Journal of Tourism and Himalayan Adventures
An International Research Journal

Nepal Mountain Academy

June 2021, Vol. 3, ISSN: 2717-5030 (Print) 2738-9642 (Online)

Climate Change and Possible Impacts on Travel and Tourism Sector

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Abstract

Nepal is a diverse country with lowlands of Terai to the highest mountains attracting many tourists and visitors to make visits. So, the tourism in Nepal is primarily nature-based as tourists are mostly attracted by the spectacular landscapes, majestic mountains, glaciers, lakes, rivers and biodiversity across its diverse ecological gradient. Mountaineering, trekking, whitewater rafting and jungle safari tours are the main forms of nature-based tourism activities in our country. Climate change is affecting Nepal in a number of ways and the travel and tourism sector cannot remain untouched. Various studies on climate change shows increased weather uncertainties and extremities resulting into long dry period and intense rain during monsoon leading to increased water induced disasters like floods, inundation, landslides, cloudburst floods, and glacial lake outburst floods (GLOFs) which are projected to continue in future as well. This has affected natural landscapes, and Himalayas influencing every walk of life and livelihood options. Though the impacts of climate change can be observed in the whole world, poor country like Nepal is likely to suffer most due to limited resources to cope with and adapt to the effects of climate change. In this paper, an effort has been made to review the impact of climate change on the travel and tourism sector in Nepal through the study of previous literatures on climate changes.

Keywords: Climate change, eco-tourism, nature-based tourism, travel and tours

Introduction

Climate change is one of the all-encompassing global environmental changes likely to have deleterious effects on natural and human systems, economies and infrastructure (TERI, 2007). Climate change is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (UNFCCC, 1997). Both developed and developing countries have been threatened by climate change in recent times. Climate change is making weather less predictable, rains more uncertain and heavy storm rainfalls more likely and this will continue with an adverse trend in the future too (Adger et al., 2003).

Earth's temperature has increased by 0.85°C (0.65°C to 1.06°C) from 1880 to 2012. However, the increase in temperature for the past 15 years (1998–2012) is 0.05°C (–0.05°C to 0.15°C) per decade (IPCC, 2014). Climate change is mainly observed by the alteration in the

temperature and precipitation (Blast, 2013). Though developed countries are mainly responsible for the GHGs contribution, the impact is felt by the entire global community. Climate change has wide spreading effects on the environment and socioeconomic sectors including water resources, agriculture and food security, human health, terrestrial ecosystem and biodiversity, and coastal zones. As the world today is 1.1°C warmer than in pre-industrial times, the consequences of this warming are enormous, observed by the increase in intense floods and fires, and extreme weather events in the past decade (UNFCCC, 2020). Rising sea levels, retreating ice caps and dying coral are the most visible impacts of a warming planet (UNFCCC, 2020).

Changing rainfall patterns is likely to lead to severe water shortages or over flooding. Melting of glaciers can cause flooding and soil erosion. Rising temperature is causing shifts in crop seasons affecting food security and shifting disease vectors putting more people at risk. Temperature increase of 2o C potentially affects the extinction rates of many habits and species by up to 30%. The United Nations estimates that 1 million species are on the brink of extinction owing to human activity as temperatures have risen so quickly that myriad species, already weakened by habitat loss or pesticide overuse, cannot adapt to new conditions quickly enough (UNFCCC, 2004). In this paper, an effort has been made to review the impact of climate change on the travel and tourism sector in Nepal.

Climate change and variability in Nepal

Hindu Kush Himalayan region has observed severe impacts of climate change and Nepal cannot be the exception with altitudinal variation and fragile geographic structures. Impacts of climate change in Nepal can be observed through escalated natural hazards, rise in temperature and change in rainfall patterns, shifting of tree line and unfavorable weather change phenomena (K.C. & Ghimire, 2015). The warming trend that has been observed in Nepal is higher than the global average. Temperature is noticeably increasing across the country with higher rate in the high altitude and urban areas (Baidya et al., 2007).

In Kathmandu, the annual rate of temperature increase is 0.05°C with an increasing seasonal and decadal trend. The rate of change is higher in winter season (Agrawala et al., 2003; Baidya et al., 2007) which is getting cooler and summer is getting warmer (Eugenio-Martin & Campos-Soria, 2010) with increased warm days and nights; but decreased cold days and nights (Shivakoti et al., 2015). Based on data from 1971 to 2014, Department of Hydrology and Meteorology has shown that warming trend in annual maximum temperature in Nepal is significantly positive, at 0.056°C/yr (DHM, 2017), a similar finding was found by Shrestha et al. (1999) for temperature trends between 1971-1994. The average temperature rise is estimated at 0.5°C per decade, which is very high, compared to several other developing countries (Shrestha, 2000).

