

## The Interconnectedness between Climate change and Tourism

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### ABSTRACT

The two way linkage between tourism and climate change has serious economic and developmental consequences in many areas globally. It is therefore of great essence to review and analyse the existing literatures on the relationship between tourism and climate change in order to come to terms about the present of level of institutional and corporate involvement in the industry so as to establish a proper guideline for future research. Globally, very little attention has been paid to the issue of climate change impact on tourism. Generally speaking, the general corporate world and institutions are still lost on how to implement adaptation and mitigation measure. This is very crucial in order to assess the organizational determinants of these tools and their related outcomes. There is therefore the need to examine the choice of visitors as regards activities and destination, the effect of global warming and how it impacts their decision making ability. The existing studies is been based particularly on individual ability to address the effects of climate change on tourism.

**Keywords:** Climate Change, Tourism, Adaptation, Mitigation, Review, Literature

### Introduction

The relationship between tourism and climate change cannot be overemphasized. It involves complicated relations and can be better explained as a two way affairs. Firstly, tourism activities contribute to climate change (Nicholls, 2006). The topmost regarding this are private automobile and air transport companies (Chapman, 2007) followed by accommodation (UNWTO, 2008). By 2005, tourism related carbon dioxides (CO<sub>2</sub>) emissions from transports accounted for about 75% with air transport contributing the most. This implies that air transport accounts for about between 2.5% and 3.5% of the entire anthropogenic emissions responsible for climate change (Scheelhaase and Grimme, 2007; Mendes and Santos, 2008).

On the other, global warming considerably impacts tourism sector, most especially the way it impacts tourism destination attractions and tourist surge (Amelung et al., 2007). Tourism is dependent on natural resources like water, landscape, biodiversity, coastline, etc. These impacts are mostly on the possible destination attractions. Nevertheless, climate change does cause havoc on some of the important natural resources (Gossling and Hall, 2006a). This article

will be divided into four: - tourism and Climate Change, the contribution of tourism to climate change effects on tourism development.

## 1. Tourism and Climate Change

Tourism is considered a climate change sensitive industry according to the Intergovernmental Panel on Climate Change (2007). As a follow-up to the 2007 IPCC declaration, the Davos 2007 declaration clearly stated that Climate Change should be considered as the highest impediment to sustainable tourism in this 21<sup>st</sup> century ( UNWTO, 2007), Tourism industry makes use of energy for transportation of tourists to and fro destinations and in all other kinds of tourist engagements ( Hernandez and Ryan, 2011). Since most of the energy comes from fossil fuels, tourism therefore is a principal sector for greenhouse gases (GHGs) emission with devastating effects for climate change. Tourism as a contributor to greenhouse gases emissions, accounts for 5% of the world anthropogenic of carbon dioxide (CO<sub>2</sub>) which is capable to increase in the next decades ( Hall et al., 2015a). Therefore, according to Becken (2008: 351) climate change cannot be ignored by tourism decision makers, since it “has the potential to substantially change the way people will travel in the future”.

Furthermore, according to Buckley et al, (2015: 59), climate change is one of the most important “macro-scale trends that are likely to be particularly influential in the tourism sector in the next 15- 30 years”. Hall et al. (2015b), further explained that climate change “ is extremely significant for tourism because of its influences on the economic viability of tourism destinations and activities, tourist behavior, and its ramifications for the entire tourism system”, and the need for it to be adequately acknowledged by important international organizations, industry and decision- makers. Weather and climate are essential factors of tourism, as by many people duly recognized climate as an important factor influencing tourist flows on world stage (Moreno, 2010)

