



Exploring Livestock Health Status in the Humla: Perceived Impact of Climate Change and ‘Tibau’ Disease on Local Yak Populations and Farmer Well-being

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Abstract

The Humla district is one of the most remote regions of Nepal. As a result, no research has been done to evaluate the impact of climate change on the district's livestock's health. Researchers assessed the impact of climate change on livestock's health in the Humla district through a case study of the undiagnosed disease complex—'Tibau'—and its impact on the local herders and yak populations. The study utilized descriptive, exploratory, and participatory research methods for data collection. Results suggest that increased temperature, decreased rainfall and snowfall, and decreased feed and fodder have a significant impact on the health status of livestock. Herders in the Humla region of Nepal reported a local disease called 'Tibau' as having a significant impact on yak populations and their own well-being. The census data depicted Tibau as major factor contributing in decreasing Yak population. Researchers recommend using the study results to further characterize the disease 'Tibau' and using a LAPA framework for encouraging dialogue between Humla's yak herder population and policy makers to formulate policy adapting these livestock systems to climate change. 🐄

The Humla is significantly impacted by climate change, but its effects on livestock are poorly understood



Focus group discussion with herders. (Photo credit: Sidhi Bajracharya)

Reachable only by foot or aircraft, the Humla district is one of the most remote regions of Nepal. The majority of the Humla's population rely on livestock keeping for their livelihoods, raising yak and yak hybrids as a reliable food and income source. Research suggests that this mountainous region is poorly equipped to adapt to the harsh effects of climate change, resulting in significant impacts on the health of the area's farmers and the livestock they depend on. Due to the remoteness of the region, no research has been done in the Humla to assess the impact of climate change on livestock's health. To fill this gap, researchers conducted an in-depth case study of an undiagnosed disease complex—known locally as 'Tibau'—and determined its impact on the region's herder's wellbeing and their livestock's health. Researchers conducted the study in Muchu VDC, Humla district of Nepal, an area with a total population of 1,563 people living in 252 households. The study population consisted of transhumant herders and their livestock residing in five villages in the region - Yalbang, Yangar, Chala, Muchu, and Yari.

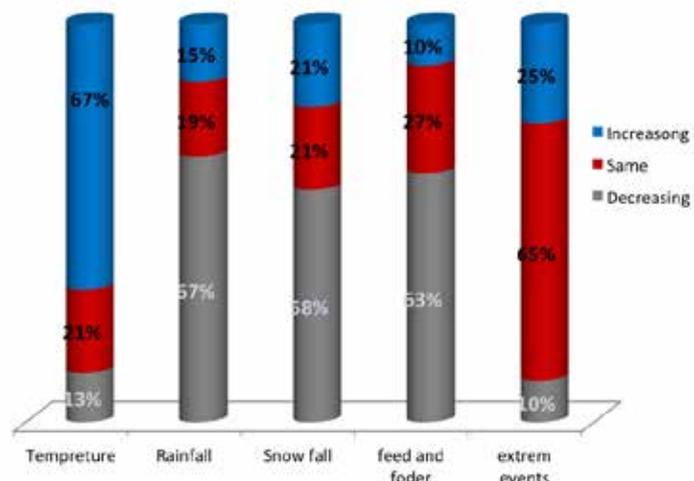
Survey, interviews, and case studies were used to elucidate the relationship between climate change and livestock and herder health

Researchers employed descriptive, exploratory, and participatory research methods to assess the impact of climate change on the Humla district's livestock and people. In the first phase of research, an exploratory pre- and post-study design was used to assess the health status of these livestock in the context of climate change. Using an animal health survey, researchers observed yak health before the livestock were taken to upper grazing land in the summer and after their return to the area's lower regions in winter (transhumance). In the second phase of research, a case



study approach was used to describe and explain an undiagnosed disease complex regionally known as ‘Tibau’. Household surveys were conducted to provide a census of the yak population over the last ten years. The census was used to describe trends in the yak population and the impact of the disease ‘Tibau’ over the assessed time period.

Qualitative data was collected by conducting focus group discussions and individual interviews with herders and key informants. During these discussions, the herders’ knowledge of ‘Tibau’, perception of climate change, and herder well-being was accessed.



Graph of herders’ perception on climate change variables

Climate Change and ‘Tibau’ disease may affect livestock health and herder well-being

The findings suggest that transhumance practices affect the health status of livestock in the region. The herders inferred the cause of this to be the increasing temperatures, decreased rainfall and snowfall, and decreased availability of feed and fodder in the upper grazing land—all features that could be attributable to climate change.

According to these farmers’ perceptions, when animals are in higher temperatures they are 0.45 times more likely to be unhealthy as compared to lower temperatures. Comparing less rainfall to more rainfall, animals are 5 times more likely to be unhealthy in times of low rainfall than that of increased rainfall. Comparing less snowfall to more snowfall, animals are 3 times more likely to be unhealthy when there is less snowfall. Finally, comparing less feed availability to more, animals are 7 times more likely to be unhealthy when there is less feed than more. The frequency of extreme weather events was not found to significantly impact animal health.

