13

Climate Change and Rural Adaptive Strategies : Exploring the Perceptions of Local People in Eastern Nepal

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Exploring the perceptions and adaptive strategies of rural people regarding the impact of anthropogenic climate change has become a hot issue for policymakers as well as academic discourses. This study explores the perceptions and rural adaptive strategies of local people living in a small mountainous village, Umling, in eastern Nepal. I used an exploratory ethnographic framework of qualitative research design by taking six participants and conducting the informal interviews. I found that the perceptions and the selection of specific strategies by local people regarding the effect of climate change are shaped by individuals' diversified habitus, capital, and field. On the one hand, the diversification of perceptions and adaptive strategies are directly connected with the small differences in elevations. On the other hand, the perceptions of people living in the same elevation are more or less similar though they have diversified habitus, capital, and field. Therefore, unlike the epistemology of natural sciences,

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culture-specific, location-specific, as well as elevation-specific ethnographic studies are essential in such a phenomenon.

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1. Introduction

Climate, as an average state and variability of temperature, humidity, precipitation, and windiness at a particular place, is changeable in nature and of course an inevitable natural process. Climate change is a regular and natural process of periodic modification of earthly climate that results from the changes in the atmosphere and other geologic, chemical, biological, and geographic factors within the system of Earth (Jackson, 2021). But the variability of records and situations indicates that today's climatic change is more rapid than ever before, and it should not be explained by natural processes alone (Denchak & Turrentine, 2021). Though natural causes are still relevant for very low influence, studies published in peer-reviewed scientific journals show that 97 percent of climate scientists agreed that anthropogenic causes are responsible for climate change (Johnson et al., 2017). Therefore, the over-whelming majorities of the studies relating to climate change indicate that anthropogenic factors are the leading cause of the earth's rapidly changing climate today (Rosa et al., 2015; De Matteis, 2017; Denchak & Turrentine, 2021).

The natural process of changing climate and the alteration of adaptation strategies should be taken as an ongoing natural process for coping with the environment. However, anthropogenic climate change and its rapidly increasing rate have resulting unusual impacts and unacknowledged conditions on the natural and an inevitable process of coping with the atmosphere for human beings. Broadly, anthropogenic causes are socio-politico-cultural and economic factors which result into implicit and explicit pressures on the environment (Rosa et al., 2015).They have disturbed "the existing functional relations between socio-ecological systems" (Poudel, 2020, p. 30), as well as "the biophysical conditions that make Earth a suitable home for all natural species, including humans, and thus threatens the future of society" (Brulle & Dunlap, 2015 : 1).

Though the impact of anthropogenic climate change is already noticeable in people around the world; its intensity and severity are diverse. The rural people particularly residing in mountain areas

around the world still practise the conventional way of life and adopt livelihood strategies that are highly reliant on natural resources. Moreover, the people directly more dependent on natural resources for livelihood are more likely to be vulnerable to the impact of climate change. The adverse effects of anthropogenic climate change on rural people are already manifested in the Hindu Kush-Himalayas including Nepal (Macchi, 2010). Similarly, the results of different studies suggest that the disparity of climate change and its impacts tends to be intense at increasing elevations and in areas with complex topography, as is the example in Nepal's mid-hills (Diaz & Bradley, 1997; Gentle & Maraseni, 2012; Merrey et al., 2018).

Despite the negligible contribution of Nepal for worldwide emissions, the irresponsible anthropogenic activities of other industrial countries have adverse effects on the subsistence and adaptive strategies of the people in different geographical regions of the country. Moreover, the changing pattern of precipitation, warming, and glacier recession in mountain regions has provided a new identity to these places as a climate change hotspot for resulting the potentially serious consequences for local ecosystems, people, and downstream regions as well (Shrestha et al., 2000). Some remarkable impacts of climate change resulting in mountain areas in Nepal are erratic rainfall and the unpredictable onset of monsoon seasons, water scarcity and pasturelands depletion, landslides, storms, glacial retreat, and drought (Kohler et al., 2010; Macchi, 2011; Poudel, 2020). These incidences have resulted in crop failure, food and livelihood insecurity, water scarcity, and income insecurity to the local people (Macchi, 2011). In addition, it created possible threats and vulnerability to the livelihood strategies adopted by local people.

