Rethinking CBT in response to climate change

https://www.routledgehandbooks.com/doi/10.4324/9780429274664-34
30
RETHINKING CBT IN RESPONSE TO CLIMATE CHANGE
Kamrul Hassan and Jannatul Ferdaus

30.1 Introduction

Climate change means major shifts in worldwide temperatures, precipitation, wind patterns, and other measures of climate that occur over several decades or longer periods of time. The Intergovernmental Panel on Climate Change (IPCC) defines it as, ‘Any change in climate over time, whether due to natural variability or as a result of human activity’ (IPCC, 2007, p. 871). Carbon dioxide is a major contributor to climate change. Burning fossil fuels, cutting down trees, and increasing livestock farming are some significant sources of carbon dioxide emissions. The world’s leading climate scientists have observed several long-term changes in global weather patterns since the mid-19th century (Jain, 2018). They have also recorded that the current global temperature is 0.8°C higher than it was in the 19th century (IPCC, 2007). Human activities that cause the earth’s average surface temperature to rise are commonly referred to as global warming (NASA, 2019). The rising concentration of greenhouse gases (GHGs) in the earth’s atmosphere is mainly responsible for global warming. The rise in global temperature is causing warming of oceans, melting of ice masses, and increasing evaporation. These effects range from more frequent and severe droughts to snowstorms and extreme winter weather, which have subsequent wide-ranging effects on ecosystems, economies, societies, and human health (WIRED, 2018).

Community-based tourism (CBT) is widely considered to be a tool for rural poverty alleviation (Stone and Stone, 2011). It revitalizes rural economies through the creation of employment and promotes cultural and environmental conservation (Sebele, 2010). Though CBT is often termed as ‘pro-poor tourism’, sometimes the costs incurred by rural communities outweigh the benefits because of lack of financial viability (Goodwin, 2008). Local communities cannot precisely participate in tourism planning and development owing to different critical needs such as lack of clean water, food, and shelter (Stone and Stone, 2011). As a result, a number of challenges make it difficult for the communities to run CBT successfully. However, beyond the other challenges of CBT, climate change is a new and emerging threat. It has an adverse effect on CBT. Tourism is a highly climate-sensitive industry, as it has a number of direct and indirect influences on tourist decision making. Fiifi and Hutton (2014) have noted that the socio-economic condition of rural communities appears to be a driver of vulnerability from a climate change perspective. Rural communities struggle with
poverty prior to participation in CBT, thus climate change creates additional obstacles for them. As a consequence of this, they become unable to manage and operate CBT effectively. For instance, they often do not have fresh water for themselves due to salinity ingress and in such a situation providing a tourist with fresh water is an extra burden for them.

Climate is a significant resource for tourism and recreation; again, tourism is considered to be an extremely climate-sensitive economic function (Becken and Hay, 2007). Three pillars of sustainability (economic, social, and environmental aspects) have been influenced by tourism flows within different regions throughout the world and changing climate has the strong potential to affect this flow (Pandey and Jha, 2012). An essential requirement of sustainable tourism development is the management of climate-induced negative impacts but the poor economic condition of rural communities make it difficult for them to address these impacts in an effective way. While there has been extensive research regarding the impacts that climate change has on tourists’ flow and destinations (Amelung et al., 2007; Gössling et al., 2012; Scott et al., 2012a) only a few have examined how such impacts vary between different communities (Davidson et al., 2003; Dolan and Walker, 2004). Furthermore, previous work has investigated community vulnerabilities to climate change but none have examined the impacts that climate change has on the capacity of rural communities for participating in CBT. Climate change poses major risks to CBT. Consequently, it is anticipated that the integrated effects of climate-induced environmental change and climate-related societal change would cause vulnerable impacts on tourism-dependent communities, which are already becoming evident in destinations globally.

To date, most climate change research has focussed on either the impact on tourism system (Amelung et al., 2007; Scott et al., 2007) or a specific community (Ofoegbu et al., 2017), rather than trying to incorporate both aspects of tourism. Conceptualizing climate change in terms of the wider aspects of CBT has considerable importance, with respect to assessing the complete impacts of climate change. Recent research indicates that the assessment of the relationship between tourism and climate change must be considered over the totality of the tourism system, particularly concerning impacts on rural communities participating in tourism, rather than just specific elements of tourism (Becken and Hay, 2007). Identifying large knowledge gaps on climate change risks to the tourism sector in virtually all tourism-dependent communities is a major interest of this study. Therefore, the aim of this chapter is to outline how climate change is threatening CBT in developing countries. In doing so, it traces some impacts of and challenges to climate change that rural communities face while operating CBT in different destinations. Moreover, this chapter seeks to enhance the understanding of climate change issues associated with tourism from adaptation, mitigation, and resilience perspectives in relation to achieving sustainability.

