

There are certain inherent locational and socio-economic constraints in the Pashmina occupation that have faced greater threats with economic development and urbanization. To sustain this traditional occupation and to preserve the culture, due focus needs to be put on alternative and better technologies. On the other hand, there are issues related to ecological sustainability, over grazing in free range pasture and deteriorating land quality. Moreover, socio-economic backwardness has to be removed in order to retain the inhabitants to their land for pursuing the profession. An integrated development program needs to be chalked out for ecological conservation and socio-economic sustainability of the region.

##### ***4.1 The Problem of the Pastoral Lands***

Traditional pastoral practices have been undergoing changes in terms of the use of rangelands and livestock management due to several exogenous factors such as, political systems, market forces, international and national funding etc. The challenge is to adapt to these changes while sustaining both livelihood and the natural resources (Niamir-Fuller, 1999). However, there are only 1058 hectares of permanent pastures and other grazing land while 26590 hectares lay barren and uncultivable (Figure 3) (District statistics, LAHDC).



**Figure 3:** Pastureland near a stream in Changthang (Source: Dolma, 2017)

With the rise in the livestock population after the 1960s, the available pastures became overgrazed and sources of dispute. This type of problems generally leads to the tragedy of the commons associated with overgrazing (Hardin, 1968). The balance between the number of livestock and the availability of natural resources such as, fodder and water pose the greatest challenge for a pastoral occupation (Khazanov, 1994). The quality of the pastures and availability of water determine the duration of settlement and pattern of movement of the nomads, further affected by localized droughts and diseases. Global warming and climate change are additional factors that are causing deterioration in the grazing conditions by reducing the supply of free-range feed during drier summers and colder winters. This limits the extent to which goat herds can be expanded. The average available area for single livestock unit is 0.4 hectare in this region which is much lower than the national average of 1.0 hectare. Moreover, there are problems of accessibility, continued negligence of pastures, low level of biomass production, growth of weeds and poisonous plants among others. On top of these, development initiatives for Pashmina will imply larger livestock population and hence greater pressure on the grazing land in future.

There is an urgent need for consolidated action program for the improvement of the pasturelands. These include survey and demarcation of existing pastures, management of soil quality, weed and grass, development of migratory routes and formation of a Unified Pasture Development Board involving all stake holders. Pasture development is needed not only to make pastoralism a viable option in future but also to decrease the competition between the wild animals and domesticated ones for the use of resources. The available data reveals that the present fodder

availability in this region is well below requirement. The cultivated fodder and crop residues fulfill the minimum fodder requirement, whereas open grazing and fodder from common property fulfils the remaining requirement. In view of the large number of resource-scarce households who are dependent on open grazing for their livestock, the only plausible option is to revitalize the degrading common fodder and pasture resources in the region (Hagalia 2004;Niamir-Fuller, 1999;Scoones 1995).

In the recent years many pasture lands have lost productivity because of low moisture or low precipitation in winters. Unexpected heavy snowfall often causes the death of the Pashmina flock and lack of fodder. Lack of accountability and non-inclusion in policies cause demotivation on the part of the nomads and leads to further deterioration of the pastures. The other deficiencies of the region exist in energy, water and irrigation facilities. The solutions may be sought in technical inputs for water harvesting, energy supply and irrigation system on one hand and participatory policymaking and management on the other.