In the context of rural eastern Himalayan regions in Nepal, there is very little information available about the people's perception of the impact of anthropogenic climate change and their adaptive strategies to coping with the situations. Therefore, the purpose of this study is to explore the people's perceptions and adaptive strategies regarding the impact of anthropogenic climate change in the local contexts. For this purpose, I have conducted fieldwork in a mountain village Umling of Sankhuwasabha District in eastern Nepal particularly revolving around a couple of major research questions concerning how the local people have perceived the impact of climate change, and what livelihood strategies they have adopted to cope up with the changing environment.

2. Literature Review

2·1 Anthropology of Climate Change

Anthropology does not have any separate branch to deal with anthropogenic climate change. Moreover, neither it has climate change-related unique theoretical perspectives nor the separate methodology that only deals with the contemporary dilemmas resulting by climate change. Anthropology does have its long history and different theoretical perspectives essential for studying contemporary climate and culture, and has been using unique perspectives and methodologies since the commencement of the discipline itself. As a professional anthropologist, the first credit goes to Margret Mead for showing concern on the issue of "healthy atmosphere" and foreshadowing the beginning of the anthropology of environmental change in 1975. However, she did not encourage the fellow anthropologists to work on the issue of climate change per se (Bear & Reuter, 2015).

Similarly, during the 1990s, anthropologists and archaeologists Mary Douglas, Steve Rayner, Carol Crumley, and Brian Fagan laid the foundations in anthropology for the study of climate change (Crumley, 1994; Douglas et al., 1998; Rayner & Malone, 1998; Fagan, 2000). Since then the study of climate change in anthropology sprouted strongly ahead consisting the perspectives like cultural ecological, cultural interpretive, critical anthropological, and applied anthropology (Bear & Reuter, 2015). Though cultural ecological perspective examines all facets of human-environmental relations, its excessive reliance on the concept of adaptation avoids the serious mitigation efforts and global climate justice issues (Crate, 2008). Moreover, cultural interpretive perspectives tend to focus on climate change perceptions through the lens of local knowledge (Bear & Reuter, 2015). In addition, critical anthropological perspective of climate change is guided by political ecology theory and talks about the political nature of interaction between human and environment (Baer & Singer, 2009). It focuses on the issues of safe climate, environmental sustainability, justice, and social equity (Bear & Reuter, 2015). Finally, applied anthropological perspective of climate change focuses on two major role of anthropologists as participating in the formulation of environmental policies, and studying and becoming involved in the environmental movement (Bear & Reuter, 2015).

The earlier theoretical approaches of climate change were guided by the rationality and objectivity of natural sciences paradigms. Either in the form of cultural ecology and cultural materialism, or archaeological and environmental anthropology, they were limited in discussing the multifaceted interrelationships between ecology and culture. Moreover, those early studies "lacked an accommodation for the global array of connections that contemporary climate change invokes" (Crate, 2011 : 178).

Contemporary discourses of climate change revealed the fact that the global climate is changing at an unprecedented rate due to the human activities, and it has expanded the role of anthropology to engage local to global contexts. Furthermore, this new cultural implication of unprecedented climate change has created two areas: "place-based community research" and "global negotiations and discourses" (Crate, 2011 : 179) for anthropological studies. In addition, at a recent development to the study of unprecedented climate change anthropologists have also engaged in "climate ethnography". Crate (2011) advocates "climate ethnography" as a multi-sited, collaborative, and unique anthropological approach for the study of climate change.

The anthropological perspective focuses on multiple dimensions of the impacts of climate change that other disciplines do not fully address. Moreover, it insists that the global problem of climate change is rooted in social and cultural-specific habits (Khazaleh, 2016). It further insists that the perspectives and epistemology of natural sciences do not offer the required knowledge and insights about climate change alone. It is because focusing solely on reducing carbon emissions ignores the systemic causes and also remains insufficient to address the impact of climate change. Anthropology sees climate change primarily not as natural problem but as human problem (Osten, 2015).

