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Original Research Article

Assessing the Possible Impacts of Climate Change on the Tourism Potentials of Ebomi Lake, Ondo State, Nigeria

Abstract

Climate change as one of the greatest threats to environmental sustainability, can impact on any sector of the economy including tourism. Thus, this study examined the possible impacts of climate change on the tourism potential of Ebomi Lake, Ondo State, Nigeria. Available literature showed that biodiversity and water resources which are the greatest assets of tourism in Nigeria are being negatively impacted by climate change. With respect to the study area, field observation showed that human activities such as farming, timber logging and bush burning which are all drivers of climate change are predominantly high. In addition, information from oral interview conducted also showed that the lake may have shrunk while the environment appeared less forested compared to the situation some 50 years ago. Thus, it was concluded that Ebomi Lake might be suffering from the negative impacts of climate change such as changing micro-climate, biodiversity loss, degradation of landscape and drying-up of lake amongst others. Therefore, our recommendations included (1) acquisition of additional portion of lands around the lake by the government to ward-off intruders and prevent illegal human activities, (2) implementation of policies and laws that prohibit human activities which are inimical to ecosystem conservation, while (3) perpetrators of illegal activities should be apprehended and punished to serve as deterrent and thus protect the environment against biodiversity loss.

Keywords: Ebomi Lake, Tourism Potential, Climate Change, Bush Burning, Biodiversity Loss

Introduction

Climate change has become the greatest threat to the environment in recent years. This is more so that the phenomenon impacts all sectors of the economy and regions of the world, though at varied magnitudes. The Intergovernmental Panel on Climate Change (IPCC) (2007) defined climate change as a change in the state of the climate that is identifiable by changes in the mean and/or the variability of its properties and that persists for an long period, usually decades or longer. Climate change may also be defined as any change in climate over time, whether due to natural variability or as a result of human activity. While climate can change as a

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result of natural causes, the scientific communities are, however, more concerned with the impacts of climate change caused by anthropogenic factors. According to the findings by the IPCC (2007), developing countries like Nigeria will be more vulnerable to climate change due to their economic, climatic and geographic settings. Unfortunately, such countries, especially those in Africa, possess the least potentials to adapt and mitigate climate change impacts.

Amongst the sector of the economy where the impacts of climate change are to be felt is tourism (Safa and Hilmi, 2012; Steyn, 2012). In the first instance, decisions on destination by tourists are usually greatly influenced by climatic and environmental conditions (Safa and Hilmi, 2012). In addition, climate impacts are causing changes in the ecosystems and natural resources needed to sustain the tourism economy (Uchegbu, 2009). Besides, water resources which have been a veritable source of tourism in various forms like lakes, dams, springs and falls are expected to be worst hit by climate change (Sadoff and Muller, 2008). For example, the River Niger Inland Delta has reduced in size from 37,000 km^2 in the early 50s to about 15,000 km^2 since 1990 and Lake Chad which earlier covered an area of 20,000 km^2 before 1970 now measures less than 7,000 km^2 (FAO, 2009). Aside extreme events in forms of droughts and floods, climate change is also expected to cause increases in sea surface temperature and mean global sea level, changes in salinity, disruption of marine ecosystems dynamics, accelerated erosion, loss of wetlands and mangroves, and seawater intrusion into freshwater sources (Kazaure and Mohd, 2013). Climate change impacts on water resources will have both direct and indirect effects on the socio-economic and the biophysical environments (Arnell, 1999; Schulze, 2005a, b; Bates et al., 2008; Kundzewicz et al., 2008; Rutashobya, 2008). Studies have also shown that Nigeria is already being affected with diverse environmental problems, which can be linked to current climate change (Odjugo and Ikhuoria, 2003; Chindo and Nyelong, 2005; Adefolalu et al., 2007; Ikhile, 2007; Oluleye, 2009; Abaje et al., 2010; Oguntunde et al., 2012; Akinsanola and Ogunjobi, 2014), all with multi-sectorial impacts.

