Community Perception about Climate Change: Investigating Experiences of Himalayan Communities Involved in the Tourism Industry

By

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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.

2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Approval

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Ethics Statement

The whole study was conducted with an ethical competence and integrity in terms of conscious decision making and responsibly acting considering of legal standards as well as social, economic and ecological consequences. While conducting field survey, at first and foremost, consent was taken from each authority to survey the study areas. All the actions such as taking photographs, talking with the respondents occurred with the permission from the concerned authority. The field survey was conducted with the consent from the Nepal Tourism Board. One of the major ethical points followed in this study is to maintain the cooperation in data collection procedure and analysis to respect the rights to information and their rights to freedom of speech. The research did not involve any activity for which there was a foreseeable risk or discomfort to the participants. Likewise, the interviews, focus group discussions and questionnaire surveys were conducted with the oral consent from the participants. All the respondents were kept anonymous in the research and are presented with different identification numbers throughout the data analysis and findings. Wherever any intellectual property is used for the purpose of this study, they are given proper credits with proper citation. The whole research is conducted with full objectivity starting from determining the research questions to research findings. The overall research design, data analysis and representation are carried out regardless any bias and inclination.

Abstract

There occurs a close relationship between tourism and climate, where the former is highly dependent on the latter. Despite being a non-negligible contributor to climate change, the tourism business can be considered as a highly climate-sensitive sector due to its close connectivity to the natural environment and climatic conditions. Local perceptions play an important role to understand climate change better, through redirecting the focus towards empirical investigations that often might be overlooked by the modern science. The present research assesses the perception of the local people who are dependent on tourism regarding their understanding and impacts of climate change in their livelihood in different villages of Manang district of Nepal. Manang is among the popular tourist locations of the country while also being located in the Himalayan region. A total of 107 respondents were involved in the study where 84 respondents were surveyed, followed by focus group discussions and interviews. The local people perceived that the climate in their villages have been changing with perceived increased summer and winter temperature, decreased snow fall and snow coverage and reduced or erratic rainfall. Though these perceived changes were observed to be positive for tourism, the stakeholders believe that these changes could negatively impact their livelihood in the long run. Additionally, no adaptation plans have occurred yet since the respondents do not feel the need for adaptation for the time being, however, they are aware that actions must be taken to reduce the impacts of climate change on tourism in the long run. In order to reduce the impacts, appropriate preventive measures and tourism in climate change related policies should be implemented in the tourism sector of Nepal.

Keywords: Climate Change, Tourism Industry, Himalayan Communities, Nepal

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Rubina Karki

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List of Acronyms

%	Percentage
&	And
AR	Assessment Report
CBS	Central Bureau of Statistics
CCFF	Climate Change Financing Framework
et al.	and others (from Latin et alii)
etc.	and so forth (from Latin et cetera)
FGD	Focus Group Discussion
GoN	Government of Nepal
ICIMOD	International Centre for Integrated Mountain Development
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
masl	above mean sea level
MoF	Ministry of Finance
MoFE	Ministry of Forest and Environment
MoSTE	Ministry of Science, Technology and Environment
NDC	Nationally Determined Contribution

UNESCO	United Nation's Educational, Scientific and Cultural Organization
UNFCCC	United Nation's Framework Convention on Climate Change
UNWTO	United Nation's World Trade Organization
USD	United States Dollar

Chapter 1

Statement of the Problem

1.1. Introduction

Climate change has become an ardent threat in the recent years, posing risks to natural and human ecosystems globally (Mishra, 2017). Due to the climate change, environmental degradation is occurring at an unprecedented and accelerated rate, contributing to increase in the frequency, duration, and intensity of weather extremities worldwide (Seneviratne, et al., 2012). Human populations are disadvantaged due to their socio-economic condition, geographical location, as well as their dependency on climate-sensitive resources (United Nations Secretariat, 2020). Particularly, the population of developing countries, in most of the cases became vulnerable due the noticeable impacts of climate change (Weiler et al., 2018), especially on the household and community levels (Sevoyan et al., 2013).

Disaster events exacerbated due to climate change are among the most discussed topics in the recent years (Ranjan & Abenayake, 2014). Community perception about disasters is an important stride that allows the traditional communities to plan and address the underlying issues (Prelog & Miller, 2013). Likewise, community's perception about disasters helps to foster community resilience and understand their decision-making process when it comes to addressing the challenges of climate change (Spialek & Houston, 2018; Lorenzoni, 2006). Local perceptions play an important role to understand climate change better, through redirecting the focus towards empirical investigations that often might be overlooked by the modern science (Kloprogge & Van der, 2006). Despite the visible importance of local

perceptions of climate change and their adaptation practices, there is limited information available on the topic (Rankoana, 2018).

Adaptation is considered as a crucial response to cope with impacts of climate change (Aalst, et al., 2008). Climate change adaptation as an urgent need (Mishra, et al., 2019) requires incorporating innovations such as advanced skills and available resources to deal with adverse climatic stresses and weather extremities (Regmi & Bhandari, 2013). Several researchers find indigenous knowledge as effective means to play pivotal roles in climate action by facilitating adaptation practices (MoSTE, 2015). Indigenous knowledge as guided by observations and experiences of preceding generations, associates itself intrinsically with the changes in surrounding natural environment (Nyong et al., 2007; Woodley, 1991) and thus it play roles to enhance community resilience through adapting with impacts of climate change (MoSTE, 2015). Despite being a non-negligible contributor to climate change, the tourism business can be considered as a highly climate-sensitive sector due to its close connectivity to the natural environment and climatic conditions (Wilbanks, et al., 2007). Thus, the lives and livelihoods of the people involved in tourism business are impacted by the climate change and it demands to understand and investigate indications of climate change in the tourism sector (Scott, et al., 2012). According to a report published by UNWTO (2008), for the tourism sector, climate change is not an event of the future, but the sector has been impacted due to the globally evident effects of climate change. The impacts of climate change on tourism are particularly observed in the region where climate holds utmost importance such as the Himalayan region of South Asia (Dar et al., 2014). Countries such as the Maldives, Sri Lanka and Indonesia have topography quite different to Nepal. These countries are low lying coastal regions. Additionally, these islandic countries are

facing consequences due to climate change which are usually contrasting to that of the impacts in Nepal. Low lying coastal regions pose risks due to climate change such as rising sea level, water scarcity, salinity intrusion and tidal inundation which have been apparent (Nicholls, et al., 2007). The economy of Maldives Islands is highly dependent on its tourism industry; thus, several studies, focusing on the impacts of climate change on its tourism industry have implied the need to take immediate actions to combat the consequences of changed climatic factors (Stojanov, 2017). Local perceptions in the Maldives strongly indicate that climate change has resulted noticeable changes in the weather, as increased summer temperature, freshwater scarcity and reduced rainfall conditions, are negatively impacting the tourism economy (Sovacool, 2012). The local people also believe that climate change has been incorporated into their daily lives and is deemed inseparable from their lived realities, thus their impacts are highly visible on their livelihoods (Arnall & Kothari, 2015).

Likewise, the stakeholders in Sri Lanka also perceive climate change as a direct factor resulting in increasing temperature, reduced rainfall and increased occurrence of disaster events such as floods, and prolonged droughts, which are consistent with the reality of climate change (Menike & Arachichi, 2016). The studies about climate change and local perception are mostly focused on farming as a livelihood option in Sri Lanka, however, these perceptions could also be interpreted with tourism sector. The researchers call for immediate need for adaptation at the local level to combat the apparent impacts of climate change through policy application and institutionalization (Esham & Garforth, 2013).

Another tourism dependent archipelago economy, Indonesia, also faces potential impacts of climate change on the tourism sector, because of its dependency on nature-based tourist

destinations. These impacts can be broadly categorized to be flooding, drought, rising sea level, extreme weather conditions and even drought (Aguilo, et al., 2005). Local people perceive that impacts of climate change on the tourism sector has been apparent as the climate directly affects their tourism-based livelihood (Wijaya & Furqan, 2018). The impacts of climate change on tourism can affect the income sources of communities, hindering their economic growth (Satyawanet al., 2020).

The impacts of climate change on varying geographical locations are found to be context specific (Mwongera, et al., 2017). Nepal is a landlocked country with varying geographical conditions (Gautam, et al., 2019). More than 80% of the land is covered by high-altitude rugged mountains of the Himalayan range and is home to eight of the world's tallest mountains including the Mount Everest (Shrestha & Aryal, 2011). This research aims in targeting impacts of climate change especially in the lives and livelihoods of communities, dependent of the tourism industry. For this study, the Manang Valley region of Nepal has been chosen as it lies within the Hindu-Kush Himalayan region and vulnerable to the increasing temperature and subsequent impacts of climate change (Schickhoff, et al., 2016). Likewise, since allowing tourists to access the Manang Valley in 1977, the valley is highly dependent on its tourism as a source of livelihood option (Watkins, 1996; Koirala, 1981). Besides the natural beauty Manang villages also abode indigenous communities of Nepal such as Gurung also known as Nyesyangba and, Phalma (Gurung, 1976). This exploratory research which employs both quantitative and qualitative method, following the case study approach will employ tools like, focus group discussion, semi structured interview, and questionnaire survey for collecting primary data from surveyed location and communities. Relevant governmental and non-governmental documents, reports, journal articles and

research papers are reviewed for supporting and verifying the primary data. The content analysis method is used for analyzing and synthesizing data while the result is analyzed and interpreted in different forms through graphical representation of data.

1.2. Rationale of the Research

This research helps to unfold the understanding and perception of stakeholders of Manang villages specifically focused on tourism as a livelihood option. Thus, the research can be used as a foundation to build on potential strategies that can be taken to combat the immediate and the future impacts of climate change on the region. For the local level, it will contribute to update plan and policy documents, discover suitable adaptation and mitigation strategies to climate change through appreciating local perceptions and understandings. Additionally, the study helps to understand the relationship between perceived and observed climate change and to understand the gap between those. It will contribute to guide future researchers as an effective source data and information.

1.3. Research Problem

There is a close relationship between tourism and climate, where the former is highly dependent on the latter (Burns & Bibbins, 2009). The tourism industry streamlines in several aspects of the economy; thus, it is important to view the adaptation strategies to climate change taken by the individuals and communities involved in this industry as a collaborative effort (Nepal, 2011). In addition to this, the perception of local communities about climate change can manifest their decisions. They may need to apply their available knowledge using local resources and traditional practices to deal with the changed situations. Additionally,

taking references of the challenges faced by other countries on tourism, could help better understand the implications of climate change on tourism driven economy in the study area.

1.4. Research Aim

Through studying of the Himalayan communities of Manang villages involved in the tourism industry, this research aims to understand community perceptions about the impacts of climate change on their lives and livelihood options.

1.5. Research Questions with Specific Objectives

The research inspects the following questions.

Research Question 1: How do the local communities of the Manang villages involved in the tourism industry perceive climate change?

Objectives:

1. To explore the understanding of local people about climate change and their perception regarding different climatic factors
2. To investigate how the local people built their understanding about the climate change variabilities in their region

Research Question 2: What are the community perceptions regarding the impacts of climate change on tourism industry?

Objectives

1. To understand the relation between climatic factors and tourism industry in the Manang villages.

2. To explore the prediction of the local people regarding the future impact of climate change on tourism industry

1.6. Research Design

The dissertation of the study is compiled of following chapters:

Chapter 2: Literature Review reviews the existing relevant literatures such as journal articles, reports, case studies and book chapters on climate change in the Hindu-Kush Himalayan region, climate change adaptation, climate change impacts on island countries, tourism and climate change and recognizes the gap that structures this research.

Chapter 3: Context of the Study entails the description of the study area, the data collection process, method of data analysis and interpretation of the result.

Chapter 4: Methodology purports a content analysis research approach with triangulation that incorporates case study, document review, semi-structured interview, questionnaire survey, and focus group discussion.

Chapter 5: Document Review for the research reviews 6 documents: 3 nationals and 3 internationals in order to understand policies and contexts regarding climate change and tourism in national and international level.

Chapter 6: Community Perception about Climate Change addresses the first research question. It investigates the collected data about perceptions of local communities that are dependent on perceived impacts of climate change.

Chapter 7: Long-term Impacts of Climate Change on the Tourism Industry: As Predicted by the Communities address the second research question. It also explores their perceptions on the impacts of climate change on their tourism-based livelihood.

Chapter 8: Findings lay out major findings of the research which are elaborated in three parts: 'reliance of tourism-dependent livelihood with climate', 'perception of the local community about the impacts of climate change on tourism', and 'impacts of climate change on other tourism dependent countries.

Chapter 9: Discussion and Conclusion summarizes the thesis by outlining the major insights and their implications and providing recommendations based on these findings.

Chapter 2

Literature Review

This research on exploring community perceptions about the impacts of climate change incorporates literatures on three central themes:

1. Community Perceptions about Climate Change

2. Climate Change and Adaptation

3. Impacts of Climate Change on the Tourism Industry

2.1. Community Perceptions about Climate Change

Gibson (1979)'s ecological theory of perception calls attention to the fact that human beings perceive their ecological relationship with the environment which in turn is guided by their behavior. This theory emphasizes that an individual analyzes the available information of the changes occurring in their surroundings to build a perception regarding them. Angell (1906) defines perception as a combination of sensation and consciousness, where both the elements are conceived through circumstances.

Likewise, the social learning theory (Akers, 1973; Sutherland, 1949) points out that behaviors are the outputs of corroboration, imitation and conditioning, where individuals of a group learn by engaging in behaviors and transmit attitudes by the act of imitation and observation. Whitmarsh (2009) noted the necessity of quantitative research for the investigation of local perceptions of climate change by understanding their unique lived experiences. Despite the known importance of understanding community perceptions,

studies involving public understandings relating to climate change issues are fairly recent (Shisanya & Khayesi, 2007; Moser & Dilling, 2004; Ungar, 2000). More specifically, as local perceptions in most cases are based on the people's conceptualization of specific topics and their own mental or cultural models of climate change, these maybe reflected on their actions (Grothmann & Patt, 2005; Whitmarsh, 2009).

Daba (2018) iterates the importance of understanding community perceptions about ongoing environmental conditions as a crucial factor to design and employ apposite adaptation measures. It is important to note that local perception have been found as a credible source and is supported by scientific data (Chaudhary et al., 2011). Local adaptation to climate change is crucially dependent on how the communities perceive climate change (Slegers, 2008; Maddison, 2007;). After studying the perception of the local communities in Kangchenjunga Himalaya Landscape, Chaudhary and colleagues (2011) have observed that the local perception of climate change in the study region have been guided by extensive knowledge thus, their perception conformed information obtained from scientific data. Similarly, Chaudhary and Bawa (2011) have found that local perceptions are often consistent with scientific observations. Weber (2010) widely asserts that people's perception is a crucial indicator to find possible solutions to environmental issues in the context of climate change. Schmidt and colleagues (2018) studied people's perception of climate change in Portugal to discover that the local people believed the widespread occurrence of climate change and were even able to comprehend its impact on their livelihood, allowing them to place adaptation measures to improve their living conditions. Hasan and Kumar (2019) also analyze the relationship between farmers' perception and their actions to combat climate change to find that these two variables were positively correlated. Several scholars

(Vedwan & Rhoades, 2001;Thomas et al., 2007) describe the perception and local knowledge as key factors to partaking adaptation.