30.2 Impacts of climate change on CBT

Climate change is a dominant issue for the expansion of CBT in rural environments. It reduces the attractiveness and appeal of a destination through changing coastal aesthetics and mountain landscapes and destroying biodiversity and infrastructures, which in turn affects the CBT of the destination (Hall and Higham, 2005; Kaján and Saarinen, 2013). Major climate change impacts, such as temperature variability, sea-level rise, coastal flooding, intense cyclones, salinity intrusion, erratic rainfall, glacier retreat, droughts, and forest fires, increase the difficulty of the ongoing operation of CBT by affecting rural communities of a destination. As a result, loss of land, properties, and infrastructures further deteriorates people’s socio-economic conditions (Zhang et al., 2018). However, these impacts vary within
different regions, depending on geographic location (Stern, 2007). For instance, coastal areas are mostly affected by sea-level rise, cyclones, salinity, etc. On the other hand, mountain areas are mostly affected by extreme temperatures, erratic rainfall, etc. The ultimate impact of this climate change exposure is a reduction in the number of visitors to the area, which decreases the economic viability of tourism-dependent communities. To respond to these climate change impacts, it is important to develop appropriate strategies that can integrate socio-economic benefits to communities (Rowell and Richins, 2012). Hence, the preliminary objectives of CBT, e.g., providing socio-economic benefits to communities, are obstructed by climate change.

### 30.2.1 Temperature variability

The earth has already warmed by 0.88°C since the late 19th century (IPCC, 2007) and is projected to further heat by 1.4°C-5.8°C over the coming decades (Amelung et al., 2007). The impact of climate change on CBT is becoming increasingly severe at higher temperatures, particularly because of rising risks of triggering abrupt and large-scale change in tourism demand due to long-term shifts in travel preferences is going to prevailing. The variability in seasonal patterns created by temperature change (Amelung et al., 2007) is profound implications for local rural communities and has varied socio-economic impacts on them (Scott et al., 2016). The biophysical impacts of SLR on coastal areas are many but most profound for CBT in coastal destinations. Coastal tourism provides many economic benefits to local communities and has varied socio-economic impacts on them (Scott et al., 2016). The biophysical impacts of SLR on coastal areas are many, but most the pronounced for CBT include the inundation of land, loss of properties, loss of high-value infrastructure, etc. These impacts have significant threats to tourism in coastal destinations. The IPCC (2007) has reported that small island states are likely to experience massive impacts of SLR, while coastal destinations in the tropics or sub-tropics are more vulnerable. The 11% of the countries population lives in areas threatened by 1 m SLR (Hug et al., 1995). Moreover, during the 1990s, with significant simulations, global sea levels rose by 1.7 to 1.8 mm/year (IPCC, 2007).

Many CBT destinations in coastal areas could face restrictions on visitor numbers and some destinations may totally be lost as a consequence of SLR. For instance, in the Caribbean island of Martinique, it was projected that around 85% of the beach area and 62% of the higheradius recreation activities such as trekking, hiking, and mountaineering (Benton, 2003).

Temperature variability not only deters tourism demand in communities but also makes them vulnerable in areas of their basic needs.
coastal infrastructure is at risk to SLR-induced erosion (Scott et al., 2012a). Rural communities engaged in CBT depend not only on tourism for livelihood but also derive earnings from a variety of activities such as agriculture, fishing, and handicraft and livestock production. SLR is expected to affect these activities too. However, rising sea levels drive millions of people to migrate and create climate refugees by displacing rural tourism-dependent communities residing near coasts (Jenkins, 2018). Stern (2007) has reported that more than a fifth of Bangladesh could be under water with a 1m rise in sea levels, a real possibility by the end of the 21st century. The potential effect of SLR on coastal resources and infrastructure has salient implications for destination competitiveness and the sustainability of CBT in many coastal destinations.

30.2.3 Coastal flooding and intense cyclones

Increased sea surface temperatures lead to intense cyclones that create numerous risks to coastal populations (Kelman and West, 2009). Coastal flooding in the context of future storm variability and shoreline changes is a significant issue facing coastal tourism-dependent communities today. Owing to these effects, coastal communities in developing countries are possibly the populations most susceptible to the adverse effects of increased intense cyclones and flooding (Woodruff et al., 2013). The acute precipitation that usually accompanies the cyclone adds to damage, through inland and riverine flooding, which in turn can cause physical damage to tourism infrastructures, natural resources, and livelihoods (Stern, 2007). Moreover, these extreme events disrupt the whole operation of CBT by impairing supplies of amenities for tourists. Beniston (2003) noted that populations of southern and tropical Asia are highly sensitive to intense cyclones and fluctuations in the trajectories and intensities of these systems. The increase in the frequency of extreme cyclones is further projected to continue, bringing more extreme wind events (Becken and Hay, 2007). It is also projected that by the end of this century there will probably be a higher occurrence of more intense tropical cyclones globally (Woodruff et al., 2013). As a result, many CBT resources, including beach, land, properties, and biodiversity are becoming prone to extreme flooding and intense cyclones.