Anthropology has focused on three ways of studying climate change : the use of ethnography, historical contextualization, and a holistic view of society and the environment (Barnes et al., 2013; Barnes & Dove, 2015). It recognizes all the possible determinants and rejects a narrow focus on a variable or set of variables of social and environmental change. Barnes et al. (2013 : 541), state that "anthropology's in-depth fieldwork methodology, long engagement in questions of society-environment interactions and broad, holistic

view of society yields valuable insights into the science, impacts and policy of climate change".

2·2 Pierre Bourdieu : Theory of Practice

The French scholar Pierre Bourdieu, through his theory of practice, has presented capital, habitus, and field as the three fundamental concepts to show how an individual's perceptions and actions are shaped in a particular time and space. Bourdieu uses the concept of habitus to refer to a system of dispositions that influence the way of individuals' perceptions and actions in the social world around them. Moreover, habitus is the "mental or cognitive structures" through which individuals are able to perceive, understand, and evaluate the social world (Bourdieu, 1977). In addition, these are "the product of the internalization of the structures" (Bourdieu, 1984 : 18) of the social world. Bourdieu argues that through habitus, something like a "commonsense", people develop a "point of view" from which they can interpret their own actions and the actions of others too (Appelrouth & Edles, 2016).

Similarly, Bourdieu argues that to understand particular phenomena, it is necessary to examine the field or "social space" in which these phenomena occurred. Moreover, Bourdieu presents the field as "a network of relations among the objective positions within it" (Ritzer, 1992 : 579). Those who occupied the positions either as agents or institutions are constrained by the structure of the field. Likewise, Bourdieu saw the field as a type of competitive marketplace or an arena of battle in which different kinds of capital (economic, social, cultural, and symbolic) are employed and deployed (Bourdieu, 1984). These different forms of capital are embodied to produce an individuals' habitus which is realized or deployed in the field. In other words, an individual's "point of view", and perceptions are influenced by their position in the field. Finally, Maton (2012 : 51) concludes that, "practice results from relations between one's dispositions (habitus) and one's position in a field (capital), within the current state of play of that social arena (field)".

In this study, I used the theoretical and methodological considerations of "the anthropology of climate change" to fulfill the purpose of the study. Similarly, I gave equal space to Bourdieu's theory of practice, as a theoretical lens, to explore and understand the people's perceptions and opinions about the impact of climate change on their livelihood strategies.

3. Study Site and Methodology

The study area, Umling is a small mountainous village located in Sankhuwasabha district of Nepal. It is situated at an elevation of about 500 to 3034 meters above sea level.The village is surrounded by Maya Khola in west-southern and TellukKhola in the eastern part. Moreover, it is a mixed residence of different caste and ethnic groups. Major occupations of local people are a mix of agriculture and animal husbandry, and tourism.