Maddison (2007) also studied farmers' perception of climate change at local level in 11 African countries to discover their ability to perceive the consequences of climate change, however, the local communities do not have full access to available knowledge and information, financial resources, and technology, thus, leading to inadequacies in adaptation. Additionally, local perceptions on climate change also allows the stakeholders involved to understand the actual reality at the ground level allowing them to respond strategically by taking appropriate adaptation measures (Bhatta, et al., 2019). There is a wide availability of available research that deals with the perception of local communities, however, in the livelihood context, there is less emphasis on communities' dependent on tourism industry, in relation with climate change. Studies particularly focus on communities' dependent on agriculture as livelihood while the perspectives of communities that are dependent on tourism as the source of livelihood option tend to be ignored (Hasan & Kumar, 2019; Maddison, 2007). Thus, this research aims to address the gap by focusing on the communities depending on the tourism industry as a livelihood option.

2.2. Climate Change and Adaptation

'Adaptation' as a common term in the field of disaster risk reduction that identifies the application of effective strategies for reducing disaster risks (Chowdhooree & Islam, 2018). It is the adjustment in natural or human systems in response to actual or expected climatic stimuli for reducing their adverse impacts (UNISDR, 2009). The Intergovernmental Panel on Climate Change (IPCC, 2014) defines adaptation as.

the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects. p.120.

Nakashima and colleagues (2012) find locally employed adaptation strategies as context-specific local response which are more pragmatic in responding to immediate impacts of any change in the climate. On the other hand, the adaptation strategies can be planned by the experts and can be implemented in a top-down manner (Tanner & Mitchell, 2008). In this way the adaptation can be classified into 2 types: 'Responsive Adaptation' that is applied and practiced by local people using their indigenous knowledge as the spontaneous and continuous adjustments in everyday practices and 'anticipated adaptation' that is planned as external interventions, anticipating to improve people's lives through minimizing adverse impacts (Chowdhooree & Islam, 2018; Tanner & Mitchell, 2008).

Community-led adaptation, more specifically, responsive adaptation employs indigenous knowledge and UNFCCC (2013) also recognizes it as an important resource for advancing climate change adaptation. In general manner of speaking, adaptation is often referred to as responses undertaken by the communities to reduce their vulnerability to climate change (Burton et al, 1998). Several scholars have applied their own twist in the definition of adaptation with relation to climate change. Fussel and Klein (2003) have identified climate change adaptation as changes implemented in a system to reduce climate change extremities. Likewise, Stakhiv (1994) recognizes adaptation as any form of proposed adjustment, such as passive, reactive, or anticipatory to combat the anticipated impacts of climate change. In another light, Oliver-Smith (2004) points out climate change adaptation as one among many

discourses of the community's preeminence over nature from anthropological context. Climate change adaptation is progressive from livelihood perspective, that ascertains inclusion of social network, cultural traditions to allow the overall social system to become self-sufficient even when the impacts of climate change become apparent (Schipper, 2007). This type of context-specific need of identifying suitable adaptation requires to study specific locations along with the communities live there. This research particularly targets to meet that need through studying tourism-based communities of the Manang Valley of Himalayan region.

2.3. Impacts of Climate Change on the Tourism Industry

In spite of increased scientific investigations and observations in the extent and magnitude of climate change, tourism is one of the economic sectors where the impacts have remained quite difficult to quantify (Hein et al, 2009). For any tourism sector that largely depends on the aesthetics of nature, the natural environment is deemed important to determine the attractiveness of the region (Scott, 2003). Thus, for mountainous destinations, the changing climate could diminish the tourism with serious repercussions on local economies (Scott, et al, 2007).

Tourism in mountainous region has provided opportunities to the local people to operate gift shops, tea houses and lodges, allowing them to have alternative job opportunities (Sherpa, 2006). However, Sherpa (2009) has observed that climate change has impeded the tourism and livelihood sector of Nepal. Nature-based tourism activities that occur in the Himalayan region are found to be highly weather sensitive, thus, tourism which mostly involves trekking is significantly dependent on weather (Rayamajhi, 2012). The tourism sector that

particularly focuses on snowfall and snow cover i.e., mountain tourism has been found to be highly affected (K.C. & Parajuli, 2015). Scott and colleagues (2007) observed that climate change could affect aspects of tourism such as resources availability directly which in turn as a butterfly effect can impact the secondary aspects of tourism such as societal structures of the tourism industries indirectly. However, Perry (2000) finds that tourism is a highly adaptive industry, continuously challenging the changing demographics and inclination towards changing trends.

Ehmer and Heymann (2008) have observed the impacts on tourism in France, Italy, and Austria by employing scoring model and finds that these countries will be negatively affected by climate change by 2030. Likewise, Scott and colleagues (2012) studied the impacts on tourism in Waterton Lakes National Park in Canada and discovered that increasing temperature in the coming years might increase visitation of tourists; However, the visitation might decrease highly from the 2050s.

König (1998) studed the impacts of climate change on tourism sector of countries like Canada, the USA, New Zealand, Austria, Switzerland, and the UK and discovers that climate change is projected to cause serious implcations in their tourism sector, particularly in the mountainous regions where snowfall attracts tourists in the region. Yanez and colleagues (2020) while studying the tourism implications of climate change in California have observed that the changing climate could highly alter the visitation by tourists, which is projected to be mostly declined and also could bring negative consequences to the local economy.

Lama (2010) studied the perception of the stakeholders about tourism and climate change in the lower Mustang of Nepal to find that the local people were highly aware of the impacts

of climate change in the region. Additionally, she also found that snow-cap and snow covers were decreasing rapidly in the region resulting to decrease in scenic beauty and water availability. Similarly, K.C. (2017) points out the need for adaptation strategies to tackle climate change in the tourism destinations that are highly dependent on tourism.

Scott (2011) asserts that tourism industry is not prepared to tackle the impacts brought about by climate change, though climate change actions have potential to occur. Likewise, Dube and Nhamo (2020) finds that perceptions of the stakeholders involved in the tourism industry is essential as the relationship between climate change and tourism is a two-way road. Mushawemhuka and colleagues (2018) observe that the perception and preferences of tourism stakeholders allow for a broader understanding of climate change impacts.

However, only fewer studies specifically assess the impacts of climate change on the tourism industry by the inclusion of tourism stakeholders (Hein et al, 2009). Thus, this research attempts to explore the stakeholder perceptions about the impacts of climate change on tourism industry and their attempts to deal with observed and predicted condition by studying and understanding the societal and livelihood aspects of the tourism sector, especially of the Himalayan range of Nepal.

2.4. Research Gap

The temporal and spatial studies of systematic literature review imply that literature gaps in the existing knowledge have a probability to limit understandings of context-specific climate change impacts (Rahman et al, 2018). Even though the realization of the significance of local knowledge to tackle climate change is increasing (Mercer, et al, 2010), this is still a less studied scenario, mostly when the issues of mitigation and adaptation arise (Acharya, et al,

2016). The research works that incorporate local perceptions and knowledge are rather heterogeneous, and more so generic (Ford, et al, 2016). Limited studies have been undertaken to discourse the efficiency of climate change adaptation plans at the local level (Ford, et al, 2015). Despite the accelerating rate to synthesize existing knowledge in climate change, it does not cover developing countries and their issues as a whole (Rahman et al, 2015). More specifically, there's lack of research focusing on community-based adaptation in relation to climate change in vulnerable communities (Gero et al, 2011).

Wilbanks and colleagues (2007) identify tourism as 'climate-sensitive human activity' where the vulnerability is localized depending on the context of the economy. On the same light, climate change adaptations interpreting climate change adaptation are limited as existing knowledge source (Scott et al, 2009). Speaking of climate change and tourism, studies that have been undertaken since the past few years tend to focus only in one element, for example a destination or market segment and remain astray from broader tourism system (Hall & Lew, 2009; Scott et al, 2008; Dawson et al, 2009).

Even though countries reliant on tourism such as Nepal are particularly sensitive to climate change, studies assessing climate change impacts on tourism has a considerable gap (K.C. & Thapa Parajuli, 2015). The recent studies attempt to incorporate the perceptions of stakeholders involved to analyze climate change knowledge, however, in several cases this study focus is only limited to one dimension of societal structure for example, either livelihood such as farming or ethnicity and does not focus on both these dimensions at once (Pandy & Rogerson, 2018; Trawöger, 2014). This research aims to understand the perception of the local people of the Manang Valley region about the impacts of climate change to their tourism business and their adaptation practices if they have any, based on the local

knowledge. These will be attained through the exercise of qualitative and quantitative research approaches involving methodological tools such as focus group discussion, semi-structured interview, and survey in order the address the research gaps stated previously. The whole synthesis has been summarized below.

Literature	Research Gaps		Scope to address research gaps
Community perceptions about climate change	The limitation in the literature includes vague indicators and indices incorporated to study climate change knowledge of the stakeholders involved.		Documenting the perception of the local people, focused on tourism to comprehend their knowledge about the impacts of climate change through the employment of participatory planning approaches.
Climate change adaptation	There are further needs to have context-specific studies to identify and practice suitable adaptation strategies.		
Impacts of climate change on tourism industry	Available literature includes single dimension characteristics of the stakeholders involved with focus on single elements such as end destinations, or economy but not livelihood context, especially in the Himalayan context		

Table 1 Summarized synthesis of literature

Chapter 3

Context of the Study: Manang Villages

This chapter describes the location of Manang district incorporating the study villages along with the tourism attraction in the district.

3.1. Manang District

Manang District is located in the Northwestern part of Himalayan region of Nepal. This study was carried out in the Manang villages of Chame Municipality of Manang District in the Western part of Nepal. Geographically, the villages are located at latitude $28^0$40'22.80" North and longitude $84^0$10'45.84''East. The district is almost 270km north-west of the capital of Nepal, Kathmandu (Bhattarai, et al., 2006). The site for the study was selected considering its location in the Himalayan region of Nepal, is also a route for Annapurna Circuit Trekking Trail thus, tourism is an important livelihood option here and the village's representation with high variation in altitudinal ranges. The Manang villages are comprised on the Upper Manang Valley (Nyeshang Valley) and the Lower Manang Valley (Gasamdo) in the east. The Upper Manang Valley extends between the highest settlement in Khangshar (3750masl) to the lowest settlement in Pisang (3100masl) whereas, the Lower Manang Valley extends between the upper settlement in Pisang (3100masl) to lower settlement in Pisang (2650masl). The villages outside of Manang valley have altitude lower than 2600masl. The study took place in 17 villages in total and the study area in this research started from Dharapani to Tilcho Base Camp from an altitude of 1800m to 4200m (Figure 1, 2).

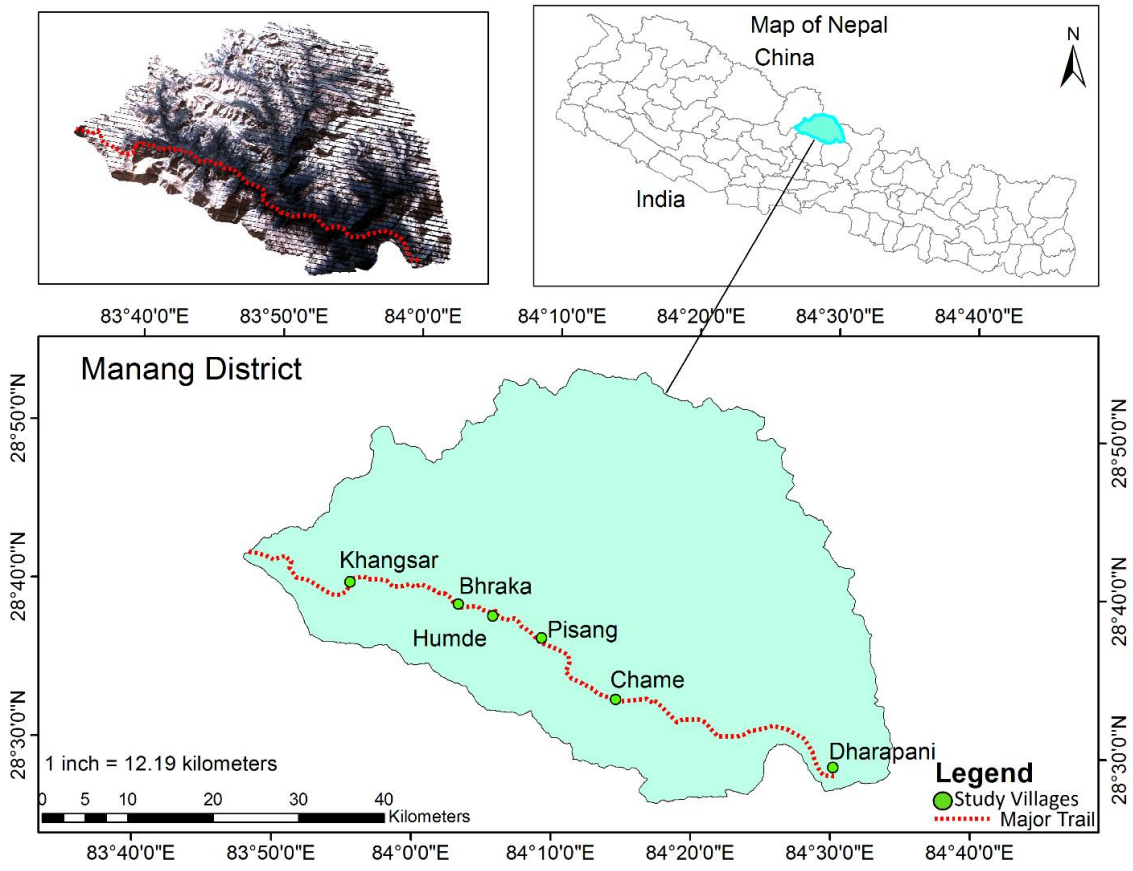

Figure 1 Map of study area (Author, 2021)

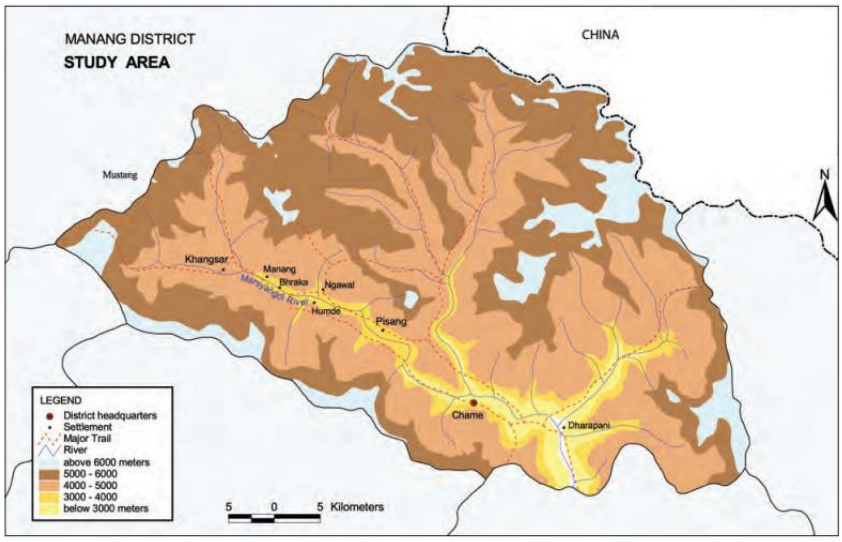

Figure 2 Map of the study area with contour features (Author, 2021)

3.2. Tourism in the Manang Region

This section explores all aspects, related to the tourism industry of the Manang region: type of tourists, the tourism destinations, and hotel and accommodation services.