Irrespective of the critical role climate plays on tourism engagements, very few researches has been carried out to investigate the link between climate change and tourism (March et al, 2014). It is been acknowledged recently by government and tourism stakeholders that climate change has the potential capacity to influence tourism on international level (Moreno, 2010; Hamilton et al, 2005b). Climate change is expected to influence tourism significantly in future. Nevertheless, the destinations are already feeling the brunt of climate change, hence various decisions within the tourism industry is been affected (Simpson et al, 2008; Reddy, 2011; UNWTO, 2008; UNEP, 2008). Climate change direct consequences on tourism does critically influence policy decision making and even that of the tourists (Saarinen et al, 2012; Rossello and Santana- Gallego, 2014). This is as a result of the fact that weather and climate impacts on both destination location and its sources ( Agnew and Viner, 2001). It impacts decision making processes of the tourist because it tends to influence the climatic location attractiveness ( Reddy,2011) One of the direct effects of climate change on tourism will include the sharing of atmospheric resources between various tourism destinations ( Marshall et al, 2011

However, as a result of the changes in the length of time can be affected thereby influencing the viable interrelationship between enterprises and operators around the globe (UNWTO,

2009; Reddy, 2011). It is a fact that natural environment is a very important source tourism world market (Uyarra et al, 2005). The aftermath of climatic change effects on destination state of condition is an indirect consequence of climate change (Agnew and Viner, 2001). Consequently, adjustments in the natural state of a destination due to climatic are capable of having critical effects on tourism destination (UNWTO, 2009). Some of these changes can trigger water scarcity, threaten local biodiversity, has the capacity of increasing coastal erosion and can significantly cause havoc to tourism infrastructures in the face of adverse climatic conditions like flooding (Reddy, 2011).

Sustainability is an important concept to think about when considering the treatment of human- environment limitation (Perch- Nielsen, 2010). For this study, sustainability shall be defined in accordance with the IPCC Fourth Assessment Report that defined sustainability or vulnerability as:

A function of a system's exposure to climate change, its sensitivity, and its adaptive capacity (Perch- Nielsen, 2010: 581).

**Table 1: Shows the essential elements of vulnerability definition.**

Elements	Narrative
Exposure	“ Nature and degree to which a system is exposure to significant climate Variations” ( IPCC, 2001: 987)
Sensitivity	“ The degree to which a system is affected , either adversely or beneficially, by climate change variability or change” (IPCC, 2007: 881) (The impact may be direct or indirect)
Adaptive Capacity	“ The ability of a system to adjust to climate change ( including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (IPCC, 2007: 869)

**Source: Perch-Nielsen, 2010**

With the above definition sustainability or vulnerability, Perch- Nielsen (2010) was able to create a matrix to evaluate the vulnerability of tourism industry to climate change (see table 2 below). This was possible through the combinations of the three elements of vulnerability; exposure, sensitivity and adaptive capacity with various methods that could have direct or indirect consequences on the tourism industry (Perch- Nielsen, 2010). Different local, national and global mitigation measures and policies that tends to advocate for the reduction of GHG emissions can run the risk of increasing transport fares ( either as a result of high cost of energy or tax increase) and shift of climatic understandings and attitudes that can possibly influence the choice of destinations by tourists ( UNWTO, 2009).

Furthermore, climate change might lead to indirect coastal change effects (UNWTO and UNEP, 2008). It is important to note that climate change effects and its ensuring mitigation and adaptation measures might escalate economic cost that might hinder economic development of various economy throughout the globe (Simpson et al, 2008).