The rainfall is inconsistent with intense rain in few days creating long drought (Malla, 2008). Baidya et al. (2008) reported an increasing trend in both the total and heavy precipitation in Nepal over the period of 1971-2006 with more weather-related extreme events such as floods and landslides. DHM (2017) too had similar findings where seasonal and annual precipitation trends throughout Nepal showed decreasing precipitation in all seasons with the highest decreasing trend (-0.3 mm/yr) in the post-monsoon season. Annual decrease in precipitation in Nepal is 1.3 mm/yr. various researches show that precipitation trend is less clear in comparison to temperature trends to study climate change.

Climate change affects everyone but the poorest and most vulnerable people in every society are affected the most as they least likely to have the means to adapt to its impacts in Nepal, being the poor country is likely to suffer from climate change most due to limited resources to cope with and adapt to the effects of climate change (Regmi et al., 2010). The effects are now visible in Nepal's tourism sectors.

Tourism in Nepal

As per United Nations World Tourism Organization (UNWTO) tourism is a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors and tourism has to do with their activities, some of which involve tourism expenditure (December 15, 2020). Simply put, tourism means travelling and staying away from home to a different place for the purpose of business, vacation and other activities. Tourists throughout the world spend their vacation in mountain areas for trekking and mountaineering, ocean beach for recreational activities and watching diversity of flora and fauna.

For most of the developed and developing countries of the world, tourism is the main source of income for sustaining livelihood. It has an impact on the environment, economy, cultures, traditions and physical infrastructures.

Nepal is a small country which covers an area of 147,181 sq. km. which is just 0.1% of the area of the planet; still it contains 3.2% of known plants, and 1.1% of animals (Ollerton, 2020). Our country is rich in biodiversity and this diversity attracts tourists from all over the world. Tourism plays a crucial role in employment and income generation for Nepal with three groups having comparative advantage i.e. sceneries and natural beauty, trekking and adventure, and pilgrimage, art and sculptures which are unique in Nepal (Sharma & Pyakurel, 2012). In 2019, contribution of travel and tourism to GDP for Nepal was 7.9% (Knoema data sheet, 2020). The total number of tourists to Nepal in 2019 totaled 1.17 million, a slight downfall over the 2018 number of 1.52 million. Nepal's tourism is primarily nature-based, as tourists get attracted for its spectacular landscapes, majestic mountains, glaciers, lakes, rivers, and its biodiversity across its diverse ecological gradient that is conserved by an extensive network of protected areas. Mountaineering, trekking, whitewater rafting and safari tours into the jungles are the main forms of nature-based tourism activities in Nepal. Of the total number of tourists visited in the year 2018/2019, an estimated 65% of the tourists visit Nepal for pleasure while 16.52% for mountaineering and trekking and 14.6% for pilgrimage (MoCTCA, 2019).

As per the report of MoCTCA, 2019, there has been the slight increase (8.6%) in the tourists who prefer to visit National Parks and Wildlife Reserve in the year 2019 as compared to that of 2018 while tourist who preferred trekking has shown decrease of 15.15 % in the year 2019 in comparison to 2018 (details in Table 1). With the international borders being shut down and national lockdown due to Covid-19 pandemic, tourism for the year 2020 has been halted and conditions still remain the same as of March, 2021.

Table 1: Comparison of tourist flow in two years for different purposes

Tourism activities	Year 2018	Year 2019	% Change
National Parks and Wildlife Reserve	395791	429764	8.6

Trekking (Manasalu, Mustang, Upper Dolpa, lower Dolpa, Kanchanjunga, Humal)	25081	21280	-15.15
Religious sites (Lumbini and Pashupati Nath which excludes Indian toursit)	332491	345020	3.76

Source: MoCTCA, 2019

Climate change impacts in Nepal

Agriculture, hydropower, tourism and livelihood of local people have been severely affected by climate change in Nepal (Sharma, 2009). The discharge of snow-fed rivers is declining (WWF, 2005). Changes in water supply and demand, and resources availability are some impacts of climate change on water resources (Nicol & Kaur, 2009). By impacting water availability, it is hindering agricultural productivity and causing malnutrition, and human health and sanitation problems; while too much water during wet season has devastating impacts on human settlements, infrastructure, and agricultural land (MoE, 2010).