3.2.1. Tourists in Manang Region

Manang falls in the Annapurna Circuit Trekking Trail, which is one of the world's popular trekking destinations. The respondents when interviewed, reported that the trekkers visit the region because of its natural beauty and aesthetic atmosphere with the view of panoramic snow-capped Himalayan Ranges namely Dhaulagiri, Machhapuchhre, Manaslu, Gangapurna, Tilicho Peak, Pisang Peak and Paungda Danda. According to the respondents, the months of October-November is found as the peak season, while the months of June-September is normally considered as the off-peak season because of the low influx of trekkers due to monsoon rain and slippery trekking trails. Likewise, from December to March it gets a smaller number of tourists because of the extreme low temperature of the winter season and inaccessibility of the trail routes due to heavy snowfall. Additionally, the months of April-May is considered as the second peak season that is famous for its crystal-clear skies and warm summer weather. Manang has two popular trekking destinations: the Tilicho Lake and the Thorung La pass. The Tilicho Lake ranks among the world's highest altitude lakes at the altitude of 4900 masl (Figure 3), while the Thorung La pass is famous as a popular mountain pass at around 5400 masl connecting Manang and Mustang districts. People of Manang, also called Manangis (composed of indigenous Gurung and Ghale people) have their own Sino-Tibetan dialect, culture and festivals, which are descendants of their Tibetan heritage. Thus, the culture in the region is quite unique, owning to their endemic settlement in Manang district. There is number of prayer wheels, and monasteries

in the villages. The traditional homesteads with thatched roofs and muddy walls are quite particular to these villages. Likewise, the villages are also quite vibrant during festivals, especially during Losar celebrations, Tibetan New year where the local men of the villages can be seen practicing their archery skills and competing in horse races, which, the respondents say are their traditions that have been handed down from generations to generations. Other popular touristic locations on this trekking route are the Gangapurna Glacial Lake (Figure 4), ancient caves, Buddhist monasteries (Viharas) and also some endangered wild animals such as blue sheep and snow leopard. Manang is mostly popular for its nature-based tourism with eye-catching panoramic views of the Himalayas and high-altitude lakes. However, another reason why Manang could also become a popular destination for trekking is its diversified cultural activities and practices of different ethnic groups, like, the Hindu communities at the lower foothills, the Tibetan Buddhist communities etc. Thus, tourists can witness the rich cultural heritage of this region while attending nature-based tours.

Figure 3 Tilicho Lake, one of the popular destinations of the Manang trek (Field survey, 2020)

Figure 4 Gangapurna glacial lake located in Manang village (Field survey, 2020)

3.2.2. Accommodation Facilities

During the interview, the respondents mention that the average quality of accommodation facilities for the tourists is improving over the past few years. In the current condition, some hotels are providing rooms of moderate size with attached bathrooms, while most of the hotels do not provide the en-suite facility (attached bathrooms with western toilets). Likewise, another common feature of the hotels is the prevalence of large spacious dining halls with a firewood-heater in the middle of the hall for providing the thermal comfort (Figure 5). Now the hotels can provide running water facility and maintain continuous electricity supply, generated from several hydroelectric power plants, installed in the vicinity. The reception for cellular networks gets lower in the higher altitude areas however, the Wi-Fi facility became available in some locations.

Figure 5 A typical dining hall in the hotels (Field survey, 2020)

Chapter 4

Methodology

This chapter discusses the overall research methodology followed in this study. It includes the details about research approach, unit of analysis, data collection tools and techniques and data analysis.

4.1. Research Approach

This exploratory research follows content analysis of research approach that incorporates the exercise of tools such as semi-structured interview, focus group discussion, questionnaire survey, and case study. The research follows both qualitative as well as quantitative methods of information collection and analysis.

4.2. Unit of Analysis

The stakeholders who are the hotel and lodge owners in the study area are the unit of analysis in this research. The respondents here are the people who were either born here or have lived more than 30 years in the region.

4.3. Data Collection

The study was conducted through questionnaire survey, focus group discussion, semi structured interview, and literature review of the secondary data to understand the relevant materials for the study. The study was carried out within 17 settlements/villages that follows the route to Tilicho Lake from the start of Manang District. They are: Dharapani, Bagarchhap, Danaque, Timang. Syarkhu, Koto, Nar Manang, Chame, Talekhu, Dhukkurpokhari, Pisang, Humde, Bhraka, Manang, Tanki Manang, Siri Kharka and

Khangshar (including Tilicho Base Camp). The district is home to indigenous ethnic group known as Gurung. Within the Manang Valley itself, according to the 2011 population census the population is about 2200 which is 40 percent of total population (6,538 individuals per sq. km) of the district (Central Bureau of Statistics , 2011).

4.3.1. Primary Data Collection

The primary data was collected through visiting the site of the research. The duration of field visit was 12 days for the study. The following tools were used for primary data collection in the study area.

4.3.1.2. Questionnaire Survey

84 respondents were surveyed during the field visit. The respondents were selected through purposive sampling method, surveying the residents who were the owners of hotels and lodges. The survey helped to understand the perception of respondents about climate change and their understanding of the relationship between tourism and climate change. While conducting the survey, the proxy indicators were kept intentionally to guide the respondents towards the reality of climatic changes. The increased summer and winter temperature, decreased snowfall conditions and snow coverage, reduced or erratic rainfall conditions were taken as the proxy indicators. The proxy indicators also validated the climatic parameters taken though published literatures. Likewise, the information obtained through questionnaire survey were validated through methodological triangulation with other research tools: focus group discussion and semi-structured interview.

4.3.1.3. Focus Group Discussion (FGD)

In order to understand the varying perception of the respondents, FGDs were done in each of the villages. The session was conducted during the day-time in each of the settlement's communal hall. The number of participants varied between 8 and 12 depending on their availability, and they all were adults ranging from 30s to 60s. Each FGD involved both male and female participation. The focus group discussion targeted to observe the basic understanding of the stakeholders about their understanding of climate change and whether their livelihood have been impacted by the observable consequences of climate change. The discussion involved the use of simpler terms in Nepali for the understanding of respondents. All the focus group discussions had been audio recorded and were transcribed and edited for data analysis. Table 2 lists the questions asked during the FGDs. Likewise, the information obtained through focus group discussions were validated through methodological triangulation with other research tools: questionnaire survey and semi-structured interview.

Understanding about Climate Change	
1.	What does climate change mean to you?
2.	What kind of changes are you observing?
3.	Do you have any knowledge about how the climate is changing globally?
Perception about Climate Change and tourism	
1.	What are the impacts of climate change in your village currently?
2.	In what prospect has climate change influenced tourism in your village? Could you tell if the length of stay, their arrival and your income have all been influenced?
Impacts of climate change on tourism	
1.	What do you think are the long-term impacts of climate change in relation to the aesthetic environment and tourism?
2.	Do you think the impacts of climate change on the tourism in your village are positive?
3.	What is your estimation of the future prospect of tourism in the long run if the trends of climate change observed here continues?

Table 2 Questions employed in the Focus Group Discussions

4.3.1.4. Semi-structured Interview

Interviews were conducted with the hotel owners in all study villages. The interview was semi-structured and was employed to explore various topics related to climate change and tourism. The interviews involved understanding the critical thinking of the participants about climate change. These interviews allowed understanding the priorities of the local people in relation to climate change and tourism and to explore whether any actions have been taken to minimize the observed impacts. The interview also allowed the participants to be comfortable using simpler terms and minimizing the use of 'heavy' academic words. All the interviews were audio recorded and transcribed for further analysis. The information obtained through focus group discussions were validated through methodological triangulation with other research tools: focus group discussion and semi-structured interview. Table 3 lists the questions of semi-structured interview:

	Tourism Scenario of the Village
1.	What kind of facilities do you have in your hotel?
2.	Can you interpret the kind of tourists that usually come here?
3.	Has the number of trekkers in your village been increased recently? And if so, what do you think are the contributing factors to it?
	Climate Change in the Village Area
1.	How long have you been staying in this village?
2.	Have you noticed any changes in the climate of your village and do you think these changes are good?
	Climate Change and Tourism
1.	Why do you think these changes in the climatic conditions in your village is good or bad for the tourism?
2.	Do you think these impacts of climate change in your village are short term? If so, why do you think that?
3.	What do you think you can do to combat these impacts of climate change in your village, or do you think anything needs to be done?

Table 3 Questions employed during interview

4.3.2. Secondary Data Collection

Secondary data were collected from the published relevant journals, magazine articles, books, web site, thesis reports, official records, etc.

4.4. Document Review

Six documents were reviewed before the field visit. Three of them were Nepal's relevant documents on climate change: Climate Change Policy, 2019; Climate Change Financing Framework (CCFF); Nationally Determined Contribution (NDC) and three of them were international documents: Sendai Framework for Disaster Risk Reduction (2015-2020), IPCC AR5 Synthesis Report (2014) and IPCC AR6 Report (2021). These documents were reviewed to understand more about climate change and tourism, if there are any relevancies with the stated subject of interest. The national documents allowed to better understand the focus of climate change policies and strategies in the context of tourism in Nepal and also helped in finding possible recommendations after the research.

4.5. Data Analysis

The obtained qualitative data were analyzed using the content analysis method. Content analysis of the qualitative data entails the detailed description of procedures along with the provision of some examples regarding its application to offer practical applicability and relevance to the research (Downe-Wamboldt, 1992). It also involves systemic evaluation of texts from documents, oral communication, and other qualitative data to make replicable and valid inferences through interpretation (Cole, 1988).

4.6. Triangulation and Interpretation

The data and information collected from the above- mentioned survey tools were triangulated to justify their authenticity and presented in next chapters as findings.

Mikkelsen (2005) suggested five types of triangulations: Data triangulation, Investigator triangulation, Discipline triangulation, Theoretical triangulation; and Methodological triangulation. This research exercises methodological triangulation. Methodological triangulation refers to the employment of several methods in qualitative research to extrapolate information through comprehensive understanding (Patton, 1999). The relevant qualitative data from questionnaire survey, semi-structured interview and focus group discussions were extracted and cross checked to test the validity through the convergence of information from these research tools. The obtained data and collected information were analyzed using Microsoft Excel (2016) for the interpretation of result in the form of pie charts and bar diagrams.

The overall research framework for the dissertation is presented below (Figure 6):

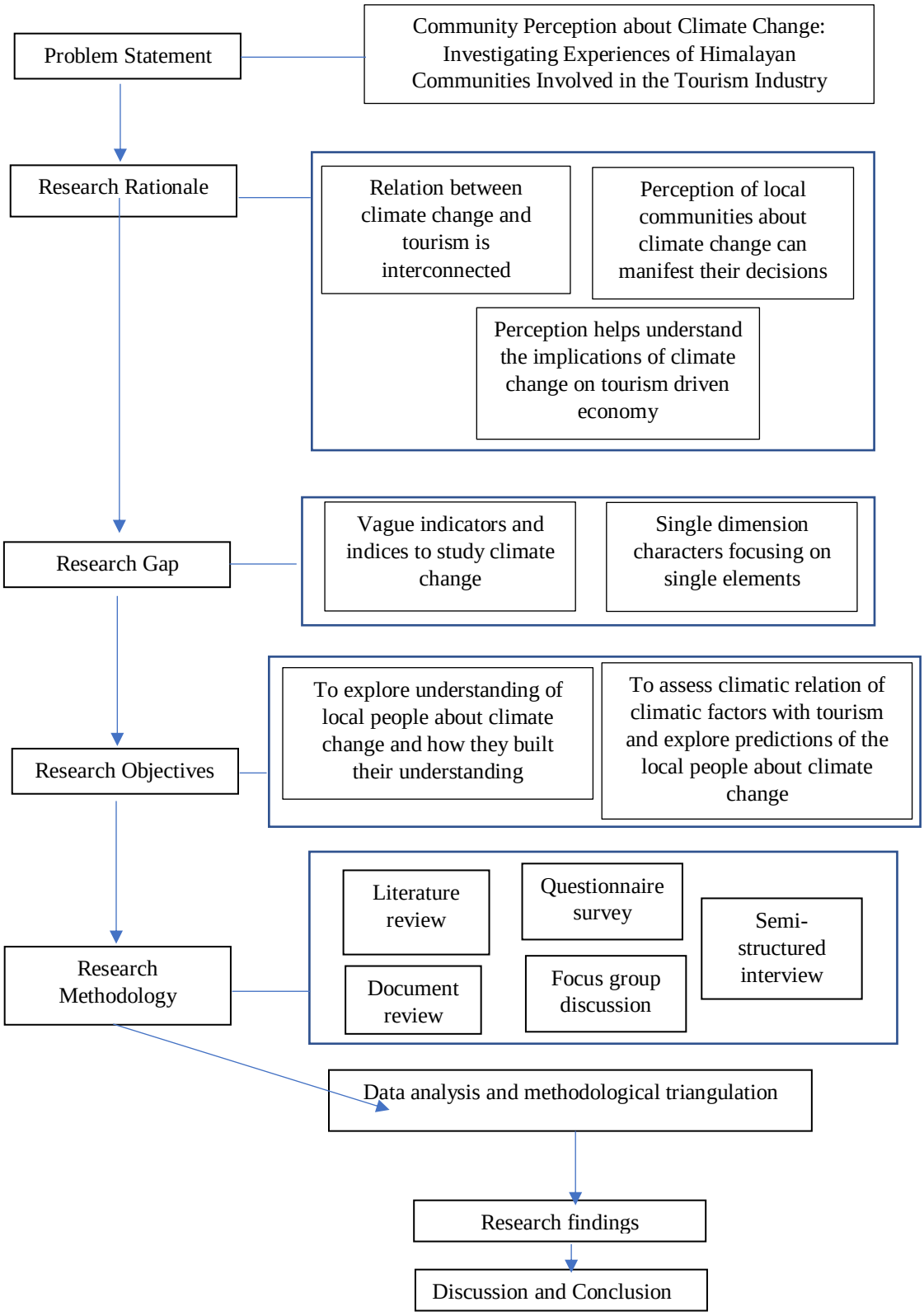

Figure 6 Research Framework (Author, 2021)

Chapter 5

Document Review

The following documents were reviewed before the field visit to the study area.

- Climate Change Policy, 2019
- Climate Change Financing Framework (CCFF)
- Nationally Determined Contribution (NDC)
- Sendai Framework for Disaster Risk Reduction (2015-2030)
- IPCC AR5 Synthesis Report (2014)
- IPCC AR6 Report (2021)

The information which deemed useful for the research at the time have been summarized below.

5.1. Climate Change Policy, 2019

Nepal's National Climate Policy, 2019 is the successor to the National Climate Change Policy, 2011. The policy contains a set of strategies for different sectors with the goal to enhance contribution in the socio-economic prosperity of the country by building climate resilient society. The sectors within the policy touch the themes: agriculture and food security; forest, biodiversity, and watershed conservation; water resources and energy; rural and urban habitats; industry, transport, and physical infrastructure; tourism and natural and cultural heritage; health, drinking water and sanitation; disaster risk reduction and management and inter-thematic areas such as gender, social inclusion, and livelihoods. The policy also acknowledges the lack of studies and research about the impacts of climate change and loss and damage issues on these sectors. In the context of tourism, the policy

talks of climate-friendly eco-tourism and green trekking route to be mainstreamed in the development sector. Additionally, the policy also promotes the concept of zero emission using renewable energy on tourism hotspots. Likewise, the policy also encourages the implementation of climate-friendly tourism program, however, fails to categorize what kinds of programs would be climate-friendly. On another light, the policy encourages community participation in climate-friendly tourism programs. The policy also talks about enhancing access to climate change related information through active involvement of the local people by conducting climate change adaptation, disaster risk reduction and management programs. Similarly, the policy ensures the effectivity of preparedness and response to climate-induced disasters such as flood, landslide, land erosion, fire, etc. through the development of monitoring, forecasting and early warning system (MoFE, 2019).