30.2.4 Salinity intrusion

For CBT, salinity intrusion is arguably the most certain and potentially devastating climate change impact. It primarily affects rural communities and their ability to spontaneously participate in CBT. Climate change impacts such as SLR, intense cyclones, and flooding bring saline water from the sea and mix it with ground water (Cong et al., 2016). As a consequence, different sources of fresh water, namely rivers, ponds, and tube-wells, cannot provide fresh water anymore (Mustari, 2014). Consequently, rural communities suffer from various kinds of health problems (e.g., high blood pressure, diarrhoea, cholera, etc.) because of food that contains more saline than required. Several climatic factors including temperature, wind speed, and rainfall in coastal zones are considered favourable for a wide range of food production. Therefore, the majority of people involved in CBT living in coastal areas highly depend on the agricultural production of crops, fish, and livestock for their livelihood. Salinity decreases crop production and a decrease in food supply brings poverty for rural communities (Ofoegbu et al., 2017). Increased salinity is also responsible for the loss of livelihood, biodiversity, fisheries, resources, and many more resources, which are critical attractions of CBT (Sebele, 2010; Scott et al., 2012b). Mustari (2014, p. 16) projects that ‘in
Western Australia, at least 1,500 plant species will suffer from dry land salinity, with 450 of these possibly subject to extinction and fauna species are likely to be reduced by 30%.

30.2.5 Erratic rainfall

A more pressing concern of climate change is altered rainfall patterns. A large amount of water may be gained or lost by many people due to water cycle intensification. Differences in water availability between CBT destinations are becoming increasingly pronounced and the frequency of high-intensity rainfall is leading to more flash floods and landslides (Kaján and Saarinen, 2013; Nyaupane and Chhetri, 2009). High-latitude areas are prone to getting more water than dry subtropics and tropical areas are prone to face effective changes (Stern, 2007). It is also noted that at present about 1.1 billion people don’t get enough fresh water for themselves and around one-third of the world’s population is facing moderate to high water stress in different countries. Changes in rainfall patterns imply alterations to the structure and functionality of forest ecosystems. This effect has several implications for rural tourism-dependent communities, who primarily rely on forest resources for livelihood (Ofoegbu et al., 2017). Erratic rainfall is also perceived to be a potential trigger of increased food insecurity and impoverishment in most communities that rely on rain-fed agriculture (Ofoegbu et al., 2017). The intense rainfall damages roads and tourist trails, causes landslides, and makes it difficult for tourists to enjoy various outdoor activities such as trekking, bird-watching, sightseeing, etc. For instance, Nepal’s tourist population is the lowest during the height of the monsoon season in June and July, as roads and trails in the mountains wash away with landslides and erosion (Nyaupane and Chhetri, 2009).

30.2.6 Glacier retreat

Glacier retreat is regarded as one of the most pronounced climate change impacts among tourism communities living in mountain regions. The IPCC forecasts that in recent decades there has been a worldwide decrease in the extent of snow cover and depth in spring due to glacier in many mountain areas (Scott et al., 2007). Shrinking glaciers lead to changes in the hydrological response of certain regions; as glaciers melt rapidly, they provide enhanced runoff, but as the ice mass diminishes, the runoff will wane (Beniston, 2003). Many glaciers in temperate mountain regions are likely to disappear completely in the next decade, given current trends (Stern, 2007). Researchers from the United Nations Environment Program (UNEP) and the International Centre for Integrated Mountain Development (ICIMOD) identified 3,252 glaciers, of which 44 are melting rapidly and are expected to burst in as little as five years (Nyaupane and Chhetri, 2009). Hence, this poses a potential threat to the communities living along the streams and in downstream cities, the ecosystem, and the tourism industry (Nyaupane and Chhetri, 2009). Moreover, glaciers are considered an important attraction for mountain parks in many countries. As a result, the number of tourists will decrease within mountain communities (Debarbieux et al., 2014). Scott et al. (2012a) projected that about 20–43% of tourists would not visit Lijiang, China in the absence of the glacier.

30.2.7 Drought and forest fires

Drought is considered a recurring environmental challenge in many CBT destinations. It decreases water levels of land and leads to forest fire. These impacts of drought on forest ecosystems have serious implications for CBT in forest areas. According to Beniston
Rethinking CBT

With climatic change as projected by the IPCC, prolonged periods of summer drought would transform areas already sensitive to fire into regions of sustained fire hazard. Therefore, increased frequency and intensity of forest fires would have severe consequences for rural communities (Ofoegbu et al., 2017). Drought conditions in Yellowstone National Park, USA, during the summer of 1988 created dangerous wildfires and the park closures, which resulted in declined visitor numbers by 15% and a total loss of US$60 million (Nyaupane and Chhetri, 2009). Drought can seriously destabilize CBT since it could threaten the cultures of rural communities and forest ecosystems, which are core tourist attractions of CBT. The exacerbated loss of biodiversity due to drought is also a threat, as several ecosystems, particularly marine ones, are changing rapidly and some of the species that inhabit them may be unable to adapt (Awuor et al., 2008). In the case of present climatic conditions, southern Europe may face serious droughts every 10 years instead of every 100 years with a 3°C rise in temperature (Stern, 2007).