Household survey was conducted to document the total number of yaks within the last ten years. Ten years ago, there was an estimated 1,443 yaks living in all five villages. In 2014, this number has decreased to 779, showing a 47% decrease in the total number of yaks in all five villages in the last ten years. The total number of yaks was found to be stable until the last 6 years, after which their numbers started drastically decreasing.

Herders reported that the number of livestock has been decreasing for a number of reasons. However, 90% of herders reported the local

disease ‘Tibau’ as a distinct reason for this decline. According to herder reports, ‘Tibau’ has wiped out more than 50% of the total yak population within the last ten years. Herders also reported that the disease has moved upward from the lower region due to increasing temperatures. The highest numbers of yaks to have died from ‘Tibau’ occurred five years ago, with the death of 103 yaks reported in 2009. Due to fear of this disease, herders increasingly sold their livestock as a coping strategy, with this population decline maintained by a common reluctance to purchase or keep more livestock. An undiagnosed disease complex, ‘Tibau’ is a disease with very limited understanding in the veterinary or medical community, with its impact in the area creating a distinct need to learn more about the disease.

Herder’s Well-Being is Associated with their Livestock

Herder’s well-being in the Humla region is profoundly associated with their livestock. The herder’s of Humla are very proud to be yak herders and regard their animals as members of their family. In fact, the Humlis speak of themselves as being the *gorupuccha* or “tail-of-their-animal”. As the district suffers from chronic food shortages, farmers have great difficulty feeding themselves and their families for 3-5 months of the year. Keeping livestock is an important risk reduction strategy for vulnerable communities, as livestock are important providers of nutrients and manures for growing crops as well as providing transportation. Livestock are indispensable draft animals for the purpose of carrying rice from district headquarters or flour from Taklakot, a neighboring market center in Tibetan China. Moreover, in remote areas, livestock are an important cash commodity. One yak is worth up to 100,000 NPR (\$1,000 USD), making yak the most valuable asset in their livelihood strategy. Moreover, Humlis consume a great deal of ‘bhote tea’—whose main ingredient is yak’s butter—which gives them heat and energy to survive in this cold region. Without the yak, this food culture would be unable to persist, and the means of getting heat, energy, food, and income would be greatly reduced.

‘Tibau’ Case Study

This intricate entwinement of herder’s health, wealth, and well-being with their yaks has been jeopardized by the disease ‘Tibau’. According to livestock herders, the disease has wiped out more than 50% of the yak population from the Humla region within the last ten years. Herder’s pointed out that the disease is a major barrier to improving their well-being. Due to this disease, herders are apprehensive and reluctant to increase their number of livestock—further jeopardizing their health and income.

In light of the findings, researchers carried out a second phase of the study to characterize the undiagnosed disease complex using a case study methodology. Tibau is an uncharacterized, undiagnosed disease complex believed to be associated with climate change.

Herders reported that the highest number of cases of ‘Tibau’ occurred from August to October. During these months, there is significant animal movement for transport of food stuffs and other required materials from Tibet to their respective VDCs. All herders reported that the most vulnerable breed of livestock is the yak and chauri, especially when the animal is overweight. When these over conditioned yaks are used as draft animals and are made to carry a large amount of

Table 1. Animal Health Status Before and After Transhumance

Health Status	Pre Sample		Post Sample	
Healthy Animals	305	92%	195	59%
Not healthy Animals	26	8%	136	41%
Total Sample	331	100%	331	100%
McNemar's test	p value 0.000		significant at .05 significant level	

weight, quickly, over long distances the yak contracts the first symptoms of 'Tibau'.

In the initial stages of 'Tibau' the yak stops eating grass and stops normal regurgitation associated with ruminant digestion. They become increasingly lethargic, sleeping for long periods of time. The yak exhibits difficulty defecating, while the fecal matter that is passed is extremely dry and pebble-like. After these primary symptoms, the yak's condition slowly worsens. The yak begins breathing very fast and its muzzle area becomes dry. The yak then presents with high fever, based on herders identifying a wetness to the animal's coat from sweating. The yak bellow in pain, with the disease progressing to swelling and protrusion of the eyes that become laden with discharge along with yellowish discharge from the nose. The yak then stays with its head bowed down. Its urine takes on a reddish hue. If forced by the herder to stand and walk, the yak staggers and walks "as a drunken man".