5.2. Climate Change Financing Framework (CCFF)

Nepal's Climate Change Financing Framework (CCFF) 2017 has taken the initiative to institutionalize and mainstream climate change into national plans and budgets. The CCFF project's the commitment of the Nepalese government towards planning and managing climate finance, tracking the expenditure in regards with the livelihood options and vulnerable population and disseminate accountability information. The framework provides the trends of climate budget allocation starting the fiscal year 2013/14, however, tourism among other sectors such as health, education, agriculture, and forest do not have climate change as prioritization criteria. Despite the contribution of tourism in Nepalese GDP is more than 4.3% (Investment Board Nepal, 2015), tourism has not made it to the prioritization list, thus, there is a necessity that climate change be a general criterion for the prioritization of these sectors (MoF, 2017).

5.3. Nationally Determined Contribution (NDC)

The government of Nepal submitted its second (enhanced) Nationally Determined Contribution (NDC) under the Paris Agreement for the period 2021-2030 following the Articles 4.2 and 4.11 of the Paris Agreement by taking the principle of 'common but differentiated responsibilities and respective capabilities' as the country's goal for emission reduction to build climate resilient society. The NDC targets 5 sectors as the mitigation components of Nationally Determined Contributions (NDC), these are: Energy; Agriculture, Forestry and Other Land Use (AFOLU); Industry; Waste and Other Relevant Targets which includes Tourism; Urban Settlements and Gender Equality and Social Inclusion (GESI).The NDC suggests to meet gender-specific needs for practicing gender equality and social inclusion by 2030 through the equal participation of women, children, youth and indigenous peoples in climate change related policy development, planning, monitoring and evaluation at all levels (GoN, 2020). The NDC proposes to elaborate strategies to reduce emissions from these sectors, mostly focusing on using renewable energies such as hydropower, wind, and solar energy, conserving forest coverage and encouraging climate smart agricultural practices. In the context of tourism and climate change, it suggests to formulate and implement nature-based tourism plans in at least five main tourism destinations by 2025 and ensures to make the destinations carbon neutral by 2030. Likewise, it suggests to formulate policy measures to offset carbon emission footprint of tourism related transportation system. These targets seem pragmatic, however, the NDC does not really specify what criteria would be taken into consideration to select these tourism destinations. Additionally, the NDC also does not focus on recognizing and promoting indigenous knowledge based traditional practices for adapting with changed climatic factors and reducing disaster risks.

5.4. Sendai Framework for Disaster Risk Reduction (2015-2030)

The Sendai Framework for Disaster Risk Reduction is a successor to the Hyogo Framework for Action (HFA) (2005-2015). The framework focuses on the necessity of improved understanding of the disaster risks in terms of priority actions for exposure, vulnerability and hazard characteristics; strengthening of the disaster risk governance accountability in disaster risk management and enhance preparedness to 'Build Back Better'; to recognize the role of the stakeholders involved; to mobilize risk sensitive investment into resilient health infrastructure; and work for strengthening international cooperation and global partnership. The framework expects substantial reduction in number of affected people; disaster mortality; direct disaster economic loss; disaster damage to critical infrastructure and disruption of basic services such as health and education; enhance international cooperation and increase the availability of and access to multi-hazard early warning systems and disaster risk information by 2030; and by 2020, the framework aims to substantially increase the number of countries with national and local disaster risk reduction. Additionally, the framework also promotes the mainstreaming of disaster risk assessment, mapping and management into rural development planning and management such as in mountains, rivers, coastal flood plains and wetlands. In terms of roles of stakeholders in disaster risk reduction, the framework encourages the participation of women, children, persons with disabilities, older persons, indigenous people and migrants with their context-specific skills and knowledge, and encourages academia to further research on the disaster risk factors and scenarios. Likewise, the framework also understands the high vulnerability of least developed countries and pushes the need for urgent strengthening of international cooperation for appropriate assistance to disaster prone countries. Similarly, to invest in

disaster reduction for resilience, the Sendai Framework supports the promotion and integration of disaster risk management approaches throughout tourism industry considering the level of reliance of the communities on tourism as a livelihood source (UNISDR, 2015).

5.5. IPCC AR5 Synthesis Report (2014)

The Synthesis Report (SYR) of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) provides an overview of the available climate change knowledge focusing on the science of climate change, emphasizing new findings on the plethora of climate change information and is a successor to the IPCC Fourth Assessment Report (AR4) of 2007. The report talks about the observed changes in the early to mid-2010s in terms of climate change, focusing on the fact that human influence on climate change through recent anthropogenic emissions of greenhouse gas emissions is apparent and is causing widespread impact on both human and natural systems. The report also observes that snow coverage and amount has decreased due to climate change along with other impacts such as rising sea level in the oceans. The Synthesis Report also predicts future climate change, risks and impacts if the greenhouse gas emissions were to continue interrupting the climate system, resulting on increasing probability to intense and severe impacts on the climate systems, and that it would be possible to limit climate change through substantial and sustained reductions in the 21st century in greenhouse gas emissions through both adaptation and mitigations. The report also says that both mitigation and adaptation options are to be incorporated to address climate change issues through the effective implementation on policies and cooperation at all levels and their inter-alia sectors associating other societal objectives. The report suggests the first step towards climate adaptation would be reducing vulnerability and exposure to climate variabilities through

integration of adaptation into policy planning, design, decision making by maintaining synergies with development and disaster risk reduction (IPCC, 2014).

5.6. IPCC AR6 Climate Change 2021

The sixth assessment report of the IPCC addresses the latest physical understanding of climate change through evidence from paleoclimate, process understanding, global and regional climate related simulations. The first part of the report: The Working Group I contribution to the assessment report named 'Climate Change 2021: The Physical Science Basis' was released on 9th of August, 2021. The Working Group II and the Working Group III contributions are yet to be released along with the Summary for Policymakers and Synthesis Report. The report solidifies the fact that anthropogenic activities are the cause of changes in atmosphere, oceans and land warming. Likewise, it further unequivocally establishes that the damage caused due to climate change is irreversible, such as rising sea levels and melting of the glaciers. The report also finds the magnitude of the climatic changes to be unprecedented over several hundred years to several thousand years. The report also establishes the fact the human influence is very likely the main driver of the global retreat of the 'snow cover and glaciers' since the 1950s and 1990s respectively. This is an important point to discuss for a Himalayan country like Nepal. In addition to this, the assessment report focuses on three models of climate scenarios. The first model talks about the warming when limited to 1.5 degree-Celsius compared to the pre-industrial era. The model reports that the threshold of 1.5 degree-Celsius will lead to serious and irreversible consequences to the climate system for hundreds of years while, the warming will continue to occur and exceed by 2030. The second model analyses the scenario where the planetary temperature increases by 2 degree-Celsius in comparison to the pre-industrial level. This warming scenario

assumes the commitment to the climate policies in order to restrict fossil fuel usage in this decade. Likewise, the third model analyses the trend where the warming reaches up to 4 degree-Celsius (IPCC, 2021). The three scenario models subscribe to alarming elements that need to be addressed through the continual commitment to climate policies and implementation of strategies that meet global challenges (Maraden & Jouenne-Mazurek, 2021). The report concludes with the urge to go beyond current action plans in order to meet the 1.5 degree-Celsius target of the Paris agreement.

The documents are summarized below:

S.N.	Document	Relevant Points
1	Climate Change Policy, 2019	• touches the themes: agriculture and food security; forest, biodiversity, and watershed conservation; water resources and energy; rural and urban habitats; industry, transport, and physical infrastructure; tourism and natural and cultural heritage; health, drinking water and sanitation; disaster risk reduction and management and inter-thematic areas such as gender, social inclusion, and livelihoods. • acknowledges the lack of studies and research about the impacts of climate change and loss and damage issues on these sectors.

		• talks about enhancing access to climate change related information through active involvement of the local people by conducting climate change adaptation, disaster risk reduction and management programs.
2	Climate Change Financing Framework (CCFF)	• provides the trends of climate budget allocation starting the fiscal year 2013/14, however, tourism among other sectors such as health, education, agriculture and forest do not have climate change as prioritization criteria. • tourism has not made it to the prioritization list, thus, there is a necessity that climate change be a general criterion for the prioritization of these sectors.
3	Nationally Determined Contribution (NDC)	• targets 5 sectors as the mitigation components of Nationally Determined Contributions (NDC): Energy; Agriculture, Forestry and Other Land Use (AFOLU); Industry; Waste and Other Relevant Targets which includes Tourism; Urban Settlements and Gender Equality and Social Inclusion (GESI).

		• proposes elaborate strategies to reduce emissions from these sectors, mostly focusing on the use transitioning to the use of renewable energies such as hydropower, wind and solar energy, focusing on forest coverage protection and cultivation of climate smart agriculture. • intends to include measures in policies to offset carbon footprint of emissions that occurs through tourism transport, however, does not really specify what criteria would be taken into consideration to select these tourism destinations.
4	Sendai Framework for Disaster Risk Reduction (2015-2030)	• focuses on the necessity of improved understanding of the disaster risks in terms of priority actions for exposure, vulnerability and hazard characteristics; strengthening of the disaster risk governance accountability in disaster risk management and enhance preparedness to 'Build Back Better'. • expects substantial reduction in number of affected people; disaster mortality; direct disaster economic loss; disaster damage to critical infrastructure and disruption of basic services such as health and education; enhance international cooperation and increase the availability of and access to multi-

		hazard early warning systems and disaster risk information by 2030; and by 2020, the framework aims to substantially increase the number of countries with national and local disaster risk reduction.
5	IPCC AR5 Synthesis Report (2014)	• talks about the observed changes in the early to mid-2010s in terms of climate change, focusing on the fact that human influence on climate change through recent anthropogenic emissions of greenhouse gas emissions is apparent and is causing widespread impact on both human and natural systems. • says that both mitigation and adaptation options are to be incorporated to address climate change issues through the effective implementation on policies and cooperation at all levels and their inter-alia sectors associating other societal objectives. • suggests the first step towards climate adaptation would be reducing vulnerability and exposure to climate variabilities through integration of adaptation into policy planning, design, decision

		making by maintaining synergies with development and disaster risk reduction
6	IPCC AR6 Climate Change 2021	• addresses the latest physical understanding of climate change through evidence from paleoclimate, process understanding, global and regional climate related simulations. • unequivocally establishes that the damage caused due to climate change is irreversible, such as rising sea levels and melting of the glaciers. • establishes the fact the human influence is very likely the main driver of the global retreat of the 'snow cover and glacier' since the 1950s and 1990s respectively. This is an important point to discuss for a Himalayan country like Nepal. • concludes with the urge to go beyond current action plans in order to meet the 1.5 degree-Celsius target of the Paris agreement.

Chapter 6

Community Perception about Climate Change

This chapter explores the study villages incorporated during the research. Likewise, it also explores the perception of the stakeholders involved regarding their perception of climate change. This research exercises methodological triangulation. Data analyzed from semi-structured interviews, focus group discussions and questionnaire survey were combined, processed, evaluated and interpreted in order to get a complete picture of the community perceptions regarding climate change.

6.1. Study Profile

The study was carried out within 17 villages that follows the route to the Tilicho Lake from the entry point of Manang District. They are: Dharapani, Bagarchhap, Danaque, Timang. Syarkhu, Koto, Nar Manang, Chame, Talekhu, Dhukkurpokhari, Pisang, Humde, Bhraka, Manang, Tanki Manang, and Khangshar (including Tilicho Base Camp). The condition of each location is described below:

Figure 7 Motor route to Manang district (Field survey, 2020)

6.1.1. Dharapani

Dharapani (Figure 8) is the entry point to Manang district, which can be reached through hiking and also via motorized vehicles, which is usually meant as the four-wheeler jeep drive. It is more like a gateway to the Thorang la Pass and the Tilicho lake. Located at the altitude of 1860 masl, the village is surrounded by smaller mountains and is drained by the Marshyangdi river. There are 18 hotels in total in this village and these provide both food and accommodation. Based on the interviews, it has been understood that the trekkers rarely spend nights here and most of the time, they usually stop for having some snacks or lunch.

Figure 8 Landscape at Dharapani (Field survey, 2020)

6.1.2. Bagarchhap

Bagarchhap is the second village on the route that takes to the Tilicho lake. This village can be accessed by jeep; however, trekking is an alternative option to reach there, and trekking enthusiasts usually prefer to reach there on foot. Bagarchhap is located at the altitude of 2160 masl and has 5 hotels in total (Figure 9). However, this village is also not a popular overnight destination, and most trekkers only stop by to have lunch or snacks. Only 3 hotels offer accommodation in Bagarchhap, the rest 8 are small restaurants. However, during the peak season, when trekkers cannot find any accommodation in other areas, they choose Bagarchhap for spending nights.

Figure 9 Locality at Bagarchhap (Field survey, 2020)

6.1.3. Danaque

The third village on the route to the Tilicho Base Camp is Danaque. Located at the altitude of 2190 masl, the village has 6 hotels in total, offering the services of both food and accommodation (Figure 10). Danaque is also not a popular destination for an overnight stay among the tourists and serves as a destination for snacks and lunch during off-season. One can easily reach Danaque through Jeep services which is also the trekking route. However, like Bagarchhap and Dharapani, the hotels in the village are opted as alternative options when accommodations in the upper, more favorable destinations are not available.

Figure 10 Landscape at Danaque (Field survey, 2020)

6.1.4. Timang

Located at the altitude of about 2400 masl, Timang offers 9 hotels that serve both food and accommodation. Surrounded by lower mountains, Timang offers picturesque views of higher mountains (Figure 11). According to some of the respondents, Timang used to be one of the central hubs for accommodation for the tourists before jeep services had been introduced, however, during the peak season, at present it serves only as the resting spot.

Figure 11 View at Timang (Field survey, 2020)

6.1.5. Syarkhu

Syarkhu is a village enroute to the Tilicho Base Camp located at the altitude of 2490 masl (Figure 12). Additionally, Syarkhu offers 5 hotels that serve both food and accommodation. Considering the fact that jeep services have made it easier for low budget tourists to reduce their trekking duration, Syarkhu is also another village considered to be a stoppage/resting spot in the recent times. The trekking trail to the village is also the same as used by Jeep services.

Figure 12 Syarkhu village (Field survey, 2020)

6.1.6. Koto

Surrounded by high altitude snow-capped mountains, Koto is located at the altitude of 2500 masl. Koto is comparatively a bigger village offering more than 10 hotels. Even though, the route to Koto is easily accessible through jeep, the village is also popular for overnight stay among the tourists as per the information conveyed by the respondents during the interview. Thus, the hotels in the village offer both food and accommodation (Figure 13). The village also has a police check point for ensuring safety and security of international tourists.

Figure 13 A hotel in Koto (Field survey, 2020)

6.1.7. Nar Manang

Located at the altitude of 2600 masl, Nar Manang also serves as a stoppage or resting point for the trekkers. Like Nar Manang, most of the villages to Tilicho Base Camp have been built alongside the river Marshyangdi. There are 5 hotels in total in Nar Manang that offer accommodation (Figure 14). However, it is also not a popular destination for spending nights, as this village can be accessed by motor vehicle and trekkers skip this stoppage to reach other high-altitude villages fast.