30.3 Approach to the study

This study has reviewed research documents including journal articles, book chapters, conference proceedings, and online resources to explore the research objective on how climate change is threatening CBT in developing countries. As climate change literature is expanding rapidly, these kinds of reviews can be seen as an effective method of observing what is done and what possible gaps still exist in research (Kaján and Saarinen, 2013). A combination of terms, including ‘tourism’, ‘climate change’, ‘rural community’, and ‘sustainability’, was used to search through an electronic library under the ‘social science’ and ‘humanities’ category. This is the same approach utilized by many authors including Ford et al. (2011) and Kaján and Sarianne (2013). However, articles that used terms such as rural community and tourism were included, instead of only selecting articles about CBT. Additionally, ‘mitigation’, ‘resilience’, and ‘adaptation’ were used in another search for wider coverage of ‘responses to climate change’ related articles. As the aim of the chapter is to focus on empirical studies or papers that deal with conceptual models and frameworks published in journals, conference papers, and reviews, studies that had very little to do with CBT in practice were excluded. Table 30.1 depicts some of major research contents that have been reviewed for serving the purpose of the study.

30.4 Challenges to manage CBT for climate change

The effects of climate change have the potential to significantly devastate both the built and natural assets of tourism-dependent communities (Kaján and Saarinen, 2013; Pandey and Jha, 2012). Communities are vulnerable particularly in areas of food, health, and livelihood strategies. Rural communities participating in CBT face a wide range of challenges while operating it. Table 30.2 indicates a range of climatic hazards for CBT and challenges to communities in coastal, forest, and mountain destinations. Climate change impacts are not alone responsible for these challenges; the poor economic conditions of the rural communities in developing countries have equally contributed to this (Ofoegbu et al., 2017). Geographical exposure is an important factor in determining the challenges of managing CBT under climate change. In other words, the surface of the world is not a flat plane or the same in all regions, some are low-lying and some are high. So too will the obstacles created by those impacts vary with their geographic characteristics (Stern, 2007). For example, difficulties faced by coastal communities are quite different from communities living near mountain or forest areas. In recognition of the
considerable challenges to CBT from climate change, the socio–economic condition of poor tourism–dependent communities is further deteriorated (Kaján and Saarinen, 2013). These consequences represent a serious threat to the sustainability of CBT.

As Scott et al., (2012b, p. 884) have noted, ‘Coastal environments are among the most physically dynamic on earth’. Coasts are influenced by short–term extreme storm events that alter tourism infrastructure, properties, and the livelihood of communities living near shore areas in a matter of hours, as well as long–term, gradual processes, such as SLR, intense cyclones, and flooding (Dolan and Walker, 2004; Scott et al., 2012b). Besides, rural communities have no or little skill and resources to protect tourists during the occurrences of cyclones and flooding. On one hand, these impacts decrease coastal aesthetics, which reduces visitor numbers; on the other hand, these effects put greater pressure on coastal communities to restructure or rebuild their houses, properties, and infrastructure to continue their participation in CBT. Moreover, salinity intrusion is another challenge for coastal communities, as it deters their ability to serve tourists properly. Salinity intrusion degrades soil quality, which in turn reduces crop production as well as degrades water quality (Ofoegbu et al., 2017).

### Table 30.1 Major research reviewed

<table>
<thead>
<tr>
<th>Authors</th>
<th>Method Used</th>
<th>Research Area</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amelung et al. (2007)</td>
<td>Tourism Climatic Index</td>
<td>Implications of climate change for global tourism and seasonality</td>
<td>Global</td>
</tr>
<tr>
<td>Cong et al. (2016)</td>
<td>Interviewing (Empirical Research)</td>
<td>Climate change adaptation strategies for coastal communities</td>
<td>Vietnam</td>
</tr>
<tr>
<td>Gössling et al. (2012)</td>
<td>Interviewing (Empirical Research)</td>
<td>Influence of climate change on tourism demand</td>
<td>Global</td>
</tr>
<tr>
<td>Kelman and West (2009)</td>
<td>Document Analysis (Theoretical Research)</td>
<td>Vulnerability of climate change for tourism in SIDs and response measures</td>
<td>Pacific and Caribbean SIDs</td>
</tr>
<tr>
<td>Nyaupane and Chhetri (2009)</td>
<td>Document Analysis (Theoretical Research)</td>
<td>Climate change impact and vulnerability on tourism</td>
<td>Nepal</td>
</tr>
<tr>
<td>Ofoegbu et al. (2017)</td>
<td>Case Study (Theoretical Research)</td>
<td>Impact of climate change on rural communities, adaptive capacity and coping practice</td>
<td>Africa</td>
</tr>
<tr>
<td>Pandey and Jha (2012)</td>
<td>Interview (Theoretical Research)</td>
<td>Resilience of rural poor community, traditional knowledge of adaptation to climate change</td>
<td>India</td>
</tr>
<tr>
<td>Scott et al. (2007)</td>
<td>Visitor Survey (Theoretical Research)</td>
<td>Influence of climate change and induced environmental change on visitation</td>
<td>Canada</td>
</tr>
<tr>
<td>Scott et al. (2012b)</td>
<td>Geo reference database</td>
<td>Destination communities adaptive capacity to climate change</td>
<td>Caribbean coastal area</td>
</tr>
</tbody>
</table>

