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Climate change- perceived impacts, risks, vulnerability, and response strategies: A case study of Mombasa coastal tourism, Kenya

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Abstract

Climate change policies are advancing, at least rhetorically. These policies are made through complex processes of interactions among stakeholders whose opinions are shaped by historical experiences, beliefs, awareness and understanding of potential climate impacts coupled with information received from third parties, both formal and informal. However, it has been argued that tourism stakeholders' actions in response to climate change will depend on their supply-side perceived vulnerability. Interviews were used to study tourism stakeholders' past account of environmental hazards, perception potential impacts of climate change and their response strategies for coastal tourism region of Mombasa, Kenya. Findings indicate categorical awareness variation with government officials, conservation and research institutes being more aware of climate change potential impacts whereas tourism managers were found to have global picture of the phenomena rather than local picture of the occurrence of climate change impacts despite having experienced challenges of water scarcity, coral reef bleaching, changes in precipitation, flooding, and changes in beach structure which all have implication for tourism. No tangible adaptation actions are reported among tourism operators, but the government is engaging on planned adaptation. Information sharing, education and actor-partnerships among the players at the destination are proposed and further research gaps are outlined.

Key words: coastal tourism, climate change, planned adaptation, climate policy, Kenya



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Introduction

Tourism is an important social economic activity. It contributes to about 9% of global GDP both directly and indirectly (UNWTO, 2014). It is also the fastest growing social economic sector and has continued showing a positive growth in the past six decades. In 1950 tourist recorded 25 million tourist international arrivals and has exhibited a positive growth in arrivals to reach 1080 million arrivals in 2013 and currently regarded as the fastest growing sector globally (United Nations World Tourism Organization 2013). This growth has been projected to continue at a rate of about 4% between 2012 and 2030. However climate change has been singled out as one of the greatest challenge for human social economic advancement in the 21st century and beyond (IPCC, 2007).

Tourism is climate sensitive because climate is a core resource for tourism development. It not only dictates the type of natural attractions and resources like the sun and ecosystems, but also determines the nature of tourist activities, their location and the seasons to be spent by the tourists (Gosling et al. 2006b; Morrison, Pickering 2013b). Therefore tourism is vulnerable to changing climate regime United Nations World Tourism Organization, (United Nations Environmental Programme & World Metrological Organization, (Simpson et al. 2008) and it is likely to pose challenges for most tourism destinations (IPCC, 2007)

In response climate change challenges mitigation and adaptation strategies have been proposed (Simpson et al. 2008); IPCC 2007; (Weaver 2011), since adaptation to climate change risks is urgent (IPCC, 2012). In this regard tourism policy makers are already advancing policy efforts, at least rhetorically. In research, 'collective actions,' 'bottom-up approaches', and 'localised approaches' have been favoured as sustainable approach in climate adaptation (e.g. (Adger 2003). However, there is limited research on the climate change- tourism nexus (Scott

2011);(Weaver 2011); especially from developing countries (Kaján, Saarinen 2013a), despite being considered the most vulnerable regions (Parry 2007). Furthermore, as it has been previously noted, tourism is said to be behind in many aspects of climate change research (Wolfsegger et al. 2008).

The IPCC fourth report recognises coastal and mountainous tourism as the most vulnerable forms of tourism to climate change impacts (IPCC, 2007). Despite few assessment of projected impacts of climate change on tourism especially in global south, flood risks, water-pollution related diseases in costal zones, coral reef bleaching as a result of climate change have been speculated whereas some locations are already experiencing the impacts hence there is need for destinations to adapt (Parry 2007; UNWTO-UNDP-UNEP, 2008)

Adaptation here is defined as:

'Adaptation is adjustment in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability.' [(IPCC, 2007, 881)]

There are many forms of adaptation (Trawöger 2014), including technological, behavioural, financial, institutional and informational as distinguished by earlier works of Smit et al., (2000) and further detailed with examples in (Hall, C. Michael Michael, Gosling 2012). These forms of

adaptation have found practical application on a micro-region in tourism as demonstrated in an attempt to develop a sustainable adaptation portfolio for a tourism region where the adaptation forms are interrelated with aspects of sustainability (Social, economic, environmental and institutional) to produce an adaptation portfolio (Csete and Szécsi 2012, p. 104). Nevertheless, adaptation cannot be achieved by a list of interventions or strategies (Njoroge 2014) because some other factors may enhance or limit the capacity to adapt including information access ([Smit, Wandel 2006](#)) and not limited to collective action and integrated response (IPCC, 2007).

In tourism and climate change policy, collective actions and stakeholder's involvement have been underscored as important elements for successful adaptation response (See frameworks for regional tourism adaptation e.g. (see UNDP's Adaptation Policy Frameworks for climate change: Developing Strategies, Policies and Measures' (Burton et al. 2005); UNEP's 'Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices' ([Simpson et al. 2008](#)) and in academic literature (e.g. [Jopp et al. 2010](#); Njoroge 2014), just to mention a few. These advances in research and development of 'Top-Down' policies may not contribute much to the local tourism stakeholders intentions' to respond to climate change. It is therefore important to evaluate stakeholder's perception of climate change associated impacts, risks and hazards as argued by (Trawöger 2014), where the perceptions of relevant stakeholders are paramount as is also noted in public policy process ([Bramwell, 2005](#)).

To this regard, as Kenya is advancing its efforts to have a climate policy and frameworks for adaptation in different sectors, including tourism, it is important to explore the tourism stakeholders' and key actors' understanding of climate change, problem framing, perceptions and their response strategies. Therefore, the

objective of this research is: (1) to evaluate Mombasa County's tourism operators and relevant key stakeholders' awareness of environmental, weather and climatic changes (both past and present), hazards produced, how it affected them and their response to these hazards, (2) explore the understanding of climate change and perceptions on forecasted impacts of climate change, and (3) to explore current and future adaptation plans and programmes at the destination. This research is an important starting point for developing a regional adaptation framework programmes including bottom up approaches, community based adaptation and integrated adaptation in an effort to achieve sustainability within the tourism sector. It is also a contribution to literature on supply- side perceptions among tourism operators with a focus of Sub-Saharan Africa where, currently, limited empirical research have been reported and/or published.