Figure 14 Landscape view in Nar Manang (Field survey, 2020)

6.1.8. Chame

Located at the altitude of 2715 masl, Chame is also the headquarter of Manang District (Figure 15). Considered fairly popular among the international trekkers to have an overnight stay, Chame offers more than 25 hotels that offer food and accommodation. Chame is a municipality town that has a primary hospital, a school, and a police check point for ensuring safety and security of international trekkers. The municipality is quite vibrant with plenty of small marketplaces. Chame is also a central hub that provide services to the locals of Manang district. The municipality also offers banking services. Chame can be reached either by trekking or by jeep riding.

Figure 15 The surroundings of Chame (Field survey, 2020)

6.1.9. Talekhu

Talekhu, located at the altitude of 2790masl is a small settlement that has only one hotel (Figure 16). Because of its very limited option for overnight stay, it is not at all popular among the trekkers. Talekhu serves just like a stoppage on the way to the Tilicho Base Camp route.

Figure 16 Talekhu during the day (Field survey, 2020)

6.1.10. Dhukkurpokhari

Located at the altitude of around 2900 masl, Dhukkurpokhari is famous for its panoramic view of the Swargadwaro, a huge rock formation replicating a huge slide. It is a lodge settlement that cater trekkers (Figure 17). The settlement can be easily accessed by jeep services, and it serves as a part of the trekking trail to the Tilicho Base Camp. In total it has 10 hotels, and all provide decent options for accommodation. This settlement is popular among the trekkers for overnight stay.

Figure 17 The locality of Dhukkurpokhari (Field survey, 2020)

6.1.11. Lower Pisang

Pisang is divided into two settlements, Upper Pisang and Lower Pisang. Lower Pisang takes to the route to the Tilicho Base Camp via another village, Khangshar and Upper Pisang takes to the trekking route to Ngwal. Lower Pisang was surveyed for this research as it on the route to the Tilicho Base Camp. The village lies at the altitude of 3300 masl and has total 18 hotels that offer basic accommodation services. Lower Pisang can also be easily accessed by jeep services (Figure 18). Upper Pisang is usually more favored over Lower Pisang for overnight stay because of the altitudinal difference. The respondents reported that Lower Pisang is

more of a stoppage point for the trekkers to Upper Pisang. However, the hotels provide accommodation during peak season when accommodations of Upper Pisang become full.

Figure 18 The village of Lower Pisang (Field survey, 2020)

6.1.12. Humde

Humde is another popular location for an overnight stay among the trekkers (Figure 19). It is located at the altitude of 3280 masl and has 6 hotels that offer basic accommodation to the tourists. Humde can be easily accessible by jeep services. Additionally, the village used to have a domestic airport named 'Humde Airport' which is no longer functioning because the runways have been deems unusable. Surrounded by snowcapped taller mountains, the village is popular for its natural beauty.

Figure 19 The landscape of Humde (Field survey, 2020)

6.1.13. Bhraka

Located at the altitude of 3300 masl, the locals call Bhraka 'the most beautiful village' of Manang because of its unique landscape and traditional architectural practices (Figure 20). Bhraka is on the way of two popular destinations: the Tilicho Base Camp and the Thorang la Pass. The village is popular for its traditional housing style made up of local materials, such as stones and thatched roofs. The village has 10 hotels that offer basic accommodation to trekkers, and it is a popular destination for an overnight stay. One can access the village via trekking or by jeep services.

Figure 20 Bhraka village (Field survey, 2020)

6.1.14. Manang

Located at the altitude of 3450 masl, Manang is situated on the broad valley of Annapurna Mountain range and next to the river Marshyangdi (Figure 21). In total 22 hotels offer proper food and accommodation to the trekkers. According to the respondents, Manang is one of the popular destinations to acclimatize with the higher altitude weather before trekking towards the Thorung La pass and the Tilicho Lake. The region is easily accessible by jeep services while most of the trekkers prefer reach there on foot. Manang also offers its own touristic destinations such as the Gangapurna glacial lake. Additionally, it has a small airport that has been serving its purpose since 1985, where the flights come from domestic airport in Pokhara or Kathmandu.

Figure 21 Manang during the day (Field survey, 2020)

6.1.15. Tanki Manang

Tanki Manang is another village located at the altitude of around 3500 masl, which has only 3 hotels. Because of its close proximity to Manang, it is not a usual spot for spending nights unless hotels in Manang get full (Figure 22).

Figure 22 The landscape of Tanki Manang (Field survey, 2020)

6.1.16. Khangshar

Khangshar is located at the altitude of around 3700masl and is the last village that can be accessed by jeep service (Figure 23). There are 11 hotels that provide accommodation and there are some small cafes, tea stalls and local convenience stores. Khangshar is also another popular village to get acclimatized with higher altitude weather before heading towards both the Tilicho Lake and the Thorang La Pass.

Figure 23 Khangshar and its hotels (Field survey, 2020)

6.1.17. Tilicho Base Camp

The Tilicho Base Camp is located at a high-altitude settlement zone that is surrounded by higher mountains of Himalayan range from all sides. The base camp serves as the final resting spot before the Tilicho Lake and is located at the altitude of 4200 masl (Figure 24). There are 4 hotels located in the area. The Tilicho lake is a couple of kilometers away from the base camp and according to the respondents, the trekkers prefer to have an overnight stay here before leaving for a day hike to the Tilicho Lake. The lake is among the world's highest altitude lakes located at around 4900masl, which is the ultimate destination for the trekkers following the village route.

Figure 24 Hotels in Tilicho Base Camp (Field survey, 2020)

6.2. Total Hotels Covered in the Study

The study covered 107 respondents from 112 hotels, with one respondent from each hotel involved during the survey. The rest 36 hotels could not be covered in the survey because they were either closed or the same respondent owned 2 or 3 hotels.

6.3. Understanding of Climate Change in the Study Region

In this section, the research focuses on the respondents' responses on their understanding about impacts on climate change in their region.

6.3.1. Familiarity with Climate Change

84 stakeholders were surveyed in the field visit. When the respondents were asked if they had heard of the term climate change, majority (64%) of total respondent reported that they had heard the term climate change while the rest of them had not heard about it (Figure 25).

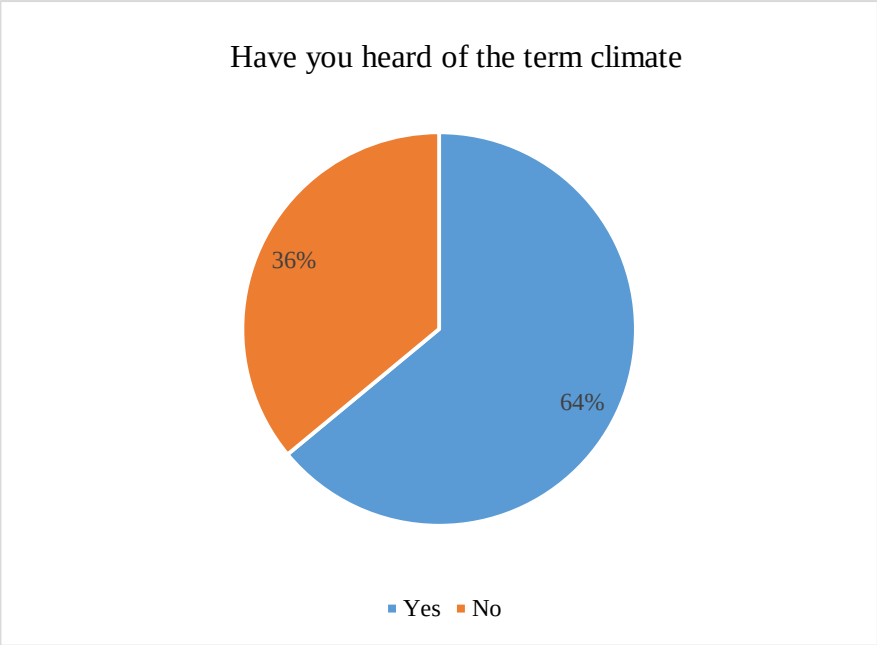

Figure 25 Familiarity of the respondents with the term climate change (Field Survey, 2020)

6.3.2. Sources from where Respondents Heard of the Term Climate Change

Among the respondents who had heard of the term climate change, more than half of them (51.8%) reported that they had heard of the term through news on television, 24.1% from radio, 16.6% from school, 5.6% from their children who had learnt about it in school and 1.9% had attended a training from Annapurna conservation area project where they learned about climate change (Figure 26).

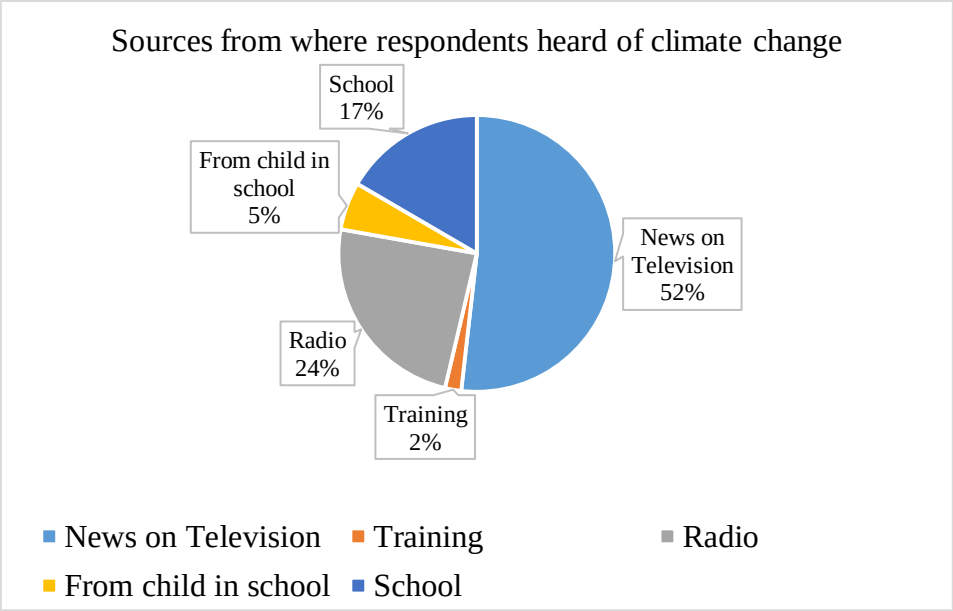

Figure 26 Sources from where respondents heard of climate change (Field survey, 2020)

Almost all respondents (98%) agreed that the climate in their region has changed from what it was 30 years before. The respondents have perceived changes in the summer temperature, winter temperature, snow coverage and rainfall pattern (Figure 27).

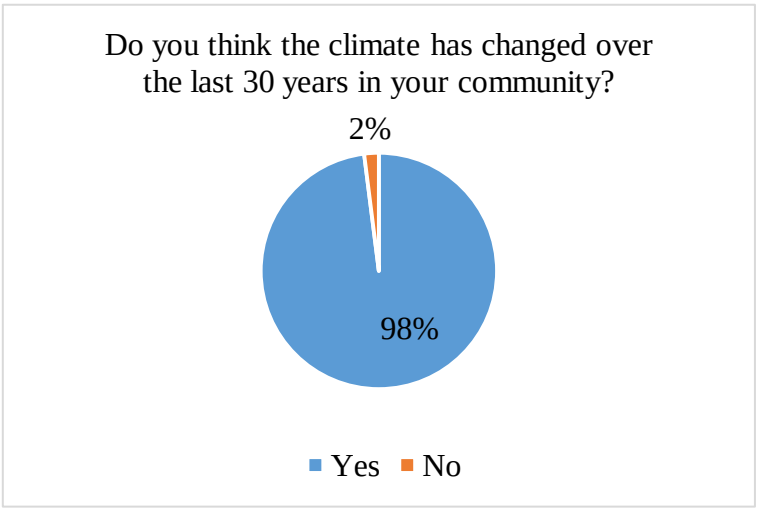

Figure 27 Perception of the stakeholders about changes in the climate variables in the last 30 years (Field survey, 2020)

It has been observed that more than half of the respondents had an idea about climate change. Even if they didn't know the proper term for it, based on their perception of the changes in the climatic conditions in their villages over the course of few years, they were able to specify their understanding of it.

In most of the cases, the respondents got ideas from news on electronic media. All the respondents have televisions and radios at their residences. The respondents informed that the national broadcasting channel of Nepal, 'Nepal Television', on certain occasions such as International Mountain Day or International Biodiversity Day, broadcasts informative documentaries describing the beauty of the Himalayas and explaining the term 'climate change'. Likewise, the national radio channel also broadcast news about climate change and its global impacts which allow them to get some idea about it at the local level. In addition to this, schools are another source of information for climate change as some of the respondents learned about climate change from the course syllabus on 'Environment, Population and Health (EPH)' subject in their secondary level schooling.

Almost every respondent has noticed the changes in climatic variables in his/her village over last 30years. Less amount of snowfall and snow coverage, erratic or reduced rainfall, increased summer and winter temperature are some indications that are observed by the locals.

Chapter 7

Long-term Impacts of Climate Change on the Tourism Industry: As Predicted by the Communities

This chapter investigates the perception of stakeholders regarding the changes occurred in the region in the last 30 years and their understanding about the impacts of climate change on their tourism dependent livelihood. Likewise, it also investigates other factors that may have influenced tourism in the region. Additionally, the predictions about long-term impacts of climate change on the tourism industry is also explored. Similarly, the participants have also provided some suggestions in order to secure their tourism-based livelihood in the future. This research employs methodological triangulation. Data from focus-group discussions, semi-structured interviews and questionnaire surveys were combined, processed, evaluated and interpreted to validate the complete scenario of the stakeholders' perception about climate change in association with their tourism livelihood.

7.1. Changes Observed in the Climate in the Last 30 Years

Four indicators were counted as the variables for identifying changes in the climatic condition:

i. Winter temperature
ii. Summer temperature
iii. Snow coverage and
iv. Rainfall conditions

The respondents were approached to know their perceptions regarding the changes in these variables. More than 86.9% of the respondents perceived that there has been an increase in the winter temperature in the past 30 years. Similarly, less than 10.7% perceived that there has been a decrease in the winter temperature. Likewise, more than 86.9% of the respondents have noticed an increase in the summer temperature while 11.9% have noticed a decrease in the summer temperature and 1.2% think that it did not change at all. Similar kind of information was received in the case of snow coverage perception. Majority of the respondents (96.4%) have witnessed the decrease in the average snow fall rate, whereas only 1.2% of respondents thinks that it has been increased and 2.4% are unaware of any such changes. However, the case is quite different in the case of rainfall occurrence. More than 46.4% of the respondents believed that the rainfall occurrence has reduced in the last 30 years, however 48.8% of them believe that it became more erratic (Figure 28).