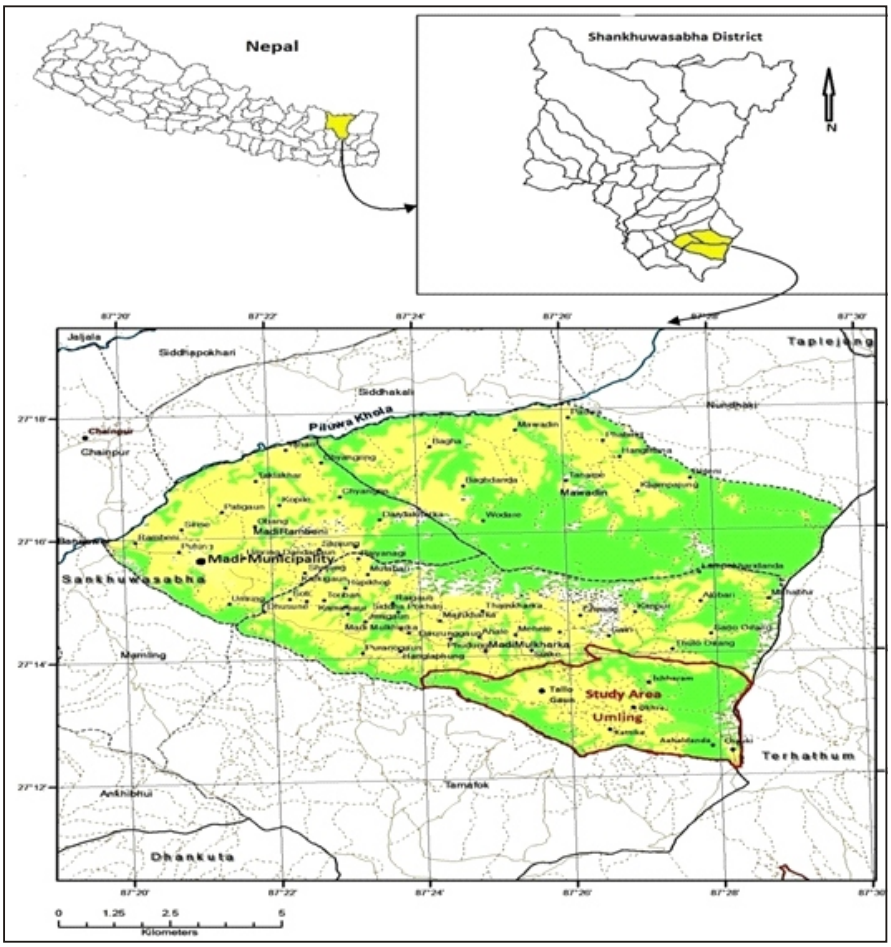

Figure 1 : Map of the study area

The people of the study area cultivate paddy, maize, potato, wheat, barley, cardamom, and vegetables as a subsistence economy. The access to the agricultural road made the villagers possible to sell milk and vegetables since eight years. In addition, access to information technology has further made it easy for the villagers to be informed about the national and international scenarios.

As this study is highly based on the perception of the local people living in a mountain village Umling, I used an exploratory ethnography framework of qualitative research design by adopting the interpretivist philosophical consideration. This philosophical consideration believes in the existence of multiple and subjective forms of reality and gives priority to explicating the socio-historic context of the phenomenon by recognizing the subjective understanding and interpretations of the individuals (Gorton, 2010; Ojha, 2021). Moreover, "ethnography is a way of grounding the climate problem by exploring cultural phenomena in the context of social life" (Fiske et al., 2014 : 19). In this sense, through ethnographic study, I have carefully explored and interpreted the perceptions and adaptive strategies of the local inhabitants relating to their own contexts.

The universe of the study is the inhabitants of Umling. Out of the universe, I selected six participants using purposive sampling and the data were obtained through informal interviews employing semi-open as well as open-ended questions. In addition to that, I also conducted 3 months of fieldwork from October to December of 2021. Finally, I carried a thematic analysis to analyze the descriptions and perceptions of local people depending on their views regarding the issue.

4. Findings and Discussion

Nepal is vulnerable place to anthropogenic climate change in the globe. The long-term climate risk index (CRI) ranked Nepal at ninth position in the world as the most affected country in the period from 1999 to 2018 (Eckstein et al., 2019). The people in different regions and sectors in the country are at risk from the impact of the human-created changing climate. Moreover, with the faster rates of changes in temperature and precipitation than the global average, millions of Nepalese are at risk in terms of degeneration of agriculture production, strained water resources, loss of biodiversity, damaged infrastructure, and food insecurity as well as other natural resources (USAID, 2017). In this context, I have found different perceptions of local people living in Umling regarding the issue of climate change.