The United Nations World Tourism Organisation (UNWTO) defined tourism as a combination of activities, services and industries which provide a travel experience involving transportation, accommodation, eating and drinking establishments, retail shops, entertainment businesses and other hospitality services render for individuals or groups travelling away from home. Therefore, much as climate change impacts on tourism, the sector is also a notable major contributor to the anthropogenic changes in climate through the release of greenhouse gases

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(GHG). Safa and Hilmi (2012) stated that tourism contributes significantly to climate change through the greenhouse gas emissions produced by transporting and accommodating tourists and the services and products that are provided to support tourism in a destination. Earlier, a research carried out by UNWTO in conjunction with the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO), reported that CO_2 emissions from international tourism including all forms of transport accounted for just under 5% of the world total or 1,307 million tonnes in 2005 (UNWTO, 2007). Despite this, tourism activities are daily gaining recognition as more countries are embracing the sector because of its economic benefits. The sector is regarded as a primary source of foreign exchange earnings in 46 out of 50 of the world's Least Developed Countries (LDCs) (UNDP, 2005; UNWTO 2007c; Hall, 2007).

Regardless of the poor development of tourism in Nigeria, the importance of the sector to the economy of the country cannot be over-emphasised, especially given the recent dwindling oil- revenue and the need to diversify the economy. According to Bankole (2002), analysts of the tourism sector in Nigeria had submitted that the sector has the potential of not only contributing to foreign exchange earnings but also can aid the reduction of the concentration of foreign exchange sources in the oil sector. Besides, the sector is capable of reducing unemployment as tourism has the capacity to provide both direct and indirect employment for citizens of all ages. In Ondo State, the government has recently taken much interest in tourism development with the extensive face-lifting of some tourist centres in the state including Ebomi Lake, the focus of the present study. This is in recognition of the potential of the tourism sector to contribute to the internally generated revenue of the state. But, even as governments take steps to develop the sector, there is the need to bring to fore the possible impacts of climate change on it. This is necessary so that steps can be taken to inculcate in the policy framework, appropriate strategies for adaptation and mitigation. Therefore, the aim of the study is to assess the possible impacts of climate change on the tourism potential of Ebomi Lake, Ondo State, Nigeria.

2.0 Material and Methods

2.1 The Study Area

Ebomi Lake (Plate 1) is located at Ipesi in Akoko South East Local Government Area in the northern part of Ondo State, Nigeria. The lake which is about 1600 m long and 40 m wide is about 115 km from Akure, the state capital. It lies within the derived Savannah vegetation zone

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between 6^0 30^1 and 7^0 10^1N and longitude $5^0 35^1$ and $4^0 31^1$E (Adegbite, 2014). The lake is a hanging lake which has its origin from upper Ose and empties into the lower Ose at Ago Panu Area of Ondo State. The Lake has a drainage area of about 10 ha while the surrounding vegetation is about 15 km^2, made up of Riparian forest (60 %) and derived Savannah (40 %). The lake is bounded by four towns and villages - Ipesi, Imeri, Iromi and Ayeteju (Edo State). The climate of the study area is a tropical one with clean dry and wet seasons, characterized by the rain bearing South-western winds coming to the land off the Atlantic Coast while Harmattan wind prevails during the dry season from November to March and has North-east to North-south direction. Rainfall in the wet season from April to October ranges from 1,270-2000 mm per annum. The mean monthly temperature is about 21-28^0C and may rise above 30^0C in March (Adegbite, 2014). Common soil types found in the area are clayey loam (synclime), sandy soil (anticline) and gravel. Regarding the geological setting, the study area is underlined by rocky stone (Adegbite, 2014). The dominant tree species in the riparian forest are *Brachystegia spp*, *pierocarpus spp*, *Celtis spp*, *Ricinodendron heudellotii* and *Cola hispida* while the dominant tree species in the derived savannah are *Oliverii butyrospermum*, *Daniela spp* and *Accacia species*. Common animals in the area include monkey, antelopes, chimpanzee, bush pig, mischievous squirrels, variety of birds and fishes. History has it that the name Ebomi means wonderful or something mysterious. Consequently, the people of Ipesi-Akoko where the lake is located attach to it, certain religious significance. According to oral history, there used to be an appointed priest in the past that was saddled with the responsibilities of appeasing the lake in times of trouble and performing other rituals on behalf of the people. For the reason of its spiritual significance, fishing is forbidden in the lake.

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Plate 1: Ebomi Lake (Field Survey)

2.2 Methods

The study relies on literature, available information from the federal and state governments, visit to the site and oral interview of some members of the community where Ebomi Lake is located.