Source: Compiled by Authors on the basis of Review of Literature.
### Table 30.2 Climatic hazards for CBT and challenges to community

<table>
<thead>
<tr>
<th>CBT Destinations</th>
<th>Climate Change Impacts</th>
<th>Climatic Hazards for CBT</th>
<th>Challenges to Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBT in Coastal Destination</td>
<td>Sea level rise</td>
<td>- Beach erosion and damage of tourism infrastructure</td>
<td>- Constructing houses above mean sea level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Inundation of land and properties of communities</td>
<td>- Establishing strong tourism infrastructures</td>
</tr>
<tr>
<td></td>
<td>Salinity intrusion</td>
<td>- Saline water mix with ground water and soil that affect coastal vegetation</td>
<td>- Building sea wall and embankments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Health problem for tourists and communities</td>
<td>- Supplying safe food and pure drinking water to tourists</td>
</tr>
<tr>
<td></td>
<td>Intense cyclone and flooding</td>
<td>- Destruction of CBT resources and changes in coastal aesthetics</td>
<td>- Ensuring proper safety and security for tourists</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Life threat to coastal communities and tourists</td>
<td>- Setting up climate resistant accommodation and infrastructures</td>
</tr>
<tr>
<td>CBT in Forest Destination</td>
<td>Drought and forest fire</td>
<td>- Reduction in major community tourism attractions</td>
<td>- Enhancing forest quality as tourism attractions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Extinction of forest biodiversity</td>
<td>- Protecting habitats from being lost and maintaining biodiversity</td>
</tr>
<tr>
<td></td>
<td>Erratic rainfall</td>
<td>- Differences in water availability between different CBT destinations</td>
<td>- Introducing multi-year water supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Mobilization problem for tourists</td>
<td>- Arranging proper transportation for tourists</td>
</tr>
<tr>
<td></td>
<td>Temperature variability</td>
<td>- Higher temperature causes heat stress and other health problem for tourists and communities</td>
<td>- Protecting tourists from vector borne diseases</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Extreme temperature creates food security for community</td>
<td>- Providing tourists with traditional food</td>
</tr>
<tr>
<td>CBT in Mountain Destination</td>
<td>Glacier retreat</td>
<td>- Short term flooding near streams</td>
<td>- Building climate resistant accommodation and infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wash away houses and properties of communities residing near streams</td>
<td>- Maintaining seasonal tourism demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Shrinkage of glaciers (CBT attraction)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Erratic rainfall</td>
<td>- Cause landslides</td>
<td>- Ensuring proper safety and security for tourists</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Changes in mountain landscapes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Temperature variability</td>
<td>- Lowering of mountaineering, hiking, trekking</td>
<td>- Maintaining appeal for outdoor recreation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Depletion of water availability due to decrease in the water table</td>
<td>- Planning for long term water supply</td>
</tr>
</tbody>
</table>

**Source:** Proposed by authors
Rural communities living in coastal areas can hardly have safe food and fresh drinking water due to salinity. It thus becomes a new challenge for poor communities engaged in CBT to ideally fulfil the basic necessities of tourists. As a result, these consequences of climate change impacts demotivate rural communities from participating in CBT.

The impact of climate change on forest destinations has a serious effect on CBT. Forests have a significant role in tourism. They provide ecosystem services that are critical for communities living in forest and tourism (Davidson et al., 2003). There is growing evidence that climate-related risks are increasing among communities living in forest areas, as they have a strong tie with forest ecosystem (Davidson et al., 2003; Ofoegbu et al., 2017). Changes in temperature and rainfall patterns alter the structure and functionality of forest ecosystems, which has several implications for CBT. Rural communities living in forest areas mainly depend on the forest for food and other resources (Ofoegbu et al., 2017). Due to increased temperatures, forest fires, and other climate change impacts, these rural communities become unable to deliver those significant resources (e.g., biodiversity, wildlife, etc.) to tourists (Scott et al., 2012a). In addition to this, community people can’t ensure proper safety and security for tourists during such an extreme event, owing to their limited resources, knowledge, and skill about dealing with climate risks, shocks, and stresses. All these impacts degrade the image of forest tourism destinations and reduce tourism demand for the forest area (Gössling et al., 2012). As a consequence, rural communities are deprived of getting economic benefits from tourism activities.