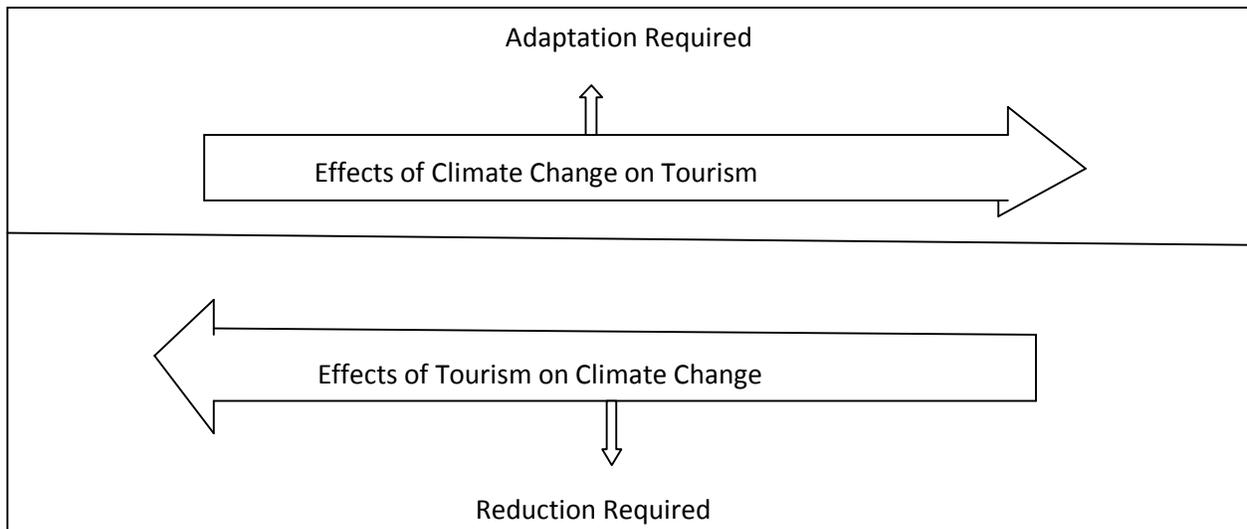
**Table 2 Theoretical Framework for vulnerability of the tourism industry to climate change**

	Mean climate	Extreme Events	Sea-Level	Biodiversity	Water Availability	Snow	Mitigation Measures
Exposure	Change in the suitability of the climate for the different types of tourism at destination	Change in the frequency and intensity of extreme events which may impact different types of tourism	Rise in sea levels impacts tourism at coastal destination	Change in the composition of plants & animals and their interaction	Changes in precipitate and evaporation	Change in availability of snow during winter season	Policies to reduce GHG emission
Sensitivity	Dependence on tourism that relies on the current climate	Proximity of tourism resources and infrastructure to extreme events.  Value of tourism resources & infrastructure that are at risk.  The resilience of tourism resources & infrastructure in the face of extreme events.	Proximity of tourism resources and infrastructure to maximum shoreline  Value of the tourism resources & infrastructure that are at risk.  Dependence on coastal tourism	The dependence on current tourism relying on the existing biodiversity  Aesthetic value of the new emerging plants & animals.	Water consumption of the tourism industry	The dependence of tourism relying on snow  Snow making ability.  Alternative tourism attraction	Electricity of current tourism demand  Carbon intensity of current tourism activities

Adaptive Capacity			<p>Economic Resources available to adapt</p> <p>innovation potential of tourism entrepreneurs</p> <p>Technologies available to tourism to adapt.</p> <p>Knowledge within the tourism industry on climate change &amp; its potential impacts</p>				
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Source: Perch –Nielsen, 2010b.

Contemplating on how this huge recognition of possible effects of climate change could bear on tourism industry, United Nations World Tourism Organisation (UNWTO) in conjunction with United Nations Environment Programme ( UNEP) and World Meteorological Organisation ( WMO) convened on the second International Conference on Climate change and Tourism in Davos Switzerland in 2007. One of the important results of the Davos Switzerland convention called “Davos declaration” states that: Climate is a key resource for tourism and the sector is highly sensitive to the impacts of climate change and global warming, many elements of which are already being felt. It is estimated to contribute some 5% of global CO<sub>2</sub> emissions (UNEP and UNWTO, 2008: 13). This declaration made reference to the effects of climate change that are already suffocating tourism industry, but did not acknowledge that tourism sector to a certain extent should be held accountable for carbon dioxide ( CO<sub>2</sub>) emissions causing climate change ( Simpson et al, 2008; UNWTO and UNEP, 2008). This explains the reason why concerted effort should be taken to minimize the input of tourism industry to CO<sub>2</sub> emissions and consequently helping to drastically minimize the effects of the climate change on tourism industry (Moreno, 2010). This also explains the symbiotic relationship of climate change and tourism.