Climate change perceptions in tourism research

Research on climate change perception in tourism has gained popularity in the last decade. Two distinct research fronts include one that focuses on the demand side and the other on the supply side; although the earliest interest among tourism researchers can be traced as early as Mid 1960s (Scott, Wall & McBoyle, 2005).

The earliest focus on climate change perceptions in tourism has been the demand-side which is largely dominated by research in snow based tourism regions, (e.g. Hall 2006; [Scott et al. 2007](#); [Scott et al. 2006](#)). Further attempts have been made to model future demand patterns under changing climate regimes ([Berritella et al. 2006](#); [Day et al. 2013](#)). Despite these advances on the demand side, it has been argued that such efforts may not provide a clear implication for future climate change response, specifically adaptation, among tourism

players at the local/destination level ([Wyss et al. 2014](#)).

In the recent past there is has been a growing interest among researchers who have examined the perception focusing on the supply side. A brief review on the supply side indicates a number of studies on perceptions have been conducted in the mid 2000s just after tourism was brought into picture at the global climate policy level in Djerba Tunisia (The 1st International Conference on *Climate Change and Tourism*). For example, ([Saarinen, Tervo 2006](#)) studied climate change perception of nature-based tourism entrepreneurs in northern Finland and the Finnish Lake District, south east Finland; ([Hall 2006](#)), researched on the attitudes and adaptation and mitigation behaviours of New Zealand entrepreneurs towards climate change; ([Belle 2005](#)) examine the views of policy makers and tourism managers on the potential climate change impacts and explore their preferred policies response on Barbados tourism industry, whilst, ([Bicknell, Sharon, McManus, Phil 2006](#)) compares the perceptions and responses of resort managers and government for the case of Australian ski industry.

Most recent publications include ([Marshall et al. 2011](#)) who test the awareness of tourism operators of early impacts in the Red Sea; ([Brouder, Lundmark 2011](#)) examine the perceptions of winter-oriented tourism entrepreneurs regarding potential threats from climate change and their sustainability of the region as a winter-tourism destination under climate change in Upper Norrland, in Northern Sweden; ([Trawöger 2014a](#)) on the other hand has categorically evaluated winter tourism stakeholders perception to include: 'convinced planners', annoyed deniers', 'ambivalent optimists, convinced wait-and-seers'; ([Hopkins 2014](#)) examines the perceived risks of local climate change in Queenstown, New Zealand; ([Morrison, Pickering 2013](#)) explores perceptions of ski-tourism representatives and other regional stakeholders with regard to

climate change impacts, limits to tourism development and adaptation strategies in the Australian Alps. There is also an emerging interest in integrating both demand and supply sides with an example of ([Hopkins et al. 2013](#)) who examined the travel flow of Australian tourists to New Zealand under hypothesised 'poorer snow condition' where they interviewed New Zealand ski industry representatives and Australian tourists .

Others have pursued a focus on perceptions with interesting themes such as contextual vulnerability which has become an interesting area for tourism researcher (e.g. ([Roman et al. 2010](#)); awareness and organizational response (e.g ([Helgenberger 2011](#);[Trawöger 2014](#); [Hoffmann et al. 2009](#)).

A dominating trend on tourism research including climate change perceptions has been observed with exemplary output on mountain destinations specifically in Australia, New Zealand and the Alps region, scarce case studies have been done focusing on the global south. The imbalance of knowledge persists ([Weaver 2011](#)), with limited research emanating from developing countries in Africa ([Kaján, Saarinen 2013](#)). However, research from these regions is emerging. For example an interesting case by ([Saarinen et al. 2012](#)) who studied operators' perceptions of climate change and their adaptation strategies in Kgalagadi South District, southwest Botswana.

Studies on climate change perceptions in coastal and island destinations

There has been a growing interest on coastal tourism and climate change nexus among researchers. This may be attributed to the fact that coastal zones have been considered one of the most vulnerable regions under climate change projected impacts considering its social, economic and biodiversity value.

Gosling et al. (2006) studied the role of climate in travel decision, tourist perceptions of climate change and the implication of climate change impact on

the destination. In a survey of international tourists in Zanzibar, climate change scenario (more rain, storms, and higher humidity) were perceived to negatively influence travel decision, while 'higher' temperature were thought to favour travel. Furthermore, leisure tourists were found to be unaware of what impacts they contribute to the environment.

Hübner & Gössling (2012), sought to understand tourist perceptions of extreme weather events in Martinique. By use of questionnaires and structured interviews the study revealed that while tourists have an encoded understanding of local climatic conditions due to their previous experiences, heavy rains were found to conflict with expected weather which had a negative implication for travel demand patterns.

Braun et al. (1999) studied the potential impacts of climate change on tourism preferences for a destination. Using the case of North and Baltic Sea in Germany they described scenarios to the subjects and they found that future climatic related changes would have a lesser pull factor for tourists to travel to the German Baltic sea region. Belle (2005) studied the perception of Barbados policy makers and related tourism stakeholders. They found that that they believed that climate change is 'very' likely to have an impact on the island's tourism industry. Moreover, despite a rise in awareness about climate change among stakeholders, tourism managers and policy makers had differentiated opinions/views about policy response. The policy makers saw regarded policy intervention as key and the way forward for the destination, but tourism managers were adamant about policy response.