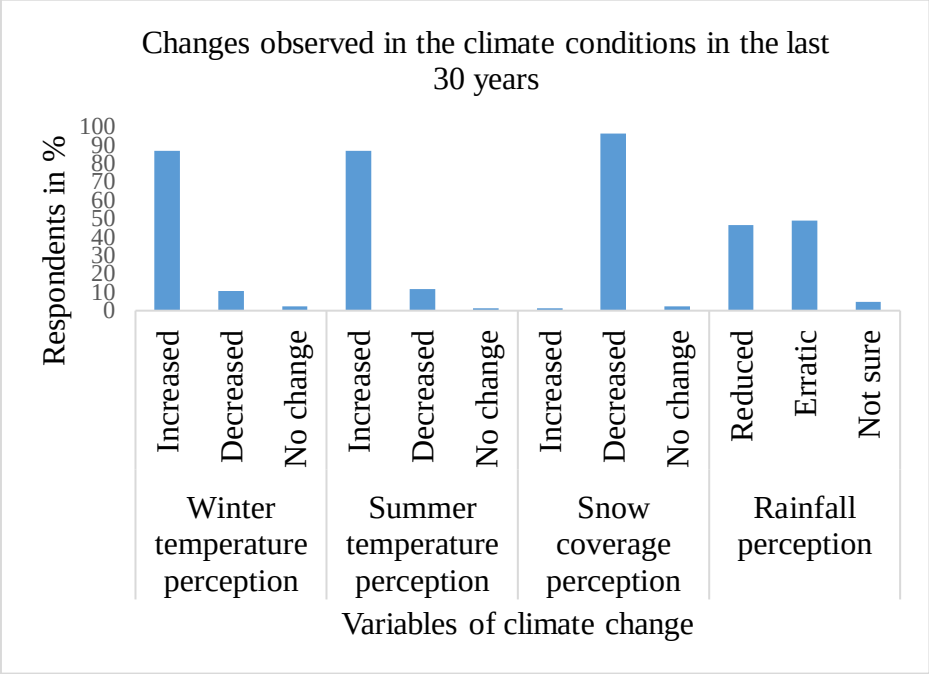

Figure 28 Changes observed in the climatic conditions in the last 30 years (Field survey, 2020)

One of the respondents from the Tilicho Base Camp shares his experience as:

> *'I feel that the snow fall rate is massively decreasing at the base camp…now I notice that the snow coverage of the surrounding mountains has been decreased. The whole mountains used to be covered in snow, but now, half of it or more usually does not get snow cover even in the peak time' (Respondent No. 12)*

Another respondent from Manang village shares her experience with the changing climate as:

> *'I've observed that the climate has become comparatively hotter than it used to be. I can recall from my childhood days when I used to feel so cold even in the summertime, even during the sunny days and we used to wear thick jackets. Now it is not necessary to wear any such clothes in the summertime' (Respondent No. 31)*

Respondents mentioned that the nearby Gangapurna glacial lake in Manang village used to be surrounded by snow-covered Gangapurna Himal all over the year. But now because of the less amount of snowfall, the mountains are barely covered with snow. The rainfall pattern has also become more erratic, and it became hard to predict the seasonal rainfall pattern. The respondents report that due to the increase in the erratic rainfall conditions, the trekking trails get more slippery and thus risky for the trekkers to walk on.

Similarly, it was found that more than 60.5% of the respondents in the upper Manang area found that the amount of rain fall has been decreased while almost one third of the respondents found that the rainfall pattern became more erratic. The respondents who believed that the rainfall conditions had gotten more erratic focused that during monsoon season, the cases of inconsistent rainfall patterns were apparent to them, with sometimes no rain at all in the region to sometimes rainfall occurrence more than what they had anticipated. Likewise, almost one third of the respondents from the Lower Manang valley identified that the rate of rainfall has been decreased while most respondents found that the seasonal pattern

of rainfall has become erratic. Comparatively the lower Manang area usually gets more rainfall than the upper area because of its position on the slightly lower altitude. But the lower part gets less snowfall (Figure 29).

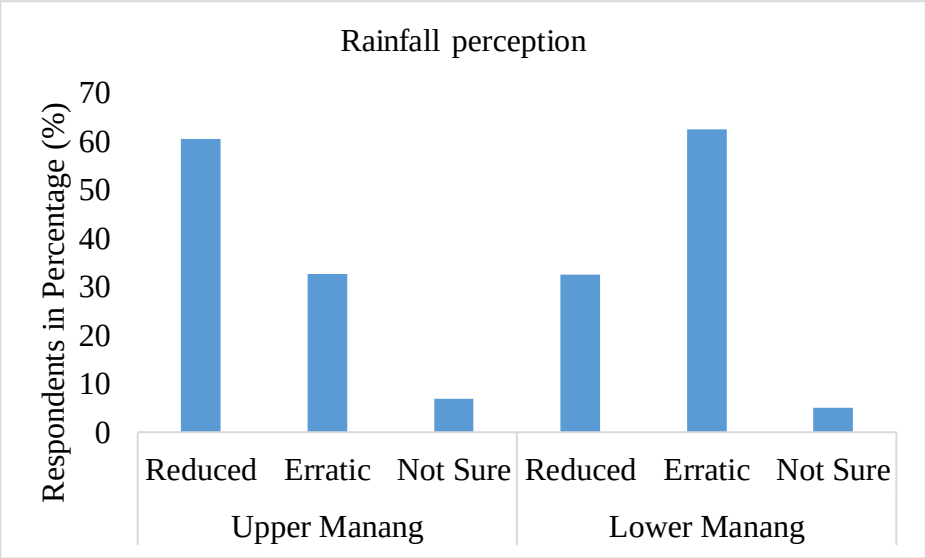

Figure 29 Rainfall perception of the respondents of Upper Manang and Lower Manang (Field survey, 2020)

7.2. Climate Change Indicators Secondary Dataset for the Hindu-Kush Himalayan Region

The temperature and precipitation data of the Hindu-Kush Himalayan region ranging from the period of 1960 to the mid-2000s and the snow cover data between the period of 2003 and 2018 validate the perception of the stakeholders of the Manang villages. The regional annual mean temperature change in the Himalayas since the 1900s to the mid-2000s shows that there occurs a gradual but increasing change in the mean temperature (Figure 30). From 1901 to the early 1970s, most of the years showed a decreased annual mean temperature, however, after the 1970s, the temperature series showed a rapid warming period in the

Himalayan region (Ren & Shrestha, 2017). In addition, in Nepal, between the period of 1998 to 2014, the country witnessed the warmest years in the past 100 years. Similarly, in terms of the precipitation changes, the annual regional precipitation changes in the Himalayan region show a gradual decrease (Krishnan & Shrestha, 2019). The annual average

precipitation around the 1980s has shown a constant decrease in the precipitation, in line with the fact that the average precipitation range has slightly reduced since 1960 (Figure 31). Likewise, the snow-coverage in the Hindu-Kush Himalayan region from 2003 to 2018 showed reduced snow-coverage in several sectors of region (Figure 32). The snow cover area trend across the Hindu-Kush Himalayan region was not statistically significant, however, the values indicated a possible tendency towards a declining trend (Khadka et al. 2020).

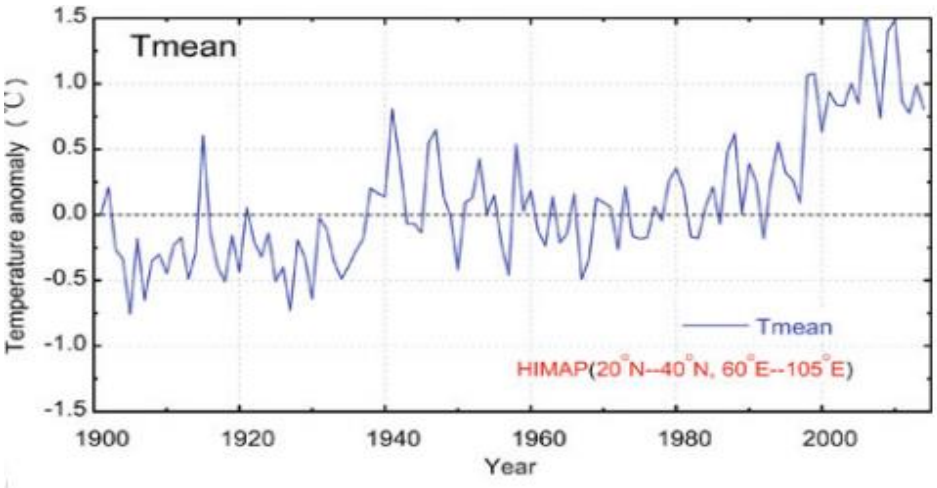

Figure 30 Annual mean temperature series for the Himalayan region between 1901 and 2014 (Ren et al. 2017)

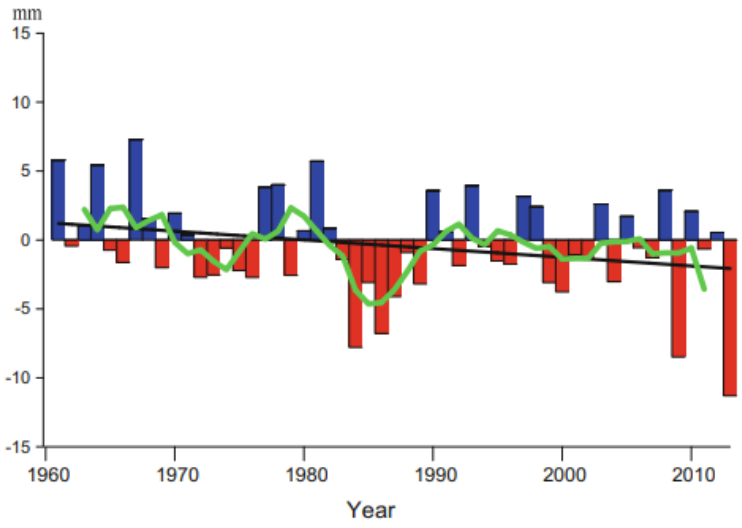

Figure 31 The regional average annual precipitation series between 1961 and 2013 (Krishnan & Shrestha, 2019)

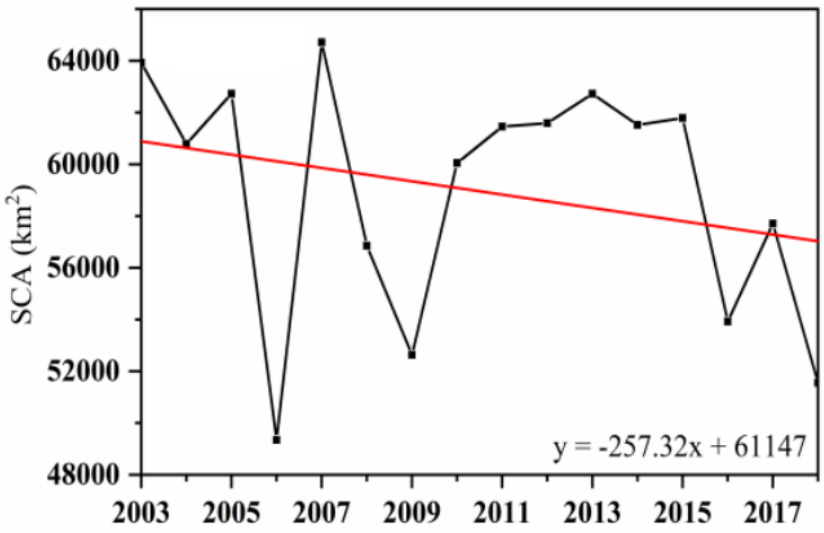

Figure 32 Snow coverage persistency in the Hindu-Kush Himalayas between 2003 and 2018 (Khadka et al, 2020)

7.3. Community Perception of the Impact of Climate Change on Tourism

Through consulting with respondents three indicators had been taken into consideration for investigating the changes in tourism sector over last 30 years, i.e., number of tourists, length of stay and economic return. More than 80% of the respondents noticed that the number of tourists (both domestic and international) has been increased. Likewise, majority of them (85.7%) also noticed that their length of stay at hotels has also been increased in the past 30

years and almost 90% admitted that they are getting better economic return from the tourism industry because of the influx of local and international tourists (Figure 33). A hotel owner from the Tilicho Base camp mentioned that the yearly winter weather is becoming more comfortable now because of the gradual increase in temperature and as a result a greater number of tourists are visiting the place even in the winter season. Another respondent said that it has become easier to go for trekking as the trails are often remain free from snow cover. Another hotel owner from Khangshar also admitted the fact that the decreased amount of snow falls, and the increased number of comparatively hotter days are allowing them to get more tourists even in the off season of January to February. Along with changes in the climatic variable the improved road transportation system also has made the route easily accessible and higher numbers of tourists got attracted to visit this place.

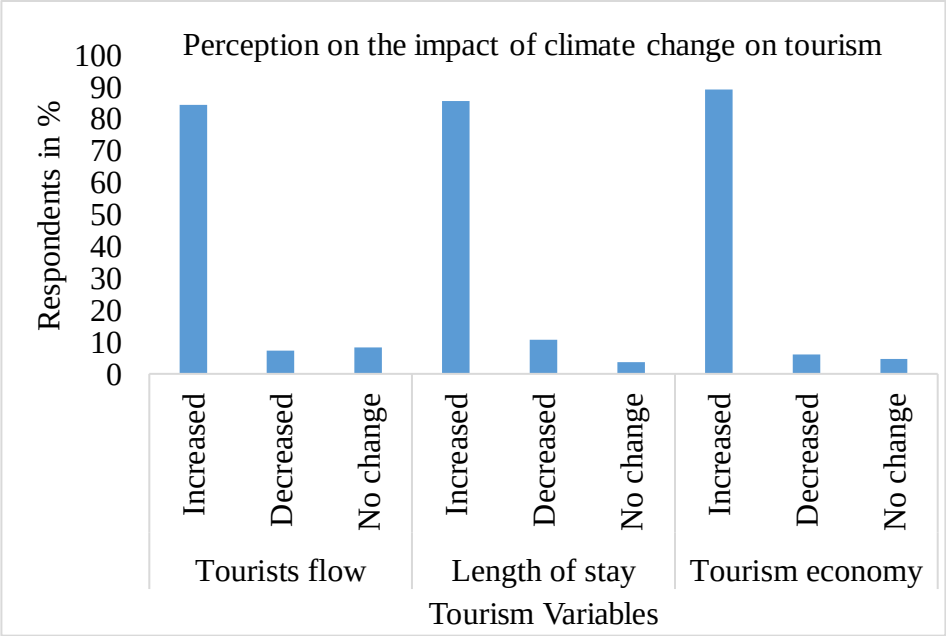

Figure 33 Perception on the impact of climate change on tourism (Field survey, 2020)

One of the respondents argued that, though the changes in climatic variables could have aided in tourist influx, the accessibility of the road network has reduced the trekking length

by at least 3days, which could also be the reason why more tourists have been coming in lately. Additionally, electricity and provision of other basic amenities may have also contributed to the increase in tourist flow and their increased length of the stay. Despite this, most of the respondents firmly believe that increased winter temperature, increased number of summer days and reduced amount of snow fall and snow coverage have contributed to increasing the number of tourists in the villages. 90% of the respondents believe that less amount of snow falls, and increased winter temperature have resulted to higher influx of tourists, consequently their length of stay also has been increased and thus the overall tourism industry is doing well. However, the rest 10% believe that the accessibility to road through jeeps and provision of basic supplies like toiletries and electricity have also aided to increase the tourists flow (Figure 34).