The ecosystem of mountain areas consists of a fragile natural environment that makes it one of the most sensitive ecosystems to climate change. As a result, the impacts of climate change in mountain areas are more severe than other regional habitats. Mountainous communities consist of about 10% of the global population (Pandey and Jha, 2012). Climate impacts are an important threat to mountain ecosystem services and the populations depending on them, and have considerable effects on water resources. CBT in mountain areas is likely to have both direct and indirect impacts from climate change. Direct impacts refer to changes in the climatic conditions necessary for specific activities such as extreme temperatures, heavy rainfall, etc. In contrast, wider-scale socio-economic changes and variation in mountain landscapes are responsible for indirect impacts of climate change on mountain destinations (Beniston, 2003). In other words, from ancient times to recent decades, mountains have remained important attractions among tourists for their biodiversity, glaciers, and various activities such as trekking, hiking, and mountaineering (Scott et al., 2007). Climate change-induced impacts decrease the appeal of these outdoor recreation activities (Nyaupane and Chhetri, 2009). Hence, it appears to be a great challenge for those tourism-dependent communities to enhance the image of mountain destinations and maintain their appeal for such activities.

### 30.5 Addressing climate change in CBT

Tourism is a major contributor to global climate change. On one hand, climate change has an adverse impact on tourism; on the other hand, tourism is responsible for emitting about 5% of global GHGs (Debarbieux et al., 2014). According to Becken and Hay (2007), the contribution of tourism to global energy use and GHGs emission is growing rapidly and will continue to do so. The need to address these challenges in an effective way has become a preliminary concern for the development of CBT. Climate change impacts on rural community, thus, need to be understood at all decision-making levels so that the implementation of suitable mechanisms, namely mitigation, resilience building, and adaptation to minimize
Rethinking CBT

the negative effects of climate change, is sustainable (Kaján and Saarinen, 2013). Moreover, CBT must pursue adaptation strategies in response to the ongoing and inevitable effects of climate change. At the same time, it should participate in mitigation and resilience-building efforts to avoid increasing the impacts of climate change. Figure 30.1 represents mitigation, resilience, and adaptation as some significant measures for responding to different climate change impacts that contribute to the sustainability of coastal, forest, and mountain destinations. Responding to climate change at the rural community level in developing countries is a major development challenge (Ofoegbu et al., 2017). Therefore, support from all areas, including government and non-governmental tourism stakeholders, is required to address climate change (Kelman and West, 2009; Mustari, 2014).

30.5.1 Mitigation

Climate change mitigation and sustainability go hand in hand and provide a new perspective on community development. It involves reducing the human impact on global climate (Becken and Hay, 2007). Policy supporting mitigation strategies is necessary to respond to both climate change and sustainable development. A number of strategies can be applied by rural communities to improve the energy efficiency of CBT and reduce its carbon footprint, such as using renewable energy sources (e.g., solar-run lights and fans), reducing the use of plastic materials, planting trees, and using low-carbon public transportation modes. Education programmes can also be arranged for rural communities, with the intention of raising awareness and influencing personal behaviours that contribute to climate change mitigation (Awuor et al., 2008). However, in recent years, the demand for green travel has increased and consumers are choosing destinations that demonstrate a clear commitment to the environment (Bushell and Simmons, 2012). CBT is a significant platform for cultural exchange between communities and tourists, so it can also be a useful tool to communicate green actions to mitigate climate change. Communities can also attract a new type of tourists (e.g., green tourists) through their green actions, thus increasing their economic benefit (Stone and Stone, 2011; Bushell and Simmons, 2012).

30.5.2 Resilience

Resilience is the ability of a social system to prepare for, avoid, moderate, and restore itself from climate-related risks and hazards (Dolan and Walker, 2004). For CBT, resilience building is a significant response towards climate change impacts, as it considers the risk associated with a destination and the residing communities and puts in place plans and resources to prepare for predicted future changes. Several approaches can be used to enhance the resilience of tourism-dependent communities. Improvements in communication systems, arranging training and education programmes for risk awareness and preparedness, the development and implementation of disaster plans, and the recognition of sound management process are all essential and likely to be important in the capacity building of any climate change resilience-building attempts (Cutter et al., 2008). The use of adaptation and mitigation techniques and planning can also increase community resilience to climatic hazards (Cong et al., 2016). For instance, climate change mitigation involves preventing changes by maintaining resources above a normative safe level, whereas resilience adapts to climate change by maintaining capacity to return to the desired state following both anticipated and unanticipated disruptions (Lew, 2014). In the same way, the practice of resilience building has emerged from complex adaptive procedures and
disaster planning. Resilience is considered an important approach to increase community competence.