(Uyarra et al. 2005), surveyed Island-specific preferences of tourists for environmental features and the implication of climate change on the tourism sector in two states, Bonaire and Barbados. Tourists visiting Bonaire regarded Warm temperatures, clear waters and low health

risks were found to be the most important features that determine their destination choice and marine life were later appreciated as an added value. On the contrary tourists in Barbados were found to prefer terrestrial features more specifically the beach characteristics. It is also reported that more than 80% of the tourists in both states would be unwilling to return to Bonaire and Barbados in case of coral bleaching induced by higher sea temperatures and sea level rise respectively in the two locations.

Buzinde et al. (2010) uses Lefebvre's triadic model of social space as a basis of understanding how symbolic landscapes meanings and are constructed. They examined tourists' perceptions on coastal a destination with severe beach erosion. They found that although symbolic landscapes may have constructed meanings, hence the tourists 'decoded' sites in different ways. However, they revealed that they had a synonymous believed that the tourist would react negatively to the changing landscape.

McEvoy et al. (2008) studied the perceived vulnerability of coastal zone and the uplands in North West England. Through a study a mix of research and 'risk' workshops with tourism stakeholders, they found that they perceived that threat from climate change would make the region vulnerable to impacts including changing water table and the dune system which acts as a natural defence. Rauken et al. (2010) examined the effect of summer season weather and weather changes among Small and Medium size Enterprises (SMEs) entrepreneurs in Northern Norway.

Through a two-stage semi-structured interviews they found that weather and weather changes was not a concern for them. However precipitation and low visibility was perceived it would have negative impact on their business. They also note the limitation of SMEs in long term planning.

Valls & Sardá (2009) evaluate the perception of European Tourism experts involved in planning double convergent-Delphi-Method. In the study majority of the experts were convinced that climate change is already happening and threatens tourism related businesses hence there is a need to respond to these threats. They also noted that the future is challenged by uncertainty. Moreover, there was a perception of responsibility and need for action for mitigation. Although they were adamant on mitigation related taxes, they voiced their call for the need for responsible growth and a push for green energy.

In another study of tourist resort region in Fiji it was found that surveyed operators were aware of climate change related impacts including cyclones, loss of coral reefs and heavy rain events, (Becken 2005). Tourism operators were also found to be prepared to climate change eventualities. Furthermore, it was revealed despite the need for the tourism industry to cut on GHGs, reducing emissions which are part of mitigation was not as important as cutting on operational cost on energy use i.e. economic gain (Becken 2005).

Klint et al. (2012) reports on shocks and stressors faced in Luganville in a dive tourism destination region in Vanuatu. Using semi-structured interviews, group discussions, and personal observations they identified cyclones, earthquakes, which have in the past altered demand patterns especially due to altered international flights. On the other hand starfish outbreaks and environmental degradation are likely to be main stressors for the destination. Moreover indigenous communities are more concerned about these developments while expatriates displayed 'little concern' for the potential impact of climate change hence a challenge for mainstreaming climate change adaptation for the destination

In summary studies on climate change related perceptions have gained momentum. A clear cut between the

demand-side (Gossling et al. 2006; Uyarra et al. 2005; Hübner & Gössling, 2012) and supply-side perceptions (Belle 2005; Buzinde et al. 2014; McEvoy et al. 2013; McEvoy et al. 2008; Rauken et al. 2010; Valls & Sardá 2009; Becken, 2005). Others have attempted to match both supply-and-demand perceptions (Buzinde et al. 2010)(see also Becken (2004). This research undertakes a supply-side focus.