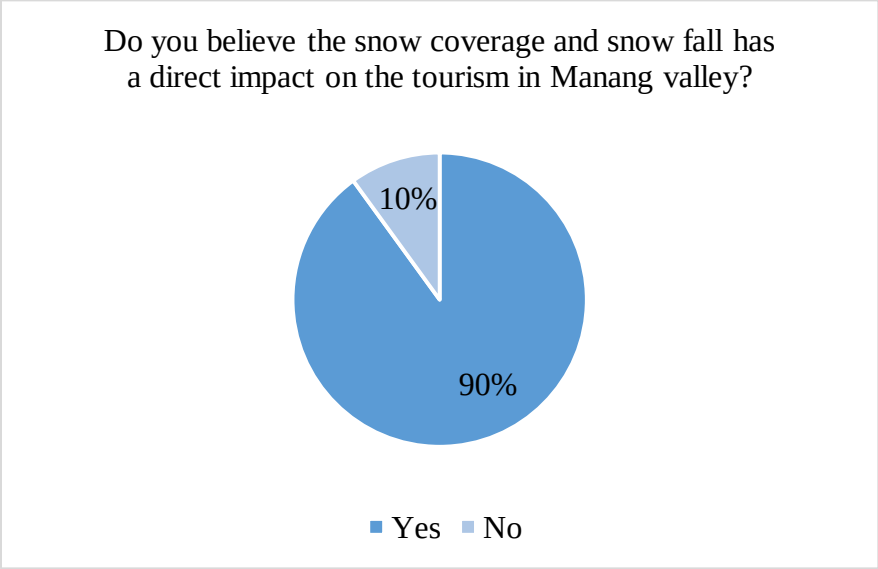

Figure 34 Respondents who believe snow coverage and snow fall have direct impact on the tourism of the study area (Field survey, 2020)

7.4.Factors that have aided the Tourism Industry in the Recent Years

According to the focus group discussions, semi-structured interviews and questionnaire surveys done in different study areas, the respondents identified several factors that could have resulted in the arrival of tourists visit in the study region. The factors were: improved road condition, better hotel facilities, repaired trekking trail, increased seasonal temperature (comparatively warmer summer and winter days), and favorable weather with lesser rainfall. Based on the interviews, it is found that the trekking in Manang region has become relatively easier and safer in the recent times compared to 30 years ago, with better trekking techniques, and equipment such as trekking sticks and better gears. The trekking trails are repaired and maintained regularly, the necessary signage with directions have been put up on fairly newer trekking trails. Likewise, villages have their own check post to regularly follow up the safety and the well-being of local and international trekkers. In addition to this, each village has a sign board to navigate the trekking trail with other information such as the notable tourism destinations in the region, the duration of hiking and information about the health posts and hotels nearby. These factors were further analyzed through pairwise ranking. Increased seasonal temperature was ranked the highest followed by road transportation, favorable weather with less rainfall and repaired trekking trail respectively. Thus, two of the indicators of climate change that were used for the study, that is, increased seasonal temperature and reduced rainfall were also perceived to be the main factors that could have aided the arrival of more tourists in the recent years (Table 4).

Factors	Road Transportation	Better hotel facilities	Repaired Trekking Trail	Increased seasonal temperature	Favourable weather with less rainfall	Rank
Road Transportation						2
Better hotel facilities	Road Transportation					5
Repaired Trekking Trail	Road Transportation	Repaired Trekking Trail				4
Increased seasonal temperature	Increased seasonal temperature	Increased seasonal temperature	Increased seasonal temperature			1
Favourable weather with less rainfall	Road Transportation	Favourable weather with less rainfall	Favourable weather with less rainfall	Increased seasonal temperature		3

Table 4 Pair-wise comparison of the factors that influenced tourism in Manang villages (Field survey, 2020)

7.5. Perception about Long-term Impacts of Climate Change on Tourism

In the interviews and focus group discussions it is communicated that the stakeholders identify impacts of climate change as one of the major factors that is aiding to increase the number of tourists and to have an overall increase in the tourism based economic return. But the stakeholders have a concern that the climate change will not positively impact in the long run. After a certain time and after experiencing higher changes in the climatic variables, the change will impact negatively. The continued increase in the summer and winter temperature and decrease in snow fall conditions will eventually lead to no or minimal snowfall in these villages and the surrounding mountain region and gradually the most picturesque views of the snow-capped mountains of this area will be rare to get. Eventually tourists will be

disinterested to visit this place anymore. Currently, Manang is solely dependent on the nature-based tourism and the tourists prefer to visit this place to enjoy the natural beauty as well as its weather. If the area fails to meet their expectations in the future, it will affect the tourism industry. The stakeholders are very skeptical about the current success and concerned for the future, suspecting that the tourist flow will go down in case of changes in climatic variables in this scale. Likewise, the respondents also believe that increased temperature would eventually lead to rapid melting of the glaciers and snow coverage in mountains, that could result in occurrences of landslides and flashfloods. Additionally, with reduced snow coverage in the mountains, this would also result in water scarcity as the rivers that is drained from the mountains would not be fed with the adequate snow. A respondent from the Tilicho Base Camp shares his experience as,

> *'The Tilicho trekking trail is among the most vibrant trekking regions of Nepal and a lot of trekkers, both local and international origin visit this site to bask in the beauty of the Himalayas. I admit that in short-term, we are enjoying the increased flow of tourists due to increased summer days and comparatively easier trekking route due to less snow coverage. I also agree that climate change is going to do more harm than good to the economy of the region' (Respondent No. 26)*

Likewise, another respondent from Manang Village also shares his experience as,

> *'I feel that the impacts of climate change in Manang mostly associate with decreasing rate of snowfall and inconsistent rainfall. I also think with rising temperature, the snow coverage of the surrounding Himalayas and mountains has been decreased. No snow or reduced amount of snow means, Manang will look like a barren desert. Ugly. Who will want to spend their hard-earned money to visit an ugly place? So, I think, in the long run,*

Manang will face serious downfall in the tourism economy if it continues to happen' (Respondent No. 42)

7.6. Suggestions by the Stakeholders to Secure their Tourism-based Professions

From the presented information, it is apparent that the stakeholders are concerned about the impacts of climate change on their tourism economy in the coming future. When surveyed and interviewed, the respondents had some suggestions to what can be done that would allow their tourism dependent livelihood to prosper even if the impacts of climate change on their nature-dependent tourism were to continue to occur.

- **Shifting to other Types of Tourism**

The respondents believed that they could still opt for tourism, however, they could add other types of attractions along with the nature-based tourism. The scopes of traditional culture-based tourism can be explored and nurtured as "*Gurung*", an indigenous community lives here. The tourists could visit the places for witnessing the varied and diverse culture of the indigenous people. It may provide the tourists to explore and experience their traditional lifestyles and festivals. The respondents believe that this approach to culture-based tourism would bring in other niche of tourists interested in getting to know the culture and traditions of indigenous people and can contribute in garnering income through tourism and need not have to necessarily depend solely on nature-based tourism.

- **Promotion of Adventure Tourism**

The respondents in the lower Manang valley also suggest to add more thrilling adventures on the list of attraction, such as rock climbing and paragliding in the nearby

mountain areas that could attract more tourists. One respondent from Humde informed that they have a rock-climbing competition every year during the end of winter season. The competition is participated by international tourists, however, he believed that the competition had not been promoted enough thus, only limited tourists participated in it. Likewise, another respondent shared that the region also hosts archery and horse-riding competitions, but they also get limited promotion thus, the number of tourists has been less than expected. Thus, the respondents believe that the concerned authority such as the local government should publicize these thrilling activities as the attractions of this region to attract more local and international tourists.

- **Developing Better Transport Infrastructure**

According to the respondents, at present, road transportation is the only way for accessing the villages, that too, via Jeep or Mules. However, the respondents hope to resort to other modes of transportation such as through cable car. One of the respondents says,

> '*We only have roads and trekking trails that too, till Khangshar for now. If we get cable car services, I think more tourists will visit us because it reduces the time of travel. Like, they did for Manakamana and Chandragiri temples, now more tourists go there, and I know the construction will take a long time and it is tedious and expensive, but we will get the money back in no time*' (Respondent No. 09)

The respondents believe that shifting towards other tourism alternatives, finding ways to attract several niches of tourists such as through adventure tourism, culture-based tourism and making the villages easily accessible through some investment would allow

them to resort to tourism even when the impacts of climate change on nature-based tourism in the region in the long run are apparent.

- **Increasing Tourist Entry Fee**

  The respondents reported that at present, the entry fee for international tourists is only USD 10, while the domestic trekkers need not pay for entering the region. Hence, the respondents believe the necessity to increase the tourist entry fee for the international tourists and impose some amount of fee to the domestic tourists as well. This would also increase their tourism income which can be used for regular maintenance of cultural heritages in the region. Hence, higher value accommodation would attract higher value tourists and thus the tourism would not have to just focus on low-budget travelers.

From the information laid in this section, it can be understood that the participants had some understanding about climate change, how climate is actually changing in global scale and also in their local community, if there are any impacts of climate change in their locality, whether climate change is influencing tourism in their locality and if there are any long-term consequences of climate change in tourism business in their region. Based on their perception, the changes observed in the climatic condition over the last thirty years in the villages such as increased winter and summer temperature; reduced snow fall and snow coverage; and reduced and erratic rainfall conditions are visibly apparent. The respondents believe that these observed impacts of climate change in their region could be more negative in the long run, impacting their highly dependent tourism livelihood. Thus, they believe that it would be better to opt for other alternatives to nature-based tourism.

Chapter 8

Findings

This research investigated the perception of local people about climate change and its relationship with their tourism-based livelihood. How people perceive the changes in their surrounding natural environment such as changes in temperature, rainfall, snowfall etc. allows to construct a better understanding about the future. Thus, understanding local people's perception that is aids in bringing context-specific recommendations and measures (Seipt, et al., 2013). Likewise, understanding local perceptions incorporates the provision of vast comprehension about climate change and its relevancy and outputs (Laidler, 2006). This research identifies the understanding of the local people about the changes in their environmental conditions, which are contributing factors to the possible recommendation of the study. Hence, exploring the long-lived experiences of the stakeholders and their capacity to navigate the impacts of climate change on their livelihood contributes to develop context-specific long-term goals.

This chapter summarizes the key findings of this thesis.

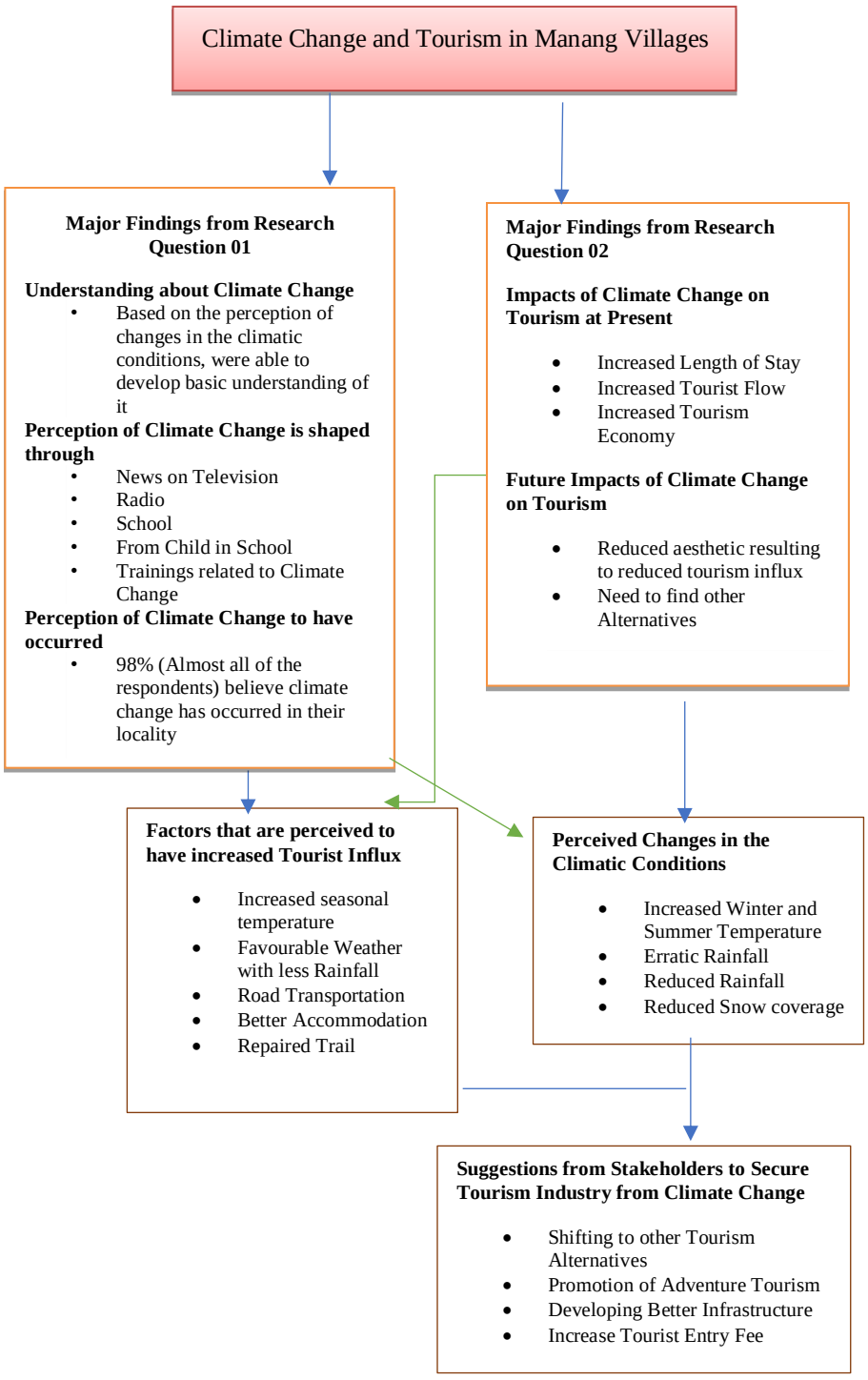

Figure 35 Spider diagram depicting findings of the Research

Researchers reported that in an archipelagic country like the Maldives where coastal tourism is one of the driving factors of the tourism economy, climate change impacts such as sea-level rise, coastal erosion and flooding have severely affected the tourism economy (Stancioff, et al., 2018). However, another report suggests that despite the impact of climate change is apparent, the stakeholders involved in the local tourism are not as alarmed as compared to those who cater for international tourism (Shakeela & Becken, 2015). A recent study that focused on coastal tourism and climate related disasters in Indonesia showed that the stakeholders involved are already aware of the consequences of climate change in their tourism economy. Wijaya and Furqan (2018) found that the influence of climate change related disasters such as flood, sea level rise and extreme weather conditions have started affecting the tourism in the coastal regions of Indonesia., the negative impacts of climate change on the tourism industry in the low-lying coastal countries are often get reported. Even at present conditions, the rise in the sea level and increased beach temperature in the coastal region have already accelerated the reduced amenity value in terms of natural aesthetic (Hoogendoorn & Fitchett, 2018). Additionally, warming climate in coastal plains which are already hotter during summer seasons demotivate the tourists in visiting the regions in lower latitudes (Hall, 2018). Likewise, the impact of climate change on a low-lying island nation, Sri Lanka is also quite apparent, especially in the coastal region with increasing vulnerability on the tourism sector (Buultjens et al., 2017). However, the challenge is rarely discussed on the research level hence, very limited information is available regarding this (Buultjens et al., 2017). This shows that the climate change at present in Manang has not brought about damageable repercussions to their tourism the way it has in low lying coastal tourism

dependent economies. These impacts can be taken as lessons to be learned and can provide a pathway to move forward for their tourism dependent economy in Manang.

It is observed that the consequences of climate change in the Manang Valley villages are apparent, but it is more positive than in the negative scenario in present conditions. Adaptation refers to changes in practices exercised in order to reduce the vulnerability of communities, regions and livelihood options due to climate change (Smit & Pilifosova, 2003). As the perceived changing climate has not brought about negative scenario for the tourism sector in Manang valley, thus, adaptation has not yet been exercised or needed in the region. The respondents themselves believe that climate change has the direct possibility of negative consequences to their tourism economy in the long run, hence, this issue should also be taken into consideration while focusing on climate change discussion. Likewise, there is a definitive urge from the stakeholders to shift their nature-based tourism to other alternatives such as culture-based tourism, in order to secure their tourism-based economy from the impacts of climate change in the long run.

Chapter 9

Discussion and Conclusion

This chapter makes an overall discussion about the major findings of the research. The purpose of discussion section is to highlight the major findings according to the objectives of the study. Likewise, conclusion summarizes the overall research.