2.3 Importance of Tourism to the Nigerian Economy

The tourist sector has over the years grown to become a major industry with significant socio-economic and environmental consequences. According to UNWTO (1995) about 25 million people crossed international boundaries for tourism purposes and generated a receipt of about 2 billion US Dollars in 1950. By the year 2002, the international tourist arrivals rose to 718 million while the corresponding receipt was in excess of 474 billion US Dollars. According to Safa and Hilmi (2012) the numbers of international arrivals increased from about 25 million in 1950 to an estimated 806 million in 2005, corresponding to an average annual growth rate of 6.5% (Figure 1). A prediction earlier in 1980s had chosen the tourism sector as the likely biggest export industry by the year 2000. It was described as the industry of the 21st century where world receipts stood at $3726 billion in 1995 with a further estimate of $2.1 trillion for the year 2010. In 2014, the contribution of the sector to the global economy rose to 10% of global GDP (US $7.6 trillion) and 277 million jobs (1 in 11 jobs) were created, thereby not only overtaking

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the wider economy, but also growing faster than other significant sectors such as automotive, financial services and health care (World Travel and Tourism Council (WTTC), 2015). Globally, UNWTO predicts that the number of international tourists will reach almost 1.6 billion by the year 2020 (as opposed to 565m in 1995), and that international tourism receipts will exceed US$2.0 trillion (UNWTO, 2007).

In Nigeria, the tourism sector is emerging as a sector with great potentials to serve as a strong alternative to crude oil in terms of foreign exchange earnings. This is especially important given the recent global fall in oil prices. Ojo (2014) stated that tourism has become a major source of economic diversification for many countries, supporting the service sector and building effective backward and forward linkages with the rest of the economy, allowing new employment and income earning opportunities. This perhaps was one of the reasons Nigerian government selected the industry as one of the six priority areas central to the revival of the economy sometimes in 2006 and a fundamental sector for achieving Nigeria's 7-point agenda and its Vision 20:2020 programme. An estimated sum of N29 billion was expected to be generated as gross revenue through international tourist spending. Despite the fact that the Nigerian Tourism Development Master Plan generated in the year 2006 has not been fully implemented, reports showed that the contribution of the sector to the Gross Domestic Product (GDP) has been on the rise. According to WTTC (2015) report, the direct contribution of Travel and Tourism to GDP was 1,560.2 billion Naira (1.7% of total GDP) in 2014, and is projected to rise by 2.4% in 2015, and to further rise by 5.8% pa, from 2015-2025, to 2,797.3 billion Naira (1.7% of total GDP) in 2025.

Similarly, tourism has the capacity to reduce unemployment in the country since it provides direct and indirect employment opportunities to various sectors of the population (educated and illiterates). Marafa (2011) asserted that tourism is arguably the major industry across the globe that creates massive employment benefits at the destination. Additionally, at the top echelon of the national economy, tourism creates one job and at the lower levels, it creates nine jobs. Esu (2012) added that commonly created jobs by tourism could be classified as either generic or specific; the generic jobs are those related to water, air and land based activities, tour guides, publishers, accountants, managers, supervisors, restaurants and caterers, gardeners and laundry, etc. Also Tunde (2012) citing WTTC reported that the industry will generate 897,500 jobs representing 1.4percent of Nigeria's total workforce in 2012 and that over the next 10 years,

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the amount is expected to grow by 6.5 percent per annum to N483.4 billion in 2022. However, latest report showed that tourism directly supported 883,500 jobs (1.4% of total employment) in 2014 in the country and that the performance is expected to rise by 0.6% in 2015, rising further by 3.4% pa to 1,240,000 jobs (1.5% of total employment) in 2025 (WWTC, 2015).