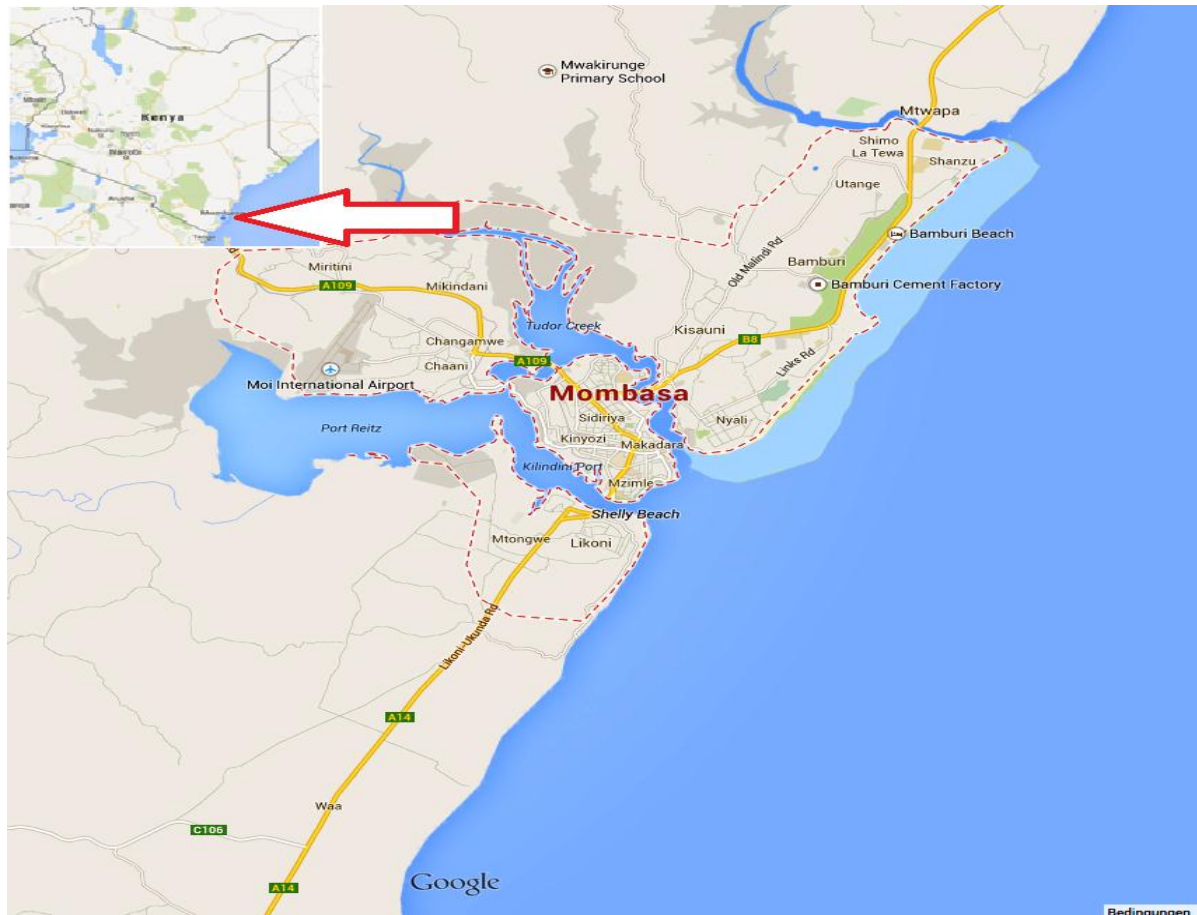
Methodology

Study area

Mombasa is one of the 47 counties that came into existence after the promulgation of the new constitution of 2010. The constitution devolved both power and resources to county level. The first administration for the county administration was formed through an election held in 4th March 2013.

Mombasa County is the second largest city in Kenya and lies between 3°80' and 4°10'S latitudes and 39°60' and 39°80' and covers a land mass of about 218 Km² (KNBS, 2010). It has six administrative boundaries: Changamwe, Jomvu Kisauni, Nyali, Likoni and Mvita constituencies. It is a port city, largest in East Africa and an important region for tourism. The city is largely developed within the island in terms of infrastructure with rich cultural heritage sites but has limited resorts. Most touristic hotels are and other touristic facilities are more towards the North along the Mombasa Malindi highway including Nyali, Bamburi and Shanzu areas just before the Mtwapa Creak where the county borders Kilifi County.

This Northern stretch provides low lying white sand beach area which is popular for the tourists. Mombasa is also the smallest county based on land mass but it is the most densely populated county in the country. According to 2009 census statistics Mombasa has a total population of 939,370 inhabitants and 4,292 persons per square kilometre where an average (KNBS, 2010).



Map 1: Mombasa (source: www.google.com)

Tourism in Mombasa

Coastal zones both terrestrial and marine are important and popular for tourism activities hence the development of massive tourist infrastructure to cater for their needs. In Kenya, tourism is a key social economic sector contributing to about 12% of its GDP making it the third important export after tea and horticulture. While Kenya may boast for its Big 5 which has led Kenya being branded as perfect destination for Safaris, almost 60% of the tourist who visit Kenya end up at her coast. This has led to rapid development of tourism infrastructures including accommodation facilities. According to the Kenya Institute of Public Policy Research Authority (KIPPRA, 2013) the coastal region accounts for almost 50% of total bed capacity. Furthermore Mombasa has

a substantial share among coastal resort regions along the Kenyan coast. This is because Mombasa has been for long time a leading tourist destination in East Africa (Akama & Kieti, 2007). Key attractions include the traditional Sun, Sand and sea, rich heritage site including two UNESCO sites (Fort Jesus and Kaya forests), Mombasa Marine Park, among others. Some of the tourist activities include snorkelling, diving, sea fishing, bird watching and wildlife watching especially marine life.

Climate change impact and vulnerability of Mombasa region

In Mombasa, like many tourism destinations in developing countries, little research on climate change and associated risks has been carried out.

Nevertheless there are a few non-tourism specific studies that can provide a glimpse of how Mombasa has have been affected or ought to be affected in future under changing climate regime. Mombasa has it share of flooding events related to El Niño and long rains in the past. This has been coupled by it being a LLCZ with several unplanned settlement that have encroached the sewerage and drainage systems in the city (Awuor et al. 2008). In the first communication report by the Government of Kenya to the United Nations Framework Convention on Climate Change (UNFCCC), sea level rise is highlighted as a potential threat to environmental, social and economic systems in the region (GOK, 2010).

Later, The first ever GIS based analysis of exposure to flood risks due to sea level rise and storm surges revealed that more than 210,000 people and over US\$ 500 million of assets are vulnerable. Further predictions of sea-level rise scenario by 2080 under A1B sea-level rise scenario (43 cm sea-level rises by 2100) and A1 social-economic scenarios would expose about 426,000 people and infrastructure of about US\$ 17 billion (Kebede et al. 2012).

In a literature review by Awuor et al., (2008) low altitude, high average temperature and humidity (26.4°C - 65% humidity) makes Mombasa vulnerable to heat stress, disease outbreaks and loss of biodiversity both terrestrial and marine. The authors also argue that, 17% of the land mass (4,600 hectares) would be submerged under a 0.3m sea-level rise. Furthermore, unplanned settlement and structures, high population and low adaptive capacity make Mombasa vulnerable to climate change impacts (Awuor et al. 2008). Although there is limited research on how climate change may affect the tourism sector it could be concluded that the tourism industry may face challenges of water scarcity, heat stress due to temperature rise, challenges of water borne disease outbreaks due to flooding, loss of destination appeal, water

stress, infrastructure damage among others. (UNWTO-UNDP-UNEP, 2008)

Research design

The methodology of this research is based on the theory of Critical Realism which substantiates the choice of a case study to accomplish the research. Critical realism recognizes three levels of reality, emphasizes on contextualization and the relationship between structure and agency (Wikgren, 2005). The philosophy of critical realism recognises case study as a legitimate method for information gathering about a phenomena. Critical realism substantiates the use of a case study to understand a phenomenon (Easton 2010). Yin (1994) presented four applications of a case study model that includes a) to explain *causal link* in real life phenomenon, b) to describe *real life* context in which the phenomena occurs, c) to describe the *phenomena* and, d) to explore the situation in which a phenomena being studied where the *set of outcome are unknown*.