#### ***4.2 Developing Pasture Land through Artificial Glacier***

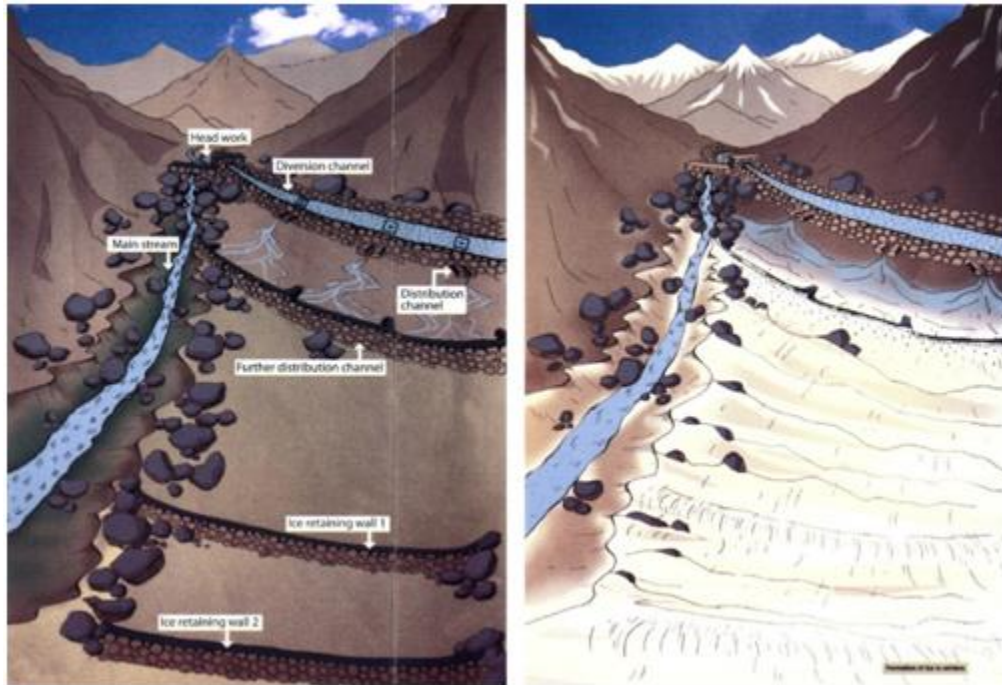
Artificial glaciers provide a simple and feasible method of water harvesting introduced by a son of the soil, Engineer Chhewang Norphel. These can be built on or close to a stream fed by perennial natural springs along with structures to store the melted ice during winter. Retention walls of 3-6 feet height may be built at regular intervals in the stream. This is a simple and traditional method used by village communities and is very effective if the stream is not exposed to direct sunlight during the winter months (Figure4).



**Figure 4:** Simple Artificial Glacier Method (Source: LNP)



Alternatively, water can be diverted from the main stream through a narrow diversion canal to a nearby valley facing north or remaining largely under shade through the winter. The water is let into this valley and allowed to freeze through a series of walls built much in line with the previous method (Figure5).



**Figure 5:** Modern Technique of Artificial Glacier (Source: Dolma, 2017)

This technique is best suited for cases where the main streams remain exposed to the sun during the winter obstructing ice formation. The former technique, besides being economical, is low on maintenance while the latter requires a lot of work. There has to be a steady flow of water in the diversion channel that is kept clear of sand and soil deposits, facilitating the formation of thin sheets of ice over the valley at regular intervals. The facility needs to be maintained by the people on a regular basis. This may be a challenge if the village is not organized to maintain common property. Water freezes in the artificial glaciers during the months of December to February and starts melting from the middle of March, just in time for the pre-sowing irrigation of the fields. The main advantage of the artificial glaciers is that it provides water during the early spring for the crucial pre-sowing watering of fields, thus facilitating timely sowing and harvesting of crops. (Norphel and Tashi, 2015; Nusser et al 2019; Clouse et al 2017).

The natural pasturelands of this region are hardly rain fed though they are along the river streams. These are irrigated mostly by infrequent rains or snow. A movable sprinkler system can be used to cover larger areas and also to provide the required amount of water to the flora of the cold desert that thrive with less water. Solar energy can be generated for this purpose locally as this region receives enough sunlight. Installation of solar-powered sprinkling systems and artificial glaciers along with organized community participation may offer a comprehensive solution.

#### ***4.3 Feasibility of Pashmina Farming at a Lower Altitude***

The occupational hazards of high altitude may be avoided if Pashmina farming can be extended to areas at lower heights. Variations in the breed may also be allowed without any major compromise in the quality of the final products.

The Chegu breed which is found in Lahul-Spitti and Kinnaur regions of Himachal Pradesh and Uttarkashi, Chamoli and Pithoragarh areas of Uttarakhand are being bred and reared in Mukteshwar under the All India Coordinated Research Project by Indian Council for Agricultural Research (ICAR) and Indian Veterinary Research Institute (IVRI) (Figure 6).



**Figure 6:** Chegu Goat Farm in Mukteshwar (Source: Dolma, 2017)

In their natural habitat, they are reared in cold deserts at heights above 4000 m with rainfall between 30-40mm and temperature dropping to -30 degrees Celsius. In contrast, Mukteshwar is at an altitude of 2400 m in the Kumaon Hills with dense forest, temperatures between -4 and 28 degrees Celsius and annual precipitation of 1000-1800 mm. The grazing is done for 4-5 hours

daily in nearby natural pastures and the livestock is managed in sheds. This breed has shown acclimatization to the humid and temperate climate as well as to the low altitude (IVRI-ICAR 2019). However, internal parasitism, pneumonia and enteritis are major causes of mortality in the warm and humid rainy season. The effect of lower altitude on the fiber quality and quantity is not much known due to the lack of data in the natural habitat. On the positive side, the fiber at Mukteshwar is fine and of medium length. The other breed of Changthangi has been farmed at Upshi and Khuril areas in Ladakh. The goats grazed at rangeland pastures at the high Taglang La have not been experimented in lower altitudes. (Koul et al 1990; Singh et al 2008).