The fieldwork conducted in Umling revealed that, most of the people living in low elevations of the village have felt the impact on the production of agricultural crops. For instance, Ram Bahadur Thapa (Pseudonym), a 56 years old farmer living in the low elevation of the village, stated :

> Although I have not heard much about jalawayuparibartan (climate change), I have felt unusual climatic variations in my locality. It's almost 15 years that I have not seen snow falling. The sources of groundwater are becoming dry while there were many sources of groundwater two decades ago. Irregular rainfall, drought, bad weather and increasing natural calamities have impacted seasonal crop production. During childhood we used to plant cardamom by considering it as a crop of one-time planting for a long period of production. But it has become a crop for a short period of time at present. So, I think agriculture lonely cannot guarantee sustainable livelihood. It's also the reason that I have begun animal husbandry as an alternative way for livelihood. I could sell the milk in the newly opened cheese factory in the village although I don't know whether it will sustain for long time in the future as an alternative livelihood pattern.

Ram Bahadur's argument gives a clear picture of the fact that despite not having sufficient theoretical knowledge on climate change, the participants did have massive experience of the instances of changes in climate and its effects. The informal interview and participant observation revealed that there were similar experiences among the participants who lived in the same elevation in the village. The participants from lower elevation adopted animal husbandry as an alternative adaptive strategy. Kamala Kumari Karki (Pseudonym), a 78 years old woman living in the lower elevation of the village, for example, said :

> I don't know much more about the changing scenarios, but what is happening nowadays is different than what we saw earlier. Surprisingly, since a decade I have been observing the pear blossoming even in October whereas its usual time falls in April and May. Moreover, the attacks of different diseases and insects on crops and vegetables have made cultivation impossible without pesticides. There is increasing loss of the production of local varieties of paddy. Irregular rainfall is decreasing the production of cardamom every year. It is also affecting our dependency on agriculture often transforming us from producers to consumers. People in my neighborhood also have increasingly shifted to animal husbandry and selling milk for dairy products and goats for meat productions. In my case, the pension of my husband has become a means of livelihood in

this difficult situation but I often worry about the future of my grandchildren.

The comment of Kamala provided a clear picture of how the changes in the climate of the village called Umling invited different effects such as decreasing crop production and peoples' shifting occupations for sustenance. The perception of people on the climate change has also direct connection to the elevation of the same village as revealed by the differences in the response of the people living in middle part of the village in comparison to the people living in high and low altitudes. In a similar concern Dhan Bahadur Budathoki (Pseudonym), a 73-year-old retired teacher of a local high school, put his observation often in quite a nostalgic tone as:

> In my early childhood, I had seen the snowfall even in the low part of the village. I remember the day of 1988 when the snowfall was so heavy that our school remained closed for two days. But now the snowline has moved to an upper elevation of the village. The children go there to enjoy snowfall. Similarly, one heavy rainy night in 1996, the flood had come in Maya Khola so terribly that that the surface of water came up to 50 meters and two suspension bridges were collapsed. Another surprising matter is that the cardamom belt has moved 1 kilometer upwards over the last 15 years. In addition, uncertainties of climatic variations have become common incidents these days while they had been more or less stable in the earlier days.

It was much clear from his comment that in comparison to his earlier life numerous changes have taken place in the climate including the baseline of snowfall, the degree of rainfall and the changing altitude of cardamom belt. Unlike the people of low elevation, the perceptions and the adaptive strategies of people living in the middle elevation of the village are quite different. They have taken the impact of climate change both as an opportunity and constraints for their livelihood. The increasing temperature created by anthropogenic climate change has made it possible for them to adopt new more profitable adaptive livelihood strategies. Hom Bahadur Khulal (Pseudonym), a 51 year old farmer and a local resident of the middle elevation of the village, representatively, said:

> Till 20 years ago, one could not even imagine planting the cardamom in my farmland. It is because, due to the frost, the land would have been covered for almost three months in

> winter. The frost was the primary hazardous. But for the last 20 years I have not observed the frost as before this period. Since then I have planted the cardamom, and for several times more it has become highly beneficial too. In earlier days, we had to depend on corn and potato for subsistence while cardamom has become a major source of livelihood at present.