Nepal having extreme climatic variation with steep topography and fragile geology, the impact of climate change is serious. In the mountains, there is less snowfall with retreating glaciers; in the mid-hills, water sources are drying up, and in the plains, people experience greater flooding and unexpected cold (Regmi et al., 2010). The country is experiencing impacts on biodiversity, water resources, forestry, agriculture, and health (Karki, 2007) along with its impact on the cryosphere (Karki, 2009). The Global Climate Risk Index 2014 has identified Nepal as the 14th most vulnerable country to the risk of climate change (Kreft et al., 2015) even though contribution of Green House Gases (GHGs) emission of Nepal is very low i.e. only 0.027% (MoPE, 2016). Glacier retreat for Everest Region was found to be 10-60 m per year (Bajracharya et al., 2008).

The rapid melting and recession of many Himalayan glaciers due to climate change is leading to the formation of new glacial lakes. Even though the total glacial area had decreased by 24% in Nepal between 1977 and 2010, while the number of glacial lakes had increased by 11% (Bajracharya et al., 2014). Nepal is ranked 6th out of 200 countries that will suffer from climate change impacts and climate change will have a significant role in the tourism industry (Bhandari, 2014).

Climate change impact on tourism in Nepal

Tourism is usually for recreational purposes. Thus, the existence of a natural disaster threat or presence of an emergency situation in a touristic destination will lead tourists to consider other touristic destination alternatives to maximize their utility that they receive from tourism activity (Genc, 2018).

Climate change will have visible impacts on the travel and tourism sector as it can impact the natural environment that attracts tourists (Bhandari, 2014). Nature based tourism is highly dependent on natural resources which are affected by climate (Scott et al., 2007). Climate is one of the most important considerations for a range of activities tourists desire as change in temperature and humidity may cause discomfort to the tourists leading to change in their plans.

Climatic change in the form of heavy precipitation and temperature variations even will increase the frequencies of landslides and flood; other adverse effects from monsoons will, in turn, create serious consequences for tourism, as the disasters often block roads and trails

(Nyaupane & Chhetri, 2009). It has in a way positively promoted tourism by reducing barriers for trekking tourism in the winter season. However, it has even caused the loss of natural scenic beauty. Slightest changes in the characteristics of the climate in the Himalayas could reduce the tourism flow negatively by altering the perceived attractiveness of the Himalayas environment as clouds can block the views of mountains and reduce the aesthetics of various destinations and attractions.

Avalanches and glacial lake outburst floods predominate in high elevations in eastern Nepal; landslides, debris flows, and flash floods are common in the hills; and floods are frequent in lowland Terai. With limited opportunities for tourism infrastructure development in the Himalayas, such destruction can have a significant effect on the tourism industry (UNEP/ ICIMOD, 2002). Untimely and high intense rainfall and snowfall had caused serious threat to the mountaineers, trekkers and travellers in the mountainous region. Bad weather had stopped flights in Everest region for several days in November 2010 stranding more than 1000 tourists in Lukla region (altitude of 2500 m above sea level) due to thick fog generation and wind. This had caused havoc among tourists that time (Sangraula, 2010).

More than 32 people were killed by sudden snowstorm in Annapurna Conservation Area of western Nepal leaving hundreds of trekkers trapped at more than 5000 m altitude from sea level in Thorong La Pass area in October 2014 (Burke & Walker, 2014). Avalanche in the trekking route of the same conservation area in January 2020 had left 7 personnel: 4 Koreans and 3 Nepali missing. Happening of such incidents time and again will negatively affect the tourists who have keen interest in trekking.

In some touristic areas like Muktinath, Kagbeni, Puthang, Marpha, and Lete of Mustang district, it has been reported that hotel owners are affected due to water scarcity caused by decreased snowfall, melting of the snow and glaciers, and increased evaporation. Besides, drying of existing water sources is compelling the local communities to bring water from new sources which are far away and has added additional burden to hotel owners (Lama, 2010). Furthermore, it has also been reported that even the camping activity in the mountain region has been affected due to water scarcity. Gössling and Hall (2006) stated that tourists' consumption of fresh water supplies in areas where such resources are scarce further competes with the needs of other livelihood practices such as farming and household water usage, and thus increases the inter community conflict. Looking at the brighter side, locals of the same area had perceived a warm and dry winter which too has promoted tourism by reducing barriers for trekking tourism in the winter season but has increased the loss of natural scenic beauty of the place (Lama, 2010).