### 30.5.3 Adaptation

Adaptation in CBT means the response to changes in the environment and the ability of tourism-dependent communities to absorb changes to the tourism system. Becken and Hay (2007, p. 225) define adaptation as ‘those actions or activities that people undertake, individually or collectively, to accommodate, cope with, or benefit from, the effects of climate change, including changes in climate variability and extremes’. Integrated policy formulation and implementation of adaptation process is a necessary strategy for responding to climate change and supporting development in CBT destinations. Educating rural communities through activity-based groups can enhance the understanding of climate-related risks. Besides raising awareness and taking proactive measures against climatic vulnerability (e.g., constructing robust accommodation, building heavy infrastructure, introducing rainwater collectors, and building structures above the mean sea level) can enhance the adaptive capacity of rural tourism-dependent communities.
Rethinking CBT

(Dolan and Walker, 2004; Kaján and Saarinen, 2013). The indigenous knowledge and experiences of rural communities are valuable for disaster reduction and adaptation plans (Kaján and Saarinen, 2013). Moreover, community people need to consider environmental (appropriate from an environmental perspective), economic (cost-effective from an economic perspective), and social (acceptable from social and cultural perspectives) aspects in order to minimize climate-associated risks and to capitalize on new opportunities (Lioubimtseva and Henebry, 2009).

Rural communities have the least adaptive capacity as they frequently suffer from poverty, unemployment, population pressure, poor healthcare-service facilities, limited education, inadequate skill to manage climate change impacts, and many more challenges (Schipper and Lisa, 2007). Apart from these, they have a number of constraints to adaptation such as lack of government incentives, financial support, and technical knowledge, and inadequate social programmes (Scott et al., 2012a). Though adaptation is a significant measure for tourism-dependent communities to address climate change, it is not possible for them to implement such strategies by themselves alone (Scott et al., 2012a; Mustari, 2014). So, indigenous knowledge of rural communities regarding adoption of suitable measures for climate change-related risk can be used in synergy with government interventions to reduce the adverse impacts of climate change on CBT. Development of early warning systems, improving public health management conditions, increasing the capacity for disaster management, establishing new dams or water reservoirs, building sea walls, and integrating coastal zone management policies are identified as critical adaptation measures for the tourism system that they can implement with support from the national government and with regional cooperation. Thus, assistance from every level of governance (such as community-level to national and international organizations) can be a useful measure of sustainable adaptation to climate change (Kelman and West, 2009).

30.6 Discussion

This study demonstrates how climate change affects rural communities engaged in CBT and to what extent they are capable of addressing such challenges. Previous research suggests that, depending on the region, climate change introduces shifts in patterns of visitation and alters tourist demands, which causes social, economic, and environmental changes in rural communities (Amelung et al., 2007; Kaján and Saarinen, 2013). Moreover, community-level focus provides a chance to discover the climatic conditions and responses (e.g., mitigation, adaptation, and/or resilience policies) that are relevant and effective for participants of CBT. It also plays an important part in climate change research and helps communicate the state of welfare in communities (Kaján and Saarinen, 2013). A number of barriers and facilitators of climate response tools were identified, including a lack of government support, scarce resources, inadequate knowledge about climate change impacts, and social programmes, which are consistent with past research. However, for many, there were several additional factors that also influence the successful uptake of climate change response tools for CBT, including local coping strategies and the traditional knowledge of rural community. These factors stimulate community participation, which is an important criterion for sustainable tourism development.

Community participation in tourism is sometimes inhibited by climate change impacts. Amelung et al. (2007) have presented a conceptual framework of annual tourism climatic Index (TCI) distribution that can be used to characterize current and projected future climate conditions. They have further revealed consistent geographic and seasonal patterns with ideal conditions for tourism activities. In a contrasting recent exception to this, Scott et al. have criticized this approach by showing the significance of a more accurate assessment of future
distribution of climate resources for tourism (2012a, p. 216). They have also suggested that a better understanding of the role of climate in tourism decision-making and varied preferences of the tourism market and cultural group can help in such assessments. Varied elements of the tourism sector have been analyzed in different studies (Beniston, 2003; Cong et al., 2016; Gössling et al., 2012) but there is an urgent need for climate change studies to be conducted solely on different approaches and types of tourism. Therefore, this study has utilized climate change as an influential factor for developing and managing CBT. Numerous climatic hazards are created by various climate change impacts on CBT that create challenges for rural communities in different destinations (see Table 30.2). An important factor of climate change risk assessment will be further research that may serve to reduce the extent of climatic hazards.