9.1. Discussion

9.1.1. Perception about Climate Change: A Foundation to Start with

How the local people perceive these changes in the climatic conditions of their environment also connect with their resiliency to intervene and interact with their surroundings. Whether the environment is natural or built, they contribute to building the perceptions of people residing there. While changes are occurred either intentionally or unintentionally, community perceptions allow to cope with the changed environment. The local people of Manang villages identify that their livelihood is very much dependent on the nature-based tourism which is at risk due the changes in climatic variabilities.

It is apparent that more than half of the respondents had heard the term 'climate change'. Some of the respondents had only heard of the term in Nepali as '*Jalabayu paribartan*', however, they were able to explain what climate change meant to them through their basic understanding based on their lived experiences. Likewise, majority of them have perceived that climatic variable has been noticeably changed in the last 30 years. Additionally, depending on the altitude, either the rainfall rate has been decreased or the pattern has become erratic, as it is noticed by the respondents. The rainfall pattern is perceived as more

erratic at the Lower Manang region while it is found at reduced amount in the Upper Manang region.

9.1.2. Climate Change is not the only Contributing Factor to Increased Tourist Influx

According to the stakeholders, the climate change has some positive correlation with tourism and stakeholders are getting benefits of it in terms of receiving increased number of tourists' flow, higher occupancy at hotels and eventually contributing to the tourism-based economy. However, other external factors also have contributed to increase the tourist influx in the recent years. Based on the interviews, it is found that the trekking in Manang region has become relatively easier and safer in the recent times compared to 30 years ago with better trekking techniques and gears with better trekking techniques, and equipment. In addition to this, the trekking trails have been repaired and maintained regularly, the necessary signage with directions have been put up on fairly newer trekking trails. Likewise, villages have their own check post to regularly follow up the safety and the well-being of the international trekkers. In addition to this, each village has a sign board to navigate the trekking trail with other information such as the notable tourism destinations in the region, the duration of hiking and information about the health posts and hotels nearby. These services have made trekking in Manang comparatively easier than it used to be. The provision of lodging, easier accessibility by motor vehicles until Khangshar, infrastructure that is, the services for lodging and travels have become more modern and 'comfortable' with western toilets, hot showers and even attached bathrooms which are moderately hygienic. These are some of the reasons why the influx of tourist in the region has increased in the recent years. Nyaupane and colleagues (2014) also observed the provision of better facilities in another Himalayan tourist destination, Khumbu region as some indirect contributors to tourism economy in the

region. In Manang, people have perceived an increase in summer and winter temperature, decreased snow fall and snow coverage, and reduced as well as erratic rainfall as the impacts of climate change in the region. These perceived variables have contributed to tourism by reducing the barrier for trekking, especially during the winter and monsoon season. Pokharel and colleagues (2017) also observed similar result while studying the relationship of the climate variables with Nepal's tourism-based economy. The research stated that there occurred positive relationship of the climatic factors such as increased temperature and snow coverage loss with increasing tourist visiting Nepal, thus concluding that climate change has the credibility to contribute to tourism economy in Nepal. However, the people still believe that the infrastructures could be built better, as the accommodation facilities are decent with basic amenities. If the region wants to focus on garnering more tourists, the stakeholders believe the need to incline more towards high-end tourism with luxurious services with investment and marketing efforts to attract new breed of high-end clientele. Additionally, the stakeholders also believe increasing the entrance fee from USD 10 to higher would also increase their tourism income which can be used for regular maintenance of cultural heritages in the region. Higher value accommodation would attract higher value tourists and thus the tourism would not have to just focus on low-budget travelers.

9.1.3. Climate Change is more of a Bane in the Long Run for the Tourism Industry in Manang

The respondents believed that though climate change has brought some positive benefits to their tourism economy for the time being, the impacts will be negative in the long run. Climate change may adversely affect the tourism economy in the future because of erratic climatic behavior leading to lose the natural aesthetic beauty and eventually experiencing

water scarcity and drought in the Himalayan touristic locations (K.C. & Thapa Parajuli, 2014). Thus, it can be well understood that even though climate change has reduced barriers such as snow coverage especially during winter season, which is beneficial in the short term, the long-term impacts will be negative with rapid melting of snow and ice in the mountains, chances of flash floods, landslides, reduced aesthetic views in the region and eventual water scarcity which may demotivate the trekkers to visit the trekking destinations (K.C., 2017). Reduced or erratic rainfall, with increasing risk of landslides and soil erosion in the future may also cause a decline in tourism influx in the Annapurna Circuit Trekking Trails (Rayamajhi, 2012). Similar observation was also made by Sharma (2009) in his research regarding trekking in the Himalayas of Nepal where he predicted that there would be a decrease in tourist number because of increased frequency of occurrence of extreme weather events such as floods, landslides, and avalanches mostly due to increasing temperatures in the long run, leading to risk for tourism associated business. In contrary, it has also been observed that warmer countries may suffer from a decline in tourism due to climate change while opposite could be the case for countries located in higher altitude (K.C., 2017). Climate change has resulted in the shifting of the international tourists more towards the polar region and the mountains (Bigano et al., 2008; Yu et al, 2009). This statement is also quite relevant in the context of Manang Valley.

9.1.4. Resorting to Other Types Tourist Attractions: Changing Tourism Patterns

The tourism centric livelihood of Manang villages mostly depends on the natural features of the area as the main attraction for tourists. Thus, the villages get tourists who are mostly interested in trekking and hiking in the Himalayan trails. However, the local people have also predicted that their nature-based tourism will be severely impacted due to climate

change as the nature will eventually lose its usual aesthetic beauty, if mitigation measures are not globally practiced to slow down the process. This means, the tourists will no longer choose Manang as their tourist destination and current boom in the tourism industry may not continue for long. Sole dependency on nature-based tourism might affect the livelihood of the locals who are dependent on it. For this reason, the stakeholders think that it will be better if the sole dependency on nature-based tourism can be reduced through exploring and nurturing other types of attractions. As the impacts of climate change in their tourism in the long run have been predicted to reduce their economy, thus, the stakeholders believe that they could focus on nurturing other types of tourist attractions and resort on culture-based tourism. This way, Manang villages can garner not just tourists interested on natural beauty but also tourists interested in learning the culture of indigenous communities of Manang. Thus, the attraction destinations for tourism can be made more diverse.

9.2. Conclusion

This research investigates the perception of local people regarding their understanding of climate change and its interrelationship with their tourism dependent livelihood, from a perspective of the changes they have observed within their environment. The study conducted in different villages in Manang located in the Himalayan region inculcates context exclusively relating to the influence of climate change in tourism, a study needed as the region ranks among highly vulnerable locations within the country. The perception of the local people about these issues have stemmed from their source of information about climate change, which in most cases was the source of news from radio and television which focused mostly on their rich biological diversity. Thus, the understanding of the local people rooted towards protection of nature rather than protection of their livelihood. The stakeholders,

however, had a clear understanding of how the climate is changing in their surroundings through observation and their residency in their region for several years. According to them, climate change has more so led to warmer weather during both summer and winter, which for the people living in the colder climates as such is more of a foundation for cozy atmosphere during the daytime. However, when they talk about it from the nature's point of view, the snowcapped mountains which once used to be their source of pride and joy have been losing their coverage every year, making the peaks look dark and barren with every passing day. The stakeholders associate the aesthetic beauty of their region with their dependence on nature-based tourism. In this way, the research answers the first research question and addresses related objectives which revolved around the understanding of the local people and their perception regarding changing climate in their region. The research observes that the local people in Manang valley villages are aware of the impacts of climate change to their livelihood, however, at present conditions, they are deemed to be more beneficial than disadvantageous. Based on the research, increased summer and winter temperature, erratic and reduced rainfall conditions, reduced snow fall, and snow coverage have been observed as the apparent consequences of climate change in the study area, however, actions to combat these issues in the regions have not been prioritized yet.

The second research question and its related objectives focused on the perception of the local people about how the observed climate change may be impacting their tourism-dependent livelihood. Though the influence of climate change in tourism has been observed, which is mostly positive in the present conditions with the increased influx of tourists, their increment in the length of stay and consequently increased economic return. In addition to this, the stakeholders also think that there are other contributing factors other than just climate

change, which are development of motorways until some portions of the villages, better accommodation facilities, and regular repairing of the trekking trail compared to the past, availability of police check post concerning the safety and security of the tourists. However, the stakeholders suspect that the factors of climate change (such as reduced rainfall and snow coverage) that have resulted in the positive influence on the tourism, will turn into a negative factor soon. Additionally, reduced rainfall conditions in the Upper Manang region and erratic rainfall conditions in the lower Manang valley have already started to affect the tourism practices in the region. In the lower Manang valley, this had led to slippery road conditions for motor vehicles and damages in bridges while in the upper Manang region, the trails get more slippery during extreme rainfall conditions. In the long run, the chances of these occurrences to increase would be more impacting on the arrival of tourists and eventually on the tourism economy of their region. Most tourists arrive in Manang because of its aesthetic beauty due to its snow-capped mountains and Himalayas. The rate at which the snowfall conditions are reducing would mean the mountains would look dry and barren, losing their aesthetic beauty, which would also mean their trekking destinations may shift to other alternatives resulting in a reduced tourism economy due to climate change in the long run. Thus, the stakeholders suggest to explore, promote and nurture alternative options of the nature-based tourism. The stakeholders believe that resorting towards more on the higher end of the clientele and targeting other options to tourism would aid in protecting their tourism dependent livelihood from the influence of climate change. These alternatives opt towards culture-based tourism with their focus on their unique indigenous culture and festivals to attract other varieties of tourists. Adaptation measures are taken when the negative consequences of climate change are observed. However, in context of Manang

villages, their tourism dependent livelihood experienced positive impacts of climate change, the stakeholders did not find it necessary for the time being. However, it is necessary to address the need to include adaption actions in the policies for the long run for Manang valley villages focusing on diversified tourism options and arranging varied types of facilities and amenities for different types tourists to reduce the negative impacts on the tourism-based economy. Additionally, this research highlights the need to associate tourism with climate change in the context of Himalayan communities where the impact of climate change has already been observed at present conditions and thus, the research contributes more to the spectrum of gathering information about local perceptions which could be utilized in related processes.

9.3. Research Contributions

9.3.1. Methodological Contributions

This research approach follows exploratory approach to gather information through 'inductive reasoning' and 'observation', thus, the process all in all is 'participatory' in nature. The research principally exercises multiple case-study approach by visiting the study area. In situ data collection involved incorporation of survey questionnaire, focus group discussions, semi-structured interviews, pair-wise comparison and ranking. The major stakeholders of the research comprised of the hotel owners in the communities, belonging to wide age range and equal participation from both men and women. The research found importance in exploring the relationship of local communities with their environment. The research design is also replicable for other exploratory research which focuses on stakeholders' perception.

9.3.2. Empirical Contributions

This research provides empirical evidence to explore the perceptions of local communities regarding climate change in their region and understanding its impacts on their livelihood. The research has discerned the source of information about climate change among the stakeholders which associates their understanding of the situation with their dependency on tourism as their source of earning. In addition to this, it also realizes the future prospect of tourism in the region, and whether climate change would be taking its course towards booming economy or the contrary. Likewise, it also discovers other factors which are not related to climate change but may have some contribution to their increased tourism influx over the recent years.

9.3.3. Practical Contributions

The research provided practical contributions through the insights about understanding of the communities regarding climate change. The research has discovered why the stakeholders have not prioritized adaptation to the changing climate yet, as the observed climate change have been realized to be more beneficial at present situations. Additionally, it also identifies the need to have alternative approach to tourism as the stakeholders predict the changing climate in the long run would impact their tourism economy adversely. Culture-based tourism could be another alternative to nature-based tourism for the region, along with developing better infrastructure in accommodation and road development and target higher-end tourists by incorporating luxurious facilities and focusing on more than nature-enthusiasts. This discovery would allow the stakeholders to focus on the future prospect of tourism in such a way that climate change would not be considered as a hindrance to their tourism economy.

9.3.4. Policy Recommendations

The document review section of the empirical study has identified some limitations of the existing policies related to climate change actions in Nepal. The policies do prioritize climate change however, with little consideration for the tourism as a major source of livelihood of the country. As this research highlights the dependency of the communities on the tourism, it recommends expanding scopes of governing bodies towards this less prioritized sector. There is a need to propose adaptation measures for the tourism industry for managing the impacts of climate change. Based on the document reviews of some national level documents of Nepal such as the Climate Change Policy, 2019 and the Climate Change Financing Framework, it is understood that implications of changing climate on tourism dependent livelihood are rarely addressed. Likewise, IPCC 6th Assessment Report also establishes the irreversibility of climate change. Thus, the inclusion of tourism among the prioritized livelihood sectors would allow shifting the focus towards adaptation in the long run. Based on the research findings, following suggestions are made to develop more effective strategies:

- ***Involvement of local people for future developmental projects in the region***

The stakeholders have been clear about their stance in their involvement of the development projects happening in Manang district. Several stakeholders talked about infrastructure development such as developing faster and better mode of transport such as cable cars, that would allow more tourist influx in the long run, when climate change may result to a barrier in nature-based tourism activities such as trekking in the regions. Hence, involvement of stakeholders would allow better understanding of the circumstances and contribute more.

- ***Working on the sensitization of local communities through context-specific approach***

Based on the findings, it is clear that the local communities have some basic understanding of the influence of climate change in their region and also in their livelihood. The 6th Assessment Report of the IPCC clearly establishes human influence to be very likely the main driver of the global retreat of the glaciers since the 1990s and decrease in the snow cover since the 1950s. This validates the urgency in the situation to address critical issues relating to the impact of climate change on Himalayan communities dependent on tourism. Trainings and workshops related to climate change and tourism would allow the stakeholders to understand the influence of climate change in a pragmatic way. Thus, sensitization of the local communities of Manang by exercising necessary tools focusing on their livelihood can help them understand climate change better and take long term actions.

- ***Focusing on more than just one sector of tourism in the region***

The people of Manang region dependent on the nature-based tourism as their sole earning source. However, the long-term impacts of climate change have been suspected to be disadvantageous to the nature-dependent income. Thus, opting to other options of tourism that also highlights alternative scenarios of Manang could be a necessary recommendation. Thus, the policy could focus on promoting culture-based tourism of the indigenous communities of Manang, which would allow more stakeholders to be benefitted from it.

9.3.5. Future Research

Further research regarding the availability of adaptation options to combat climate change impacts on the tourism sector needs to be done. This research focuses more on understanding the perception of the local people about climate change in their tourism as a livelihood option, allowing to gather information at the local level. The perceived impacts of climate change on the surrounding environment are also made apparent. The only way going forward would be taking this knowledge and transforming them to actions through adaptation or mitigation.

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Appendix A

The total number of respondents involved in the study were 107. The stakeholders involved were solely hotel owners catered to the domestic and international trekkers (tourists) and all of them belonged to Gurung indigenous group. All the respondents were the hotel owners in different study villages of the Manang district, providing the facilities of accommodation. The other socio-demographic characters of the stakeholders are listed below.

S.N.	Socio-Demographic Features	Frequency	Respondent (%)
	Age Range		
	18-30	17	15.9
1	30-45	65	60.7
	45-60	14	13.1
	>60	11	10.3
	Literacy Status		
	Literate	89	83.2
2	Illiterate	18	16.8
	Gender		
3	Male	60	56.1
	Female	47	43.9

Socio-demographic characteristics of the respondents

Appendix B

Khangshar village

Landscape of the trekking trail

Tilicho lake, one of the highest altitude lakes of the world within the trekking trail