#### ***4.4 Modern Farming Techniques for Pashmina***

The initiatives in the Handloom Industry towards Pashmina development may pose a serious threat to the wildlife in the Changthang Plains due to the stress on pastures. Examples of pasture loss due to the increasing demand for Cashmere/Pashmina is evident from Mongolia. The sheer number of grazed animals is putting a considerable strain on the limited pastureland that further causes desertification. Moreover, these animals pose a threat to wildlife owing to their competition with wild animals for the limited pastures of these arid regions (Hagalia 2004). Experiences from New Zealand shows how open grazing put stress on pastureland. The digestive system of the goats helps to destroy the seeds of the weed that they consume. As a result, the seeds are not propagated with the dung and the number of seeds of a particular species is reduced too. This causes ecological threat to the region (Harrington 2011).

In order to avoid similar problems among the native species of Changthang, alternative farming techniques, such as, zero grazing and stall-fed farming, may be developed. These methods are being successfully applied in parts of southern India. These farms procure the fodder from nearby areas and feed the animals in the farm. Animals are kept separately on the basis of age and gender and mating allowed on the basis of time and buck selection (Figure 7). This method seems to be a practical and professional method where goat/sheep farming is done in a controlled manner. It has the positive effect of not letting the animals graze in the open areas although it limits the movement of animals and encloses them in a small area. This kind of stall feeding and zero grazing livestock farming are being done in certain African countries where vegetation has been majorly lost due to intensive grazing and soil desertification process. Farmers who have taken up stall-feeding reported several advantages, such as, increase in the sales of milk and meat, flexibility of time in fodder collection, freed up time from herding duties for the herders and finally faster and healthier growth of animals housed in cowsheds. (Singhet *al.*, 2008; Mazumder *et al.*, 1980, 1983).



**Figure 7:** Zero Grazing/ Stall-fed Farming (Source: Dolma, 2017)

## **5. Conclusion**

The nomads of Changthang Plains are continuing with the age-old tradition of Pastoralism. However, migration rate has been high in recent years with most nomads already settled in the outskirts of Leh. This clearly indicates the lack of opportunities and activities in their native land. The migration may continue in future due to the harsh climatic conditions and the prospect of a better life in the cities (Goodall 2004; Miller 1998).

Clashes for pastures take place among animals and different communities of people. Increased goat population without any significant step to increase or replenish the pastures is making pastoralism an unsustainable and ecologically threatening activity for the future. Global warming and climate change have added to the woe. Economic development has caused gradual deterioration in the connection of the nomads with the land and livestock. With the added stress on pastures and lack of substantial action, the wildlife and ecology of this region is getting affected severely.

With the advent of technology, development and better living standards in other parts of Ladakh, the nomads feel backward in villages. Leh is considered to be a model of development for the young generation. This pushes them towards migration for better education, employment and other opportunities. The next generation of Changpas who are being educated in the cities, get used to the modern comforts and not experience the harsh struggle of the daily nomadic life. They will perhaps not participate in the continuation of this culture. However, there is a

possibility that the high economic value of Pashmina may attract the young generation, who will hire laborers to continue with herding while they reap the profits out of it. Even at present, the rich herders with less manpower hire laborers or some Tibetan refugees for herding their livestock. In any case, the connection of the nomads with the land and livestock will inevitably deteriorate. With time, as is the case everywhere, nomads end up settling down in areas that offer better life that is free of the risks and uncertainties of nature (Michaud 1996; Rizvi 1996, 1999).

Pastoralism is a cultural asset of the region and needs to get due importance in development planning. In order to sustain the threatened Pashmina culture, farming practices and the lives of the Changpa population, substantial steps need to be taken at the earliest. Some of these solutions lie in improving the pasturelands, introducing artificial glaciers and developing irrigation and power generation systems. On the other hand, modern techniques of goat farming may help to release the pressure on pasturelands. If an overall socio-economic development is to be charted out, then sustainable eco-tourism and rural tourism may also be added to the development plans with due consideration of ecological conservation.

Properly designed development policies for the pastoralists can sustain the region and the tradition of Pashmina. The preservation of this culture will mean the preservation of a sustainable livelihood of a sustainable community that has provided the best fabric to the world for centuries. Focused development plans for these areas with provision of farms and agriculture will not only make life easier, it will also provide the long-term base for a sustainable living to the nomads so that they do not have to leave these plains which they have called home for generations.

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