According to local traditional healers, the yak's life can only be saved if it is brought for local treatment on the first day the animal contracts the disease. Unfortunately, as only lactating heifers and cows are kept



Animal health observations. (Photo credit: Sidhi Bajracharya)

at home, most yak are left to roam freely in the nearby forest due to a lack of foraging at the herders' homes. Hence, the disease often goes unrecognized until it is too late. If recognized early enough, the yak may be brought to traditional healers for treatment. This treatment consists of piercing the animal's spleen, located in the left ventral part of the animal between the 4th and 5th rib. Once pierced, blackish thin blood is released, half of which is released outside of the animal's body cavity, with the other half remaining in the abdomen to help "flush away feces which have dried and shriveled in the rectum". Once reddish blood is seen, healers stop the blood flow. The animal is then given a sweet substance (guth) and vinegar (chuk), or honey and vinegar, or cooked local peach-like fruit. However, once the disease progresses

beyond the initial symptoms, the animal cannot be saved by this treatment.

Most herders perceive the cause of the disease to be the hot environment in the lowlands. In the upper grazing land, the high altitude creates a fairly cold environment—one in which the disease does not often present. Once the animals descend they begin to show symptoms of the disease, resulting in death of the animals. As a result, herders are reluctant to buy more yaks and villagers perceive 'Tibau' to be a fatal disease due to its high mortality rates in spite of local care. Based on this study's census findings, 511 yaks have been killed due to this disease in the last ten years, making 'Tibau' one of the single most important causes in yak value depreciation and population losses. The result of the histopathological test did not provide any clear information on manifestations of the disease. Thus the result of the histopathological test could not explain the scientific result of Tibau in this study.

Preliminary Conclusions

Study results show that climate change has a significant perceived impact on the health of livestock in the Humla district of Nepal. Increasing numbers of unhealthy livestock have been found after the seasonal transhumant transit of these livestock from low, to high regions of the area. Increased temperatures, decreased rainfall and snowfall, and decreased availability of feed and fodder may be risk factors for declining health in these yak populations and decreasing trend in livestock population numbers over the past ten years. The major reason for this decline, though, lies in the increasing rates of the disease 'Tibau'—a life threatening disease with a high mortality rate. This disease may be a major contributing factor to the decreasing health and number of livestock in the area and declines in their herder's wellbeing.

Implications for Future Work

The findings of this study should be used to help Humli farmers understand and adapt to the impacts of climate change on their livestock. These findings could act as a bridge connecting these farmers' voice to policy change by providing policy makers with insight on the urgent need for policy adapting these vulnerable livestock systems to climate change. To do so, it is recommended that the LAPA (Local Adaptation Plan of Action) framework developed in 2011 should be used for potential policy formulation relating livestock adaptation to climate change. By continuing this study and furthering its results, increased understanding of 'Tibau' in relation to climate change can help fill the research gap relating the impact of climate change to animal health, and work towards improving the health and livelihoods of both farmers and their livestock in the Humla. 🐄

Further Reading

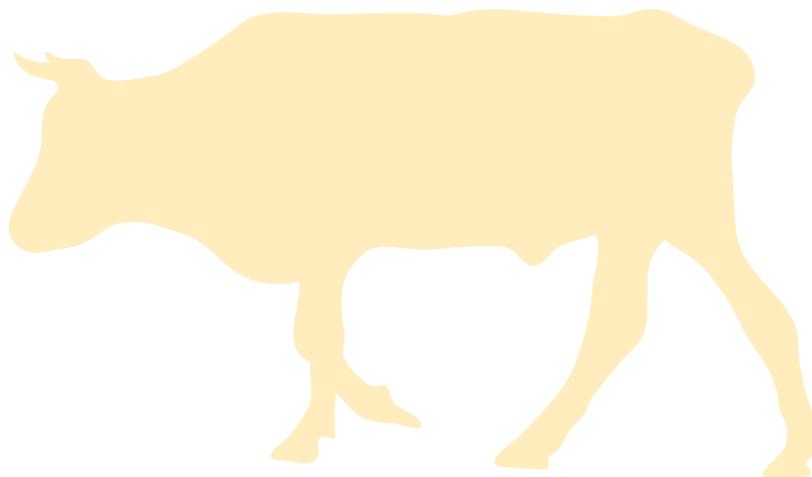
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TIRI, Targeted Investment for Research Impact, identifies early-career researchers who are interested in tackling livestock production problems through innovative approaches and fresh perspectives. This small-grant program is open to early-career researchers (five or fewer years into research career) in any discipline, from student to professor, and from any organization that is engaged in applied research on livestock production in South Asia and East Africa — colleges and universities, government research centers or laboratories, or non-profit organizations.

Proposals are selected based on their potential to make livestock production systems more resilient to increasing climate variability and severity. At the end of one year, TIRI scholars are expected to demonstrate concrete outcomes and real potential for future impact. The 10 selected East Africa TIRI scholars and the 18 selected Nepal TIRI scholars are addressing research problems on various livestock and climate research themes.



Feed the Future Innovation Lab for Collaborative Research on Adapting Livestock Systems to Climate Change is dedicated to catalyzing and coordinating research that improves the livelihoods of livestock producers affected by climate change by reducing vulnerability and increasing adaptive capacity.

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