'The relationship between climate change and tourism represents complex causal link which affects tourism destinations and its stakeholders in real life context. Climate change is the phenomenon and the interaction of climate change and tourism has set of outcomes that are unknown in the chosen case study region.' (Author)

Population, sampling and data collection technique

A total of 396 prospective interviewees including tourism business-related managers, attraction facility managers, conservation managers, researchers and consultants, climate policy institutions and other relevant government authorities were identified. A stratified random sampling method was used to ensure

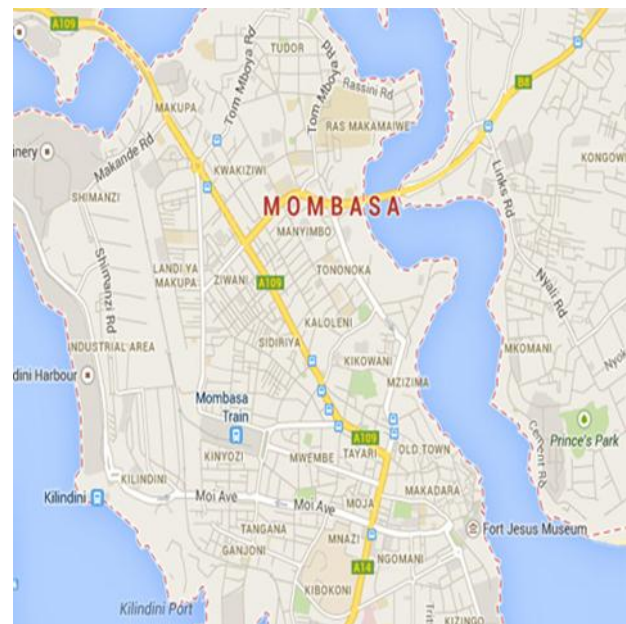
inclusive representation based on star rating and business size (for tourism businesses) considering that not standard all organizations are star rated or don't fall into rating categories while the others were identified as relevant stakeholders e.g. water sector, local planning department, coastal zone researchers and conservation both governmental and Non-Governmental (NGO), department of tourism, Attraction managers, Travel agents, Tour operators, Airline operator (See table 1 below for the complete list and explanations) .

After the sampling a standard letter was sent between November and December 2013 to 168 prospective interviewees. The letter was designed such that it did not pre-empt exactly what research interest was but rather general statement was made that the research was aimed at understanding general environmental changes and how such changes might have or ought to affect the tourism sector and/or destination. This approach was done deliberately in order to avoid pre-preparation to exact issues of interest. Terms such as 'Climate change', 'adaptation' and 'mitigation' were avoided. About 90% of the letters were hand-delivered while others were sent by post. Follow up call was made to schedule appointment.

The research project was undertaken for four months between November 2013 and February 2014 including pre-testing of the interview schedule. For some hoteliers I

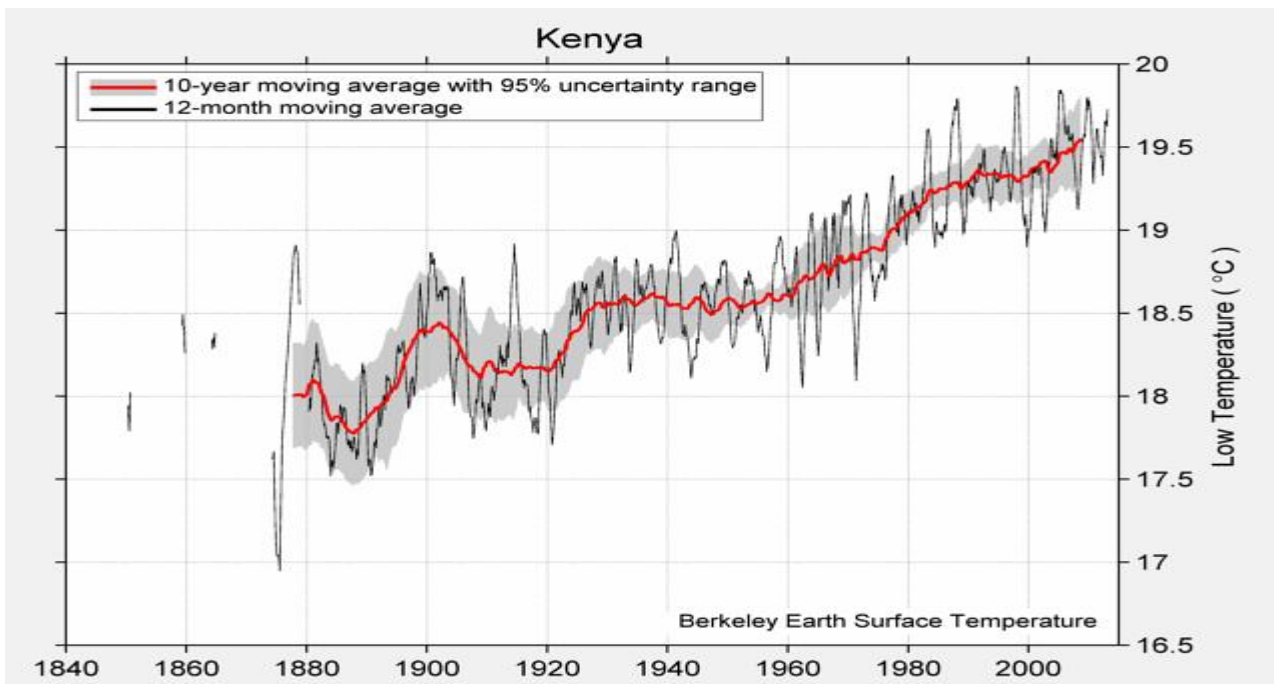
employed snow bowling method but conscious need for equal representation as per original strata. A total of 50 interviewees were interviewed successfully against a target of 70. However during transcription 1 interview was dropped due to poor audio recording hence 49 responses were considered for analysis. Among those interviews include 31 tourism business related managers, 2 attraction facility managers, 5 conservation managers, 4 research and consultants, 3 climate policy makers and 4 other relevant government authorities (see table 1).