Furthermore, by providing employment opportunity to the people, tourism also helps in poverty alleviation, a key target of the Millennium Developments Goals (MDGs) even as its successor programme, Sustainable Development Goals, was recently lunched. Brown (2001) stated that, through the employment and entrepreneurial opportunities it provides, tourism has the potential to lift people out of poverty. In the same vein, tourism has been identified as an important instrument to poverty alleviation, attainment of the Millennium Development Goals (MDGs) and sustainable development (Olorunfemi and Raheem, 2008). According to Holden (2008), tourism has huge potential for driving the developing nations toward achieving the MDGs and that, if developed and managed in a sustainable manner, it can help to improve living conditions for local populations in different destinations. In Nigeria, many tourism sites are found in the local and rural areas where the less privileged live, therefore, exploitation of the tourist attractions has improved the economic activities in the areas leading to improved standard of living. This is because the villagers can now find buyers for many of their local products such as brooms, palm wine, agricultural products like plantain, banana, palm oil, etc. In the same vein, certain cultural activities as drumming and dancing which were performed hitherto for leisure can now attract some funds aside the opportunity to generate money through the rendering of services such as hair braiding.

Tourism also contributes to rural development, for instance, through the construction of roads to tourism sites mostly located in the rural areas. Tunde (2012) stated that tourism is one of the surest ways to open up rural areas, particularly in the provision of social infrastructures. Many rural settlements which ordinarily would not have been connected to the national grid early enough have been supplied with electricity apart from other social amenities in order to open up the various sites for patronage. This ultimately helps to engender rural development in the country and also reduce rural urban migration because the rural populace can now enjoy most of the social amenities which often attract people to the urban centres. Moreover, development of the tourism sector helps to project the images of many of the small towns and villages while

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some of the tourist centres (e.g. Obudu Mountain Resort, with its longest cable car in Africa) add to the national pride.

In Ondo State, data are scarce as to the contribution of the tourism sector to the economy of the state. For instance, Omole et al. (2013) observed that there has not been huge economic gain from tourism in the state owing to inadequate development of the potentials of many tourism attractions such as Idanre Hills, Ebomi Lake, Owo Museum, etc. The work further stated that much had not been done in the state to actually identify the available tourist potentials; while some are not accessible for development, many others are being eroded away by nature. In addition, some recognised tourism sites have not been given adequate publicity to attract both local and international tourists (Omole et al., 2013). This is aside the poor standard of living of many inhabitants of the state which has made majority to believe that tourism is for the rich who have enough to throw about. However, with the recent efforts of the state government in the sector, it is believed that tourism would in no distance time contribute immensely to the Internally Generated Revenue (IGR) of the state. For example, the government has successfully hosted the Mare Festival for consecutive five years since 2010 attracting participants from across the country, South Africa and Europe. This is in addition to the upgrading of the Idanre Hills and many other tourist centres in the state including Igbo Olodumare and Ebomi Lake.

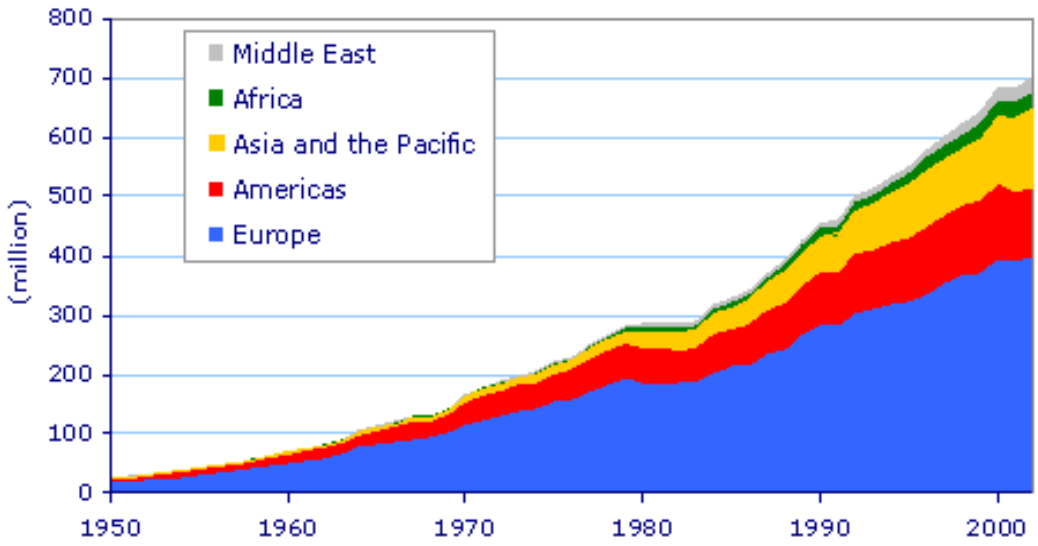

Fig. 1: International Tourist arrivals in the world, 1950-2005 (Adapted from Safa and Hilmi, 2012 as sourced from WTO)