**Table 3. Symbiotic Relationship between Climate Change and Tourism**

Source: Colakoglu and Mil, 2011

It is expected that the tourism industry contribution to climate change would increase by 2035 with world travels rising by 179% (UNEP and UNWTO, 2008). Even with all the technological advancement, tourism/ associated emission is projected to increase by 152% (Simpson et al, 2008).

From the above, it is clear that tourism is aiding and abetting to the speeding up climate change through emission release from tourist activities, and this directly opposite of global plans of decreasing and mitigating greenhouse gases emission input and the eventual reduction of the effects of climate change ( UNEP and UNWTO, 2008; Scott et al, 2012a) Because of high level input to greenhouse gases emission of tourism industry, technological know- how only would not be effective to achieving the objective of reducing greenhouse gases ( GHGs) emission ( UNEP, 2015). Therefore, it becomes very important for change of attitude and behavior from the tourists and tourism industry, so as to meet the objective of reducing tourists' greenhouse gases contribution to climate change (UNEP, 2014). However, few scholars are investigating on the tourism industry contribution to climate change, but vast majority of the studies so far are concerned about the effects of climate change on tourism industry and its activities ( Amelung et al,2007; Perry, 2006; Jones and Scott, 2006).

## 2. CONSEQUENCES OF CLIMATE CHANGE ON TOURISM

The major global attention is centered around understanding and analyzing the impacts of climate changes on tourism flows and demand (Scott et al, 2007a; 2007b). This comprises numbers of researches based on the forms of arrivals and departures of tourist based on climate change and ecological conditions. Agnew and Palutikof (2006) and Hamilton and Tol (2007) also analysed the effects of climate change on global tourist arrivals and departures and domestic tourist flows. While Hamilton and Tol (2007) based their evaluation on three on states—United Kingdom, Germany and Ireland, Agnew and Palutikof (2006) did their analysis in

United Kingdom. Nevertheless, these studies has one in common, and that is to say the effects on tourist flows of particular variable is connected to climatic condition such as air transport and eco- tax ( Gossling et al, 2008). The bulk of these research works are based on the influence of climate change based on a number of future projected scenarios recommended by the IPCC, ( 2007); Hamilton et al, ( 2005); and Hamilton and Tol ( 2007) All these literatures maintained that climate change is of great significance to tourists' flows.

In conclusion, this complex interconnectedness between climate change and tourism is the cause and costs of these inter-relations are of vital important and have economic effects (Berrittella et al, 2006) and they both require serious attention. Nevertheless, it is important to note that their economic costs are not the same in destination regions or activities (Shaw and Loomis, 2008).

### **3. CONTRIBUTION OF TOURISM TO CLIMATE CHANGE**

Generally speaking there is little discourse on how tourism influence climate change (Becken, 2005). This might be due to what scholars regarded as comparatively minimal contribution of tourism industry to carbon dioxide emission and other greenhouse gases. The consequences of tourism activities atimes are considered from a broad perception pf its ecological effects. Becken et al, (2003) explained how transport, accommodation and their activities influence energy use. Scholars such as Danielopol et al, (2003) did explain how coastal tourism can critically hinder water resources. Lordkipanidze et al, ( 2005), Williams and Ponsford (2009) went further to explore the use of the case study method to demonstrate how combined action in tourism industry can sustainably achieve success and manage the relationship between tourism and climate. Though transport activities particularly aviation industry contributes immersley to economic growth, it is important to emphasis that its growth causes extreme climatic condition ( Daley, 2009;Walker and Cook, 2009).

### **4. ADAPTATION AND MITIGATION STRATEGIES OF GLOBAL WARMING AND TOURISM INDUSTRY**

There is general opinion concerning the two important method to use in order to fight against climate change in the tourism industry: adaptation and mitigation (Bode et al.,2003; Barnett,2005; UNWTO,2008). It is widely believed that tourism must engage in adaptation plans in order to respond to the ever increasing effect of climate change but also at the same time indulge in mitigation strategies in order to minimize the increasing impacts of global warming that is too enormous to be tackled through adaption (Becken and Hay,2007; Gossling et al,2009;IPCC, 2010). Adaptation simply means the methods aimed at moderating or curbing the impact of climate change by institutions, governments, individual and corporations by making use of the opportunities of the benefits of climate change for tourism to finding a solution to reduce the effect it caused. While mitigation is said to be the action taken to cushion the contribution of tourism effects to climate change. It therefore becomes very crucial for business organizations and decision makers in the tourism industry to come together for serious

involvement in advocating strategies on adaptation and mitigation for tourism industry (UNWTO, 2008).