Rural communities can play a major role in addressing climate change impacts. Dolan and Walker (2004) have raised the need for community-based approaches to adapting climate change-related risks through an integrated vulnerability framework, whereas in a recent study Ofoegbu et al. (2017) have highlighted the importance of risk concerns for community response to climate change. Climate change devastates the economy, society, and environment of a CBT destination. In response to this, community people can adopt some significant measures, which in turn stimulate sustainability of CBT in different tourism destinations (see Figure 30.1). Similarly, Gössling et al. (2012) have determined climate change as an influential tool for tourism demand patterns that can be shaped by its impacts on destination, society, and the economy. They have also provided a conceptual framework for the analysis of tourist responses to climate change. Likewise, Scott et al. (2012a) have indicated some primary factors (e.g., climate, the natural environment, personal security, travel costs, etc.) that influence travel decisions that are impacted by climate change. In addition, they have illustrated the multifaceted interface between climate change and the tourism system, which includes tourists, the source market, tourism operators, and destinations. Thus, the traditional knowledge of community people in a CBT destination can act as a precious resource for coping with climate change.

CBT in many destinations is going to experience disruptive changes due to anticipated consequences of climate change, including rising sea levels, temperature variability, salinity intrusion, and glacier retreat. There is an immediate need to evaluate the risk to CBT associated with climate change. This study has outlined some impacts of climate change on CBT and major challenges that obstruct proper development and management of CBT in different destinations, and has suggested some measures for addressing such obstacles in rural environments from a developing country’s perspective. Different authors have provided their significant contribution to the research area of tourism and climate change (Becken and Hay, 2007; Dolan and Walker, 2004; Hall and Higham, 2005; Kelman and West, 2009; Scott et al., 2012a). Some have tried to assess destinations’ vulnerability to climate change in terms of geographic location (Awuor et al., 2008; Beniston, 2003; Davidson et al., 2003; Dolan and Walker, 2004). In contrast, some have used different indices to predict vulnerability (Amelung et al., 2007; Pandey and Jha, 2012; Zhang et al., 2018). Community participation in tourism management under climate change is recognized as a significant concern but a lack of community engagement in tourism and climate change studies has become a prime characteristic of the research in this field. Side by side, there is a growing need to better understand the socio-cultural impacts and opportunities of climate change on CBT (Kaján and Saarinen, 2013).

30.7 Conclusion

The chapter has considered real and imminent impacts of climate change on CBT. CBT is a well-known approach for maximizing socio-economic benefits for rural communities and
stimulating the conservation of natural resources. Although for many destinations climate and natural resources are the main tourist attractions and form an important base for rural economies, changes in the global climatic pattern are likely to have differential impacts among destinations and communities. In some cases, the changes will bring benefits for rural communities, whereas in other cases, they will cause major economic, social, and environmental disruptions. It is beyond the scope of this chapter to discuss the full range of potential climate change impacts on CBT in developing countries. However, the notable adverse impact of has been provided as a core discussion of this chapter. The climatic hazards for CBT and arising challenges for communities vary within different countries, regions, and communities due to their geographic location. Poverty, population pressure, unemployment, poor healthcare-service facilities, limited education, and inadequate skill to manage climate-related risks have been identified as influential barriers for rural communities responding to climate change in developing countries.

In particular, the chapter has highlighted how climate change worsens the socio-economic condition of rural communities engaged in CBT and affects their ability to participate in CBT spontaneously. Climate change also hinders the prime goal of CBT, that of promoting sustainable development of all elements in the tourism system. As noted earlier, there has been inconsiderable research on assessing the impacts of climate change on the different elements of the tourism system or on a specific community. To bridge the massive information gap in previous research, this chapter has attempted to incorporate both aspects of the tourism system and tourism-dependent communities, thus addressing the impacts of climate change on CBT and assessing how several climatic hazards create challenges for communities on the way to managing CBT in different destinations. Developing and implementing effective responsive strategies for climate change, information, and understanding are required to provide a knowledge base. This chapter can be an impetus for the future strategy of CBT in order to achieve sustainable development to which much of government and business decision-making is oriented. This chapter can help policymakers and industry leaders, too, in formulating policies and programmes to improve destination-specific coping measures and in implementing diversified strategies.

This chapter has recognized some possible approaches such as mitigation, resilience, and adaptation as a path to sustainability in responding to climate change. Yet, the utilization of such approaches in CBT is not an easy task, as it requires integrated policy formulation and implementation. Thus, the role of community engagement in climate change studies can be a vital element for future research. Additionally, there is a need to assess the adaptive capacity of different tourism-dependent communities. Future researchers may also want to look at the perception of rural communities about climate change vulnerability, the role of communities in minimizing climate change impacts from CBT, and the significance and strategies of stakeholder engagement in addressing climate change. However, with existing socio-economic vulnerability and poverty of rural tourism-dependent communities, CBT stakeholders have a significant task to manage existing and upcoming challenges of climate change. Hence, extensive research and collaborative capacity-building efforts by local, national, regional, and global organizations are necessary to develop and manage CBT in a sustainable manner.

References
Kamrul Hassan and Jannatul Ferdaus


IPCC. (2007). Climate change 2007: The physical science basis: Contribution of working group I to the fourth assessment report of the intergovernmental panel on climate change. Cambridge; New York: Cambridge University Press.