Hom Bahadur's comment replicates the way people shifted their livelihood pattern along with the changes in the climate particularly in the availability of frog in the village in the earlier times and its disappearance at present allowing the cardamom plantation as one of the major crops. The ethnographic study conducted in the village also revealed that even small differences in altitudes have huge influences on making the perceptions and adaptive strategies of people. Though people living in Aahaldanda, the upper elevation of the Umling, did not hear about global warming through any means, they felt and observed the climatic variations in the recent decades. During the fieldwork, an 86 year old farmer of Aahaldanda, the upper elevation of Umling, Kul Bahadur Karki (Pseudonym) said :

> Since 20 years, on summer days, I have been feeling increasingly hot weather. Moreover, we had noticed mosquitoes in this place for the first time in the summer of 2010, and in recent years we have been observed their increasing numbers. Likewise, in winter, the presence of snow in my farmland is rare nowadays, whereas, till two decades ago, the snow used to cover it for almost a week. The snow also used to work as irrigation and to loosen the sold and thus more fertile for potatoes. But it is not at present. So, we have started cabbage farming in alternate.

Kul Bahadur's comment on the way the villagers began cabbage farming from potatoes due to the changes in snowfall pattern reflects on how climate change causes the residents shifting on agricultural pattern considering their livelihood sustenance. Unlike the lower elevations, the residents of Chauki, the uppermost elevation of Umling, in this case, have been aware of the issue of climate change and global warming. This place is a tourist area, and most of the residents depend on seasonal tourism. Furthermore, this place is a part of the "Tinjure-Milke-Jaljala Rhododendron Preservation Area". The major traditional occupations of this area were tourism, animal husbandry, local groceries, and Yak and Mule

for transportation until 2000. But due to the construction of a road to link from Bashantapur to Gupha, provision of community forestry, and scarcity of grazing land compelled the people to leave these earlier professions, and depend on seasonal tourism. A 56 year old, hotel owner in Chauki, Hari Bahadur Karki (Pseudonym), for instance, said :

> I had heard about global warming from foreign tourists two decades ago. At first, I did not take the issue seriously. But, overtime, things came true what they had told me at that period. Till 20 years ago, Chauki was a part of the busy route for Mt. Kanchenjunga and Mt. Makalu trekking for foreign as well as local tourists. But with the construction of the road, its identity as a trekking route collapsed. Before road construction, I had Yak and Mule for transportation. Now, I am obliged to rely only on seasonal tourism for livelihood. It is mainly linked with the tourists arriving at the time of blossoming Rhododendron. Even rhododendron also blossoms a month earlier than its natural time and even occasionally less in quantity. It is somehow affecting our livelihood.

Hari Bahdur's comment not only gives a clearer picture of how people changed their livelihood pattern to cope up with the changing climatic circumstances but also the worry for the future since the changes in climate are also regular causing additional threat for future sustenance. As Bourdieu argues, individuals' specific habitus, capital and field jointly influence for constructing similar and diversified perceptions and practices to them regarding the particular phenomenon (Bourdieu, 1984), similar findings are revealed in the case of perceptions of the individuals living in Umling regarding the issue of climate change. Although they felt unusual changes in climatic conditions since recent decades, most of the participants were not acquainted with the issue of anthropogenic climate change. The people living in high and low elevation had different experiences and of course perceptions of climate change. It is because "perceived climate changes and impacts differed significantly even within a small geographic area" (Byg & Salick, 2009 : 156).

5. Conclusion

Since the perceptions of people regarding specific phenomenon are shaped by the combination of their habitus, capital and field, this is also found in terms of constructing the perceptions and selecting

the adaptive strategies by the local people living in Umling to cope up with the effects of climate change. Similarly, the diversification of perceptions and adaptive strategies are directly connected with the small differences in elevations. Furthermore, the perceptions of people living in the same elevation are more or less similar though they have diversified habitus, capital and field. In addition, the epistemological ways of natural sciences to explore and understand the perceptions and adaptive strategies of local people regarding the issue of climate change are not convincing and adequate in such a situation. Therefore, exploring the perceptions and practices of local people by linking with their diversified habitus, capital, and field, the culture-specific, location-specific as well as elevation-specific ethnographic studies is essential.

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