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Tourism Potentials of Ebomi Lake

As a natural resource, Ebomi Lake possesses tremendous potentials for the attraction of both local and international tourists and thereby adding to the IGR of the state in particular and the nation at large. This is aside its likely multiplier effects on the social-economic well-being of the host-community. Just like other natural lakes, there is no doubt that many tourists will find the natural environment attractive if they have a taste of it once and therefore develop more interest to visit again. Apart from the foregoing, the singing of birds and the occasional jumping of monkeys up and down from one tree to the other within the vicinity is a sight to behold. Again, given the serene environment in which it is located, there is the likelihood that many tourists will enjoy their stay in the area since they are far removed from the bustling and hustling activities synonymous with city life. The breathe of fresh air devoid of environmental pollution such as carbon-monoxide from vehicle smokes and industrial activities which are also common in the city centres are some of the benefits that will likely make a potential tourists to Ebomi Lake want to have a repeat visit.

Moreover, tourists also have the advantage of returning home with fresh and cheap food items such as yam, plantain, pineapple, banana, *garri* including vegetables after their period of stay because farming is a major occupation of the people of the area.

Potential Impacts of Climate Change on Tourism in Nigeria

In Africa, climate change impacts that are likely to affect tourism include beach erosion, saline intrusion, droughts, flash floods and landslides, coral-reef bleaching, less productive fisheries and agricultural systems, rising sea levels, flooding, desertification, erosion and other health-related problems. Regrettably, most of the impacts are now highly noticeable in many African countries recently and there are reasons to believe that the situation might be worse in the future considering the poor capacity for adaption. Uchegbu (2009) noted that the challenge of climate change is particularly significant for the African countries because apart from being a contributor to greenhouse gas emissions, the region is a victim of its negative impacts in forms of increased health and natural disaster risks. The African countries are said to be vulnerable to the impacts of climate change, such as rise in temperature, rainfall, sea-level rises, coral bleaching, increased storm intensity, saline intrusion, food shortage and unemployment.

However, in Nigeria the impacts of climate change can vary across the country from south to the north. For instance, as a result of rise in temperature (more heat) and decrease in

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rainfall, desert encroachment has been the major concern in the northern part of the country, with approximately1400 square miles of land turning to desert or semi-desert yearly (FME, 2008). Similarly, higher temperatures have caused a decline in vegetation and the migration of wildlife toward the areas of perennial water supply. For instance, elephant which hitherto was a common animal around the Yankari Game Reserve, Bauchi is gradually going into extinction with only few being sighted recently. Rivers that were known to be permanent in the 1960s have now turned into seasonal rivers and are drying up. Lake Chad is reported to have reduced to almost half of its original size. On the other way round, the major concerns in the coastal areas of the southern part of the country has been sea level rise and coastal inundation. Beaches such as Lagos Bar-beach which are well known for their tourism potentials have been greatly eroded and the situation might continue unabated with the current predictions of climate change and sea-level rise. Increase in sea level rise, flooding and erosion will drastically reduce the size of the already narrow beaches in the country and compromise value of recreation amenities like hotels, and other social facilities that are of importance to tourism could be displaced (Amosu et al., 2011).

Coral bleaching, also known as whitening of coral reefs, a phenomenon which affects coral reefs leading to loss of natural color is another impact of climate change on coastal tourism in Nigeria. Coral bleaching occurs when ocean waters becomes too warm owing to increased water temperature, causing stress on the zooxanthellae algae that live inside coral animals and provide them with food in a symbiotic relationship (Calthorpe, 1993). Such warming of ocean waters can occur as a result of rise in temperature occasioned by global warming and climate change. Owing to stress response, the relationship between the corals and the zooxanthellae breaks down; the corals lose their color and become white. Although the bleached corals are still alive, nevertheless they become weakened. If excessively warm-water conditions continue for too long, the bleached corals will die. This will definitely have negative impacts on tourism as many tourists will become disenchanted with the loss of the aesthetic nature of the site.