Based on meteorological data of Jomsom from 2002 to 2004 period, Dahal (2007), revealed a decrease in winter precipitation in the form of snow and an increase in rainfall after the winter. This has already affected traditional flat-roofed houses made of mud and stone as roof leakage and wall erosion problems in the homes, tea shops and hotels have experienced.

According to Bajracharya et al., 2020, there are 2070 glaciers lakes in Nepal, of which 21 are listed as potentially dangerous. The warming at higher altitudes has accentuated rapid glacier melt and reduced glacier mass and area, promoting occurrence of multiple hazards such as floods, avalanches and GLOFs. Glacier retreat contributes significantly to stream flow variability in the spring and summer, while flooding risk has increased as glacial lake outbursts have become more likely with rising temperatures. Rapidly melting glaciers means more seasonal variation in river flow resulting in more floods and droughts in the country. An

increase in temperature of 3-40C could result in the loss of 60-70% of snow cover from the Himalayas (Alam & Regmi, 2004). The precipitation is decreasing at the rate of 1.46 millimeters (mm) per year in the Higher Himalaya in Nepal from 1971 to 2014 (DHM, 2017). Lesser precipitation along with warming will reduce precipitation in the form of snow, thus, reducing the volume of snow affecting the beauty of the mountains (Bajracharya et al., 2020). As tourists are attracted to our mountains rather than the city infrastructure such as malls and buildings, losing the scenic beauty of our snow-capped mountains may adversely affect the flow of tourists.

Nepal is a home to 118 ecosystems along with endangered species, such as the snow leopard, one-horned rhinoceros, Royal Bengal tiger, Asian elephant, Red panda, and some 850 species of birds, the region offers abundant diversity in fauna and flora, which enhances the region's stature in nature-based tourism. Being rich in biodiversity, Nepal is attracting tourists from all over the world. Climate change will pose a threat to the ecosystem and biodiversity across the Himalayas. Although some species may proliferate, warming leads to extinction of most plant and animal species as 2.45% of species are on the verge of extinction annually (Alam & Regmi, 2004).

Forest fires caused by unusually high temperatures and prolonged drought in Nepal may threaten extinction of many endangered species such as Red pandas, leopards, monkeys, deer, bears, etc. (Lal et al., 2001). Nature-based tourism is closely associated with biodiversity and the charisma of a rich and varied environment. The decline in biodiversity in the ecosystem, thus, means a potential loss of tourism in the Himalayas (Nyaupane & Chhetri, 2009). Decrease in natural scenic beauty along with biodiversity loss will distract the visitors and compel them to look for alternative destinations (KC, 2017).

Tourists who visited Nepal solely for trekking were not bothered by rise in temperature but rather with irregular rainfall as it directly affects their trekking schedule. Most of the nature-based tourism activities in the Himalayas are weather-sensitive so rain and foggy conditions significantly decrease the quality of the trekking experience in the Himalaya. Tourists prefer to change their destination if weather continues to disappoint them (Rayamajhi, 2012). Even though rise in temperature has positively affected the tourism industry as it has made trekking much easier, but in a long run, climate change will have negative impact on tourism sector with scarce in water availability, onset of climate induced disasters as well as unfavorable weather changes (KC & Thapa Parajuli, 2014).

Conclusion

Unique natural features, including the highest peak in the world, biodiversity and natural landscapes, have made the Himalayas a major tourist destination. Climate has an immense role in attracting tourists. As tourism is basically for recreation purposes, they will always weigh on fine weather rather than the unfavorable one. Countries heavily dependent on tourism for their economy will be hit hard with the lesser number of footfalls of the tourist as climate sensitive tourism i.e. trekking and mountaineering will be severely affected by even the slightest change in climatic scenario. Climate change may have positive benefits for the present with more water availability downstream as well extended trekking season but in the long run, water scarcity in the downstream, less snow cover as well as losing the scenic beauty of our mountains will negatively impact our tourism sector. This will compel tourists to choose better alternatives as they value their money.

Very limited research has been conducted to study the impacts of climate change on the tourism industry and hence we need to address this issue as it is indeed a nexus between climate change and the tourism industry.

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