Source:
[http://www.newvision.co.ug/newvision_cms/gall_content/2014/7/2014_7\\$largeimg224_Jul_2014_190937657.jpg](http://www.newvision.co.ug/newvision_cms/gall_content/2014/7/2014_7$largeimg224_Jul_2014_190937657.jpg)





Source: http://news.bbcimg.co.uk/media/images/72036000/gif/_72036992_kenya_mombasa_0412.gif



Source : Berkeleyearth.lbl.gov

Table 1: Interviewee Profile

N =	Position Held	Organization category/type	CODE
	Category A: Tourism Business managers		
4	Travel and tour manager	Business operators	TA
2	Tour operation Managers	Business operators	TO
19	Hotel Managers	Business operators	HO
1	Director Hotel Keepers Association	Business Association	HA
1	Director Coast Tourism Association	Business Association	TAS
1	Beach Traders Association Manager	Business Association	BTA
1	Regional Manager	Airline operator	AO
	Category B: Attraction managers		
1	Park Manager	Recreation	A-PO
1	Curator	Cultural heritage institution	A-GOV
	Category C: Conservation managers		
1	Head of Department	Conservation	C-GOV
1	Marine life researcher	Research/Conservation	Rs/C-NGO
1	Beach monitoring staff	Conservation Agency	C- GOV
1	Researcher	Conservation Agency	C-NGO
1	Head of Research	Conservation Agency	C-GOV
	Category D: Research and Consultants		
1	Consultant	Climate change research	Rs-NGO
1	Scientist	Education Institution (Uni.)	Rs-UNI
2	Oceanographer and a marine Scientist	Research	Rs-GOV
1	Marine life researcher		Rs-NGO
	Category E: Climate policy		
1	Director	Climate policy Regulator	CL-GOV
1	Officer in charge of projects	Activist	CL-NGO
1	Member	Climate activist	CL-NGO
	Category F: Others relevant government Authorities		
1	Director	Development Agency	D- GOV
1	Director	Water resource management	W-GOV
1	Planning Engineer	Local government	P-GOV
1	Regional Director of tourism	Regulator	TR-GOV
1	County officer (NEMA)	Regulator	R-GOV
49			

Key: Code Explanation

TA: Travel Agent

TO: Tour Operator

HO: Hotel

HA: Hotel Keepers Association

TAS: Travel Business Association

BTA: Beach Tourism Association

AO: Airline Operator

APO: Privately Owned Tourist Attraction

A-GOV: Government Owned Attraction

C-GOV: Conservation institution Owned by the Government

C-NGO: Conservation Institution Owned by NGO

Rs-GOV: Research institution owned by the government

Rs/C-NGO: Research and Conservation organization owned by an NGO

Rs-UNI: University Research Institution

CL-GOV: Climate change Policy institution Owned by the government

CL-NGO: Climate Change Policy activists (NGO)

D-GOV: Regional development agency

W-GOV: Government Water Management Institution

P-GOV: Local Planning Institution

TR-GOV: Regional Tourism Government Regulator

R-GOV: Regional Environmental Regulator

Data collection techniques and methods

Interviews are part of qualitative data collection methods and are commonly used in studying perceptions in social science research. In climate change and tourism research interviews have been used to understand policy makers and industry perception on climate change in Barbados (Belle 2005); tourist perception on climate change in Zanzibar (Gossling et al. 2006) while Becken (2007) studied tourists' perception of international air travel's impact on the global climate and potential climate change policies. Saarinen & Tervo (2006) studied the perceptions and adaptation strategies of the tourism industry to climate change in the case of the case of Finnish nature-based tourism entrepreneurs.

In this study a semi-structured interview schedule was used to conduct the interviews. For tourism business, attraction and tourism policy makers a list of 25 questions were designed to capture six main areas including: a) current top concerns about their operations and destination in general, b) Awareness of past and current environmental changes, associated risks produced by this change, How it affected their operation, and response strategies to these hazards both in the past and future, c) Perceived link between these changes, and hazards produced, to climate change, d) their understanding of climate change, associated risks, perceived future hazards, vulnerability of the destination and response strategies, e) Information access and sources and f) opinion on individual vs. collective action in climate change adaptation. For other respondents, questions were framed on environmental changes, climate change impacts, vulnerability and response strategies of the region/destination based on their sector role in the region were asked. However, the number of questions asked would vary per respondent depending on their organizational role and familiarity in the region. Each Interview

lasted between 45min to 1hour. The interviews were later transcribed into text and the commercial MAXQDA™ was used to organise and extraction of main statements.¹

Results

Current top concerns at the destination,

When tourism business operators were asked about their current top three concerns, there was synonymous response for all of the operators on issues of insecurity, cost of operation, and competition from other coastal destinations within east Africa including Zanzibar and a drop in international tourists during last year's peak season. The operators were concerned about the rising insecurity caused as a result of terror groups operating within coast region and recurring youth unrest in the past few years.