## ADAPTATION

Much of the studies on tourism and climate change have been on the strategies adopted to adapt to new scenarios. Well, there is a believe that tourism industry is about five to eight years behind in terms of research on global warming as compares to other sectors of the economy.

According to (Becken, 2005,p.381), “ while the wider climate change debate has until recently mainly focus on mitigation, the sparse research specifically dealing with tourism and climate change has largely concentrated on tourism’s vulnerability and adaptation to climate change.” It is important to acknowledge that there are disparities in adaptation plans implemented in the tourism sector, in reference to the difference sectors, activities and destination. Studies have shown that in the issues of beach tourism and the protection of coast line, institution play major role in adaptation measures. It is assumed that institutional adaptation measures should go beyond private tourism companies’ adaptation policies.

According to Adger et al.,(2005,p.79), “ a broad distinction can be drawn between actions that often involves creating policies or regulations to build adaptive capacity and actions that implement operational adaptation decisions. The later will often be constrained and influenced by a higher level adaptation framework.” To this regard, different research explains institutional reactions for beach tourism. This will involve hard engineering and soft engineering measures, like dykes and wave breakers and bleach nourishment (Phillips and Jones, 2006; Hamilton, 2007). Hamilton therefore suggests that adaptation would be more reasonable from economic perspective for those stakeholders involved in beach tourism. To Hamilton (2007), soft measures will be more profitable than hard measures, because it will cause some important climatic impact that might reduce the price the tourist will be prepared to pay for accommodation, hence financial loss for companies.

Much attention has been paid to snow tourism activities, most likely because of the intense impact of global warming on this area. The important attention of this study is been adaptation measures in the area of artificial snowmaking. **This called for re-examination of different future perspectives in snow tourism as regards snow precipitation in particular areas in the years of 2020, 2050 and 2080 (Scott et al., 2007; 2008).**

The focus of the research is just to find out whether snowmaking is good for ski resorts, and how makeshift snow can affect the snow sports season in term of length of period, and how it effect tourist demand and economic consideration (Scott et al., 2007a,2007b). the finding was astonishing. It did confirm the important impact of snowmaking in both economic and stretching the season period.

## MITIGATION

Road transport is said to be the biggest contributor of greenhouse gas emission, but the highest unrelated contributor is road freight (Chapman, 2007). Aviation industry is the largest polluter

in tourism industry for the simple fact that its environmental hazard is high due to the fact that the greenhouse gases are released directly into upper atmosphere, hence adverse impact (Chapman, 2007; UNWTO 2008).

Many mitigation process are meant to reduce the air transport greenhouse gases emission, but many researches do only consider the benefit including air transport in emission trade systems (Chapman, 2007; Scheelhaase and Grimme, 2007; Mendes and Santos, 2008). Other mitigation measures simply suggest shift in pattern of behavior, by replacing air transport by form of mobility (Chapman, 2007). Aviation will also benefit from more advance technology and change of operational modes. Examples are: - (1) redesigning the airplane to consume less fuel. (2) Find an alternative energy source and lastly to re-assess its operational methods of landing and taking off (Chapman, 2007; Interavia, 2008).

Beyond the financial benefits of the above innovations, the factor behind such mitigation investment is not clear as a single type of strategy may not be sufficient for the target of sustainable aviation. And again, due to failure of the 2009 United Nation Copenhagen climate change conference which did not produce any reasonable result, only commitment to minimize greenhouse gas emission (Scott and Becken, 2010). What is needed is simply the combination of behavioral, technological and management changes (Chapman, 2007).

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