Similarly, biodiversity loss has been a common impact of climate change in the country. Climate change, with its effects on temperature, precipitation and other weather/climate elements, will surely impact biodiversity (Uchegbu, 2002). Climate change induced rises in temperature may lead to sea-level rise with its consequent flooding, which may cause an imbalance in biodiversity-ecosystem (Uchegbu, 2009). A decrease in rainfall and persistence of

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dry seasons may lead to heat waves and drought conditions, causing discomfort to plant and animal species, reduction in lifespan and in turn negatively affecting biodiversity. According to Agbogidi (2011), if climate factors such as temperature and precipitation change in a region exceed the tolerance of species phenotypic plasticity, then, changes in the distribution of the species may be inevitable. There is already strong evidence that species are migrating from one geographical location in the country to the other as a response to changing regional climates. When compared to the reported past immigration rates of plant species, the rapid pace of current changes has the potential to affect not only species distribution, but also reduce many species ability to adapt to their natural climatic environment (Thaman, 2005).

As indirect impacts, climate change which has the tendency to undermine future economic growth can cause reduction of global Gross Domestic Product (GDP). Thus, reduction in GDP due to climate change would reduce the unrestricted wealth available to potential tourists and have negative implications for anticipated future growth in tourism. This is because less people will have the wherewithal to travel for tourism activities. Additionally, international mitigation policies (i.e. policies which seek to reduce GHG emissions) may have an impact on tourist flows (Simpson et al., 2008) and lead to increase in transport costs causing potential tourists to the country to change their destinations.

The Posssible Impacts of Climate Change on Ebomi Lake

Given that Ebomi Lake is a freshwater lake, field observation has shown that the centre might be exposed to anthropogenic impacts of climate. Some of the common human activities in the area which can exacerbate climate change include farming, timber felling and bush burning. Oral interviews conducted with selected elders in the community showed that the volume of water in the lake might have reduced in the last 50 years. They also averred that the environment has become less forested due to uncontrolled timber logging in the area as compared to the situation some decades ago. All these activities expose the lake to the effects of warming climate associated with climate change. High temperature can cause drying up of water in the lake while many plant and animal species may disappear as a result of unfavourable climatic and weather conditions; all these are already being witnessed in the area. In addition, high temperature can lead to heat waves and wild fires which will in turn destroy forest species and lead to biodiversity loss. Meanwhile, IPCC (2007a) observed that, as a result of projected climate change, there can be increases in the frequency or magnitude of certain weather and climate

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extremes (e.g. heat waves, droughts, floods, tropical cyclones). Safa and Hilmi (2012) stressed that such extreme events will affect the tourism industry through increased infrastructure damage, additional emergency preparedness requirements, higher operating expenses (e.g., insurance, backup water and power systems, and evacuations), and business interruptions. This is already being seen in the area as the road which links the site with the main town is being highly affected by gully erosion.

Other possible impacts of climate change in the area may include warmer summers which will likely discourage potential tourists, and lead to increase in diseases outbreak as a result of high breeding rate of diseases vectors such as mosquito. Warmer summers may lead to increased water temperature causing deaths of certain species of fish and other aquatic organisms which add to the aesthetic value of the site.

Conclusion

Given the possible impediments that climate change might pose to revenue generation from the tourism sector even as oil revenue continues to fall, the present study examined the possible impacts of climate change on the tourism potential of Ebomi Lake, an important tourism centre in the northern part of Ondo State, Nigeria. Field observation showed that human activities such as farming, timber logging and bush burning which are great causes of anthropogenic climate change are currently on the increase in the area. In addition, respondents during oral interviews also claimed that water volume in the lake has probably been reduced while the site has become less forested. Thus, it can easily be concluded that Ebomi Lake might have been exposed to mostly negative impacts of climate change such as changing micro-climate, biodiversity loss, degradation of landscape and reduction of lake water volume. All these are capable of reducing its potentials to attract tourists and thereby impede revenue generation from the sector. Therefore, we first suggest that government should acquire additional portion of lands around the lake to ward off intruders and prevent illegal human activities close to the vicinity. All environmental laws and policies enacted to protect such tourism sites against activities such as lumbering and bush burning should be implemented, while defaulters should be apprehended and punished to serve as deterrent. Furthermore, the people of the community should be involved and educated on the need to conserve the ecosystem of the area and eschew all activities that can exacerbate anthropogenic impacts of climate change. There is also the need

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to make some of the tourism centres less natural to reduce the impacts of climate change on them.

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