The biggest challenge is how to fill up the hotel. If I have an empty hotel even my job is not guaranteed! The numbers of oversea travelers has gone down recently because of security issues linked to terror groups and youth unrest like the one that happened last few weeks (October 4, 2013). What needs to be done is to address the issue of insecurity especially terrorism...After the new county government system came into place most operators felt overwhelmed by newly introduced levies that is paid per bed among other levies. (HO-6)

There are many things that concern me as a hotel

¹ MAXQDA is a professional software for qualitative and mixed methods data analysis. www.maxqda.com

manager. First is the cost of operation. Since the National Alliance Rainbow Coalition (NARC)(2002- 2007) government the VAT and cost of operation has gone up. There are a number of taxes and levies that have been introduced and more recent a levy per bed that goes to the county government. Secondly business has been slow since 2007 post election violence, despite a growth in the Asian market we are not doing very well. Thirdly is the problem of degraded destination. It seems like our destination is losing to other destinations like Zanzibar and Tanzania. Some say that we have become expensive yet our hotels are old. Fourth is the problem of insecurity that has let to withdrawal of important charter flights from UK, Germany and other European countries. (HO-17)

Importance of Environmental resources

Regarding the importance of the environment and its resources to the respondents' daily operations, majority considered the sun sand and sea were termed as the most important environmental resources that they depend. They are regarded as the key selling point for the destination.

We depend on the sandy beach, Nature Park, Marine Park and our own beautiful lawn and trees within the hotel. (HO-1)

The quality of the environment is definitely important because we are selling the beauty of Mombasa beaches...the lovely sun, sand, and sea. The blue waters, the white

sandy beaches are what we capture in selling brochures and web images. It's is therefore a definite yes (HO-15).

The beach is one of them. It is important because one of the reason tourist come to Mombasa is because of the sun, and sea. However the beach faces many challenges. First are the beach boys, unplanned structures, overcrowding during high season, and too many annoying traders. Right now the Kenya Wildlife Service has come up with a programme aimed at cleaning the beach. However this is not done so regular (HO5)

As I mentioned, the sun sand sea and the vegetation around the place. The warm weather is core. Others are architecture of Swahili people and the historic buildings in this region.' (HO14).

...tourism is built on the environment. It forms part of the product and that's why it is important for the sector. We depend on natural resources like the sea, beach, sun, nature, built environment etc. (A-GOV)

The quality of the environment is critical for our business operation. Our business is based on the environment. As you may be aware this place was a waste land after the quarry activities ended in the 70s. We had this unpleasant wasteland. We therefore thought of rehabilitating the area and we introduced species of plants that could

survive limestone desert. We have also introduced a lot of microorganisms to restore the ecosystem that was lost. By doing so, we have managed to come up with a whole lot of restored ecosystem and good environment for day trippers and recreational tourists. Therefore our business is based on the environment. No one would visit here if the environment was wasteland. (A-PO)

Past and current environmental changes and their associated risks

When the respondents were asked whether they are aware of any past and current environmental changes, associated risks produced by this change and how it affected or affects them; high tides, strong winds and flooding were largely mentioned with reference to El Niño rains and long annual rainfall. However, most hoteliers reported that the floods had never had adverse effects on their daily operations because the resort area has a sloppy terrain which drains water into the sea unlike in unplanned settlement zones within the county. But during such times Mombasa becomes an 'unattractive destination' for tourists and low business is recorded. Furthermore some hoteliers claimed that they have experienced changes in weather pattern including dry spells that have led to decreased supply of fresh vegetables while others expressed 'abnormal' cold season especially in reference to the period when this research was undertaken.

We do not have any problems apart from the months of May, June and July when we normally experience the southern winds which are from the southern direction. During this time

you must be very careful with the sea and we usually advice our clients to take great caution. We have had a number of accidents especially with fishermen who are trapped on the reefs and some die but we have never had any problems around the beach....During the years I have been here I think I have experienced slight difference on the beach and I need to be educated by someone about it. I am losing the beach area and if you walk just a few meters from the wall you can clearly see the protruding coral stones which are a clear proof that the top sand has been washed back unlike when I came here in 1998. Our neighbouring hotels who have not erected this type of wall they are not experiencing the problem. In fact they have more sand past the boundary because of the sand building up.the rain we have now is not as much as it used to be before...there are longer dry spells than before...and...nowadays we have more problems of getting good supply of fresh vegetables and fruits unlike the recent past. ...the dependence on rain fed water has led to reduced quality and quality of the fresh produce. (HO-1)

There are some changes especially with weather

pattern. For example this year January 2014 has been cold whereas it is usually being expected to be hot. You have seen today it is cloudy. Usually January, Feb and March is usually hot, but it is becoming different. ...some few years ago we experienced flooding...and ... It happened because Mombasa we don't have adequate sewage and drainage systems. (HO-2)

During the El Niño of 1997/1998 I was living in the north coast and there was major flooding event that made the roads impassable, hence cutting the north coast and Mombasa Island. The flooding inflow into the sea caused mass mortality of the reefs which was further acerbated by the rising temperatures in the following months. (C-NGO)

Some few years ago we experienced flooding. It happened because Mombasa we don't have adequate sewage and drainage services. ...It does affect us because if it rains the tourists or holiday makers are disappointed because they come here because of the warm sunshine weather. When they arrive they ask about the weather. The following them the same they will ask. So when the weather is not favoring them they get disappointed. Favoring them how? Because their home it is cold. From April to June business

goes-slow because of the coinciding season that is spring to midsummer in their country. (HO-6)

El Niño caused flooding, disease out breaks, and for the tourism sector that is not something that destroys the destination. I may not be able to tell if this hotel was affected but i think most businesses were affected by loss of business from booking cancellation. Remember it was not a one day event but something that happened over a period of months. Like Tanzania highway was cut off at some sections and that affected the flow of people and goods between the two countries. (HO-18)

...for the case of El Niño floods definitely yes and it has been experienced in the past that rainy days people avoid the beach area and the traders rarely sell anything during that season. (BTA-1)

On the other hand resource managers, conservationists and researchers/scientist echoed sentiments raised by tourism operators about changes in the beach structure, and destruction of certain plant species to pave way for construction which have in-turn affected the laying ground for turtles. They also gave an insight of how El Nino rains of 1997/98 led to massive coral deaths.

Changes are there. You see for example there is massive construction of tourist facilities along the beach which has affected the beach structure including erosion.

Furthermore some plant species have been destroyed to pave way for the construction of these facilities. Another thing that has happened is that the laying grounds for turtles have also been affected. The encroachment is a big challenge. Another thing is that during construction some contractors have dumped debris on the beach. This debris is then washed to the beach area which is a problem. (C-NGO)

Coastline is very dynamic. The beach depends on the sediments from the terrestrial land. Generally if you take net land, the coast line is changing. Nyali beach is gaining but not as Bamburi. Human activities along the coast line are to blame on these dynamics; if sustainable mitigation measures are not undertaken then I think we shall have serious problems along this coastline especially in changing climate regime. (Rs-UNI)

The much referred El Niño rains were associated with ecological damage especially the marine life where massive coral deaths were recorded, but since then the eco system has improved as resource managers and various scientists/consultants said they have observed a healthier eco system as compared to the aftermath of 1997/98 El Niño rains. (Rs-GOV).

They also voiced their concern about unplanned development along the beach, land grabbing, destruction of mangrove forest and poor garbage management along the beach as some of the observed changes in the environment.

Unplanned development along the beach has lead to erosion. We are aware of the situation and we have pushed for tight measures to ensure proper planning and development along the coast line. Another issue is land grabbing which bars access to the beach area. The beach is a public good and the law allows access to the public to all. Another major issue is the destruction of mangrove forests by the community around this area. Mangrove has been illegally exploited for firewood but the forestry department is working endlessly to curb the practice and to restore the mangrove forest. Latest statistics show that we have lost about 80% of the mangrove forest between 1993-2013 which also has an implication on the ecosystem and biodiversity. (C-GOV)

Response strategies

When the respondents were asked about their specific response strategies to past and current environmental changes, all hoteliers who had experienced flooding in their facility said they reacted by 'improving' their drainage system however none of the hoteliers had laid clear plans for response other than mentioning an availability of a disaster evacuation plan. Hoteliers who experienced a drop in bookings

and booking cancellations said they focused on local market especially walk-ins, day trippers and conference makers.

When there was a small flash flood here in the facility we responded by unblocking the underground drainage which was partially blocked and that problem was solved completely. I have no flooding risks for now but if it happens in future we have an emergency department that can take care of our guests. (HO-1)

We used price strategies to attract customers...We also avoided outdoor activities during rainy seasons....We also advised our clients on climate forecasts on more frequent basis. (HO-8)

We had to depend on local market especially conferencing and day trippers. (HO-13)

We engaged our team in developing alternative product for conferences, workshops, day trippers and we also used the time to prepare for the high season bookings. (HO-14)

Furthermore, whilst most hoteliers have erected a barrier wall on their sea front, it was interesting to note that such barriers were not constructed as a result of any threats from the sea levels but rather for controlling movement, provide a sense of security to the guests, holding the hotel side sand from being eroded. These walls which are normally at the highest water mark point, some of them were erected over 40 years ago when the hotels were constructed. However some hotels have considered adjusting their walls to protect the hotel from high tides as experienced

during the 2004 Tsunami that reached Mombasa.

We have a wall but not a very high wall. The role is two folds. First is to control movement and to give a sense of security to our guest. The second reason is to block the water during high tides. We built at the high water mark level at least to be safe. (HO-3)

We raised our sea wall because the previous wall was a little bit low and that's why we got the water into the compound during the tsunami event. (H-7)

...I have not done anything about it other than having an already existing wall that is at the front of the beach line. But this was erected long time ago with an aim of protecting further erosion of the hotel side sand and to block high tides and strong winds that blow inland from time to time. If the sea is rising then it means we shall need stronger walls to protect the hotel facility. But those rumours are no longer there anymore. ...so building of the wall was a long term strategy but was not necessarily built for the purpose of protecting us from sea level rise. (HO-18)

Other hoteliers in Nyali area felt that they had a natural wall since their facility is built on a cliff. In this area the elevation is much higher than on the Bamburi beach area.

...the coral rocks are very hard. We have built a restaurant on the cliff which has been there for 7 years. People thought it will collapse but the coral has been the same for many years. No changes. Even when Tsunami happened we didn't get hit by the waves. Compared to our neighbors we are on safe grounds. Then they had to build gabions. (HO-6)

When they were asked whether they think such environmental changes would prevail in future, there were mixed reactions with some thinking that such challenges would be more and severe, but majority felt that they were not in a position to tell or predict such changes.

I am not sure about what may happen in future. As you may have noticed we had different weather patterns last year and this January the temperatures are not as high as always. Our high season is turning to be low season. I don't know if we are going to expect more rains or floods or we are going to experience long dry spells. (HO-8)

Awareness understanding problem framing climate change

When the tourism operators were asked whether they are aware and how they understood climate change. All respondents acknowledged awareness of the term climate change and majority defined climate change as 'global warming', 'temperature rise' and 'changing weather and/or climate patterns. There was a good understanding of climate change although not all tourism operators

had concrete understanding of the science behind it. A few had the understanding of climate change implications.

Climate change is global warming. It is attributed by rise in global temperatures that in turn changes the weather and climate patterns in the long run. I have been informed that it is going to change the travel patterns since some cold places will have higher temperatures but I wouldn't know how that would affect our local business in future. (HO-8)

I understand it as global warming has an implication that may range from changes in rain patterns, or rather weather patterns, flooding risks, etc. (HO-7)

Climate change, I understand it when it comes to how it affects us both humans and nature both in the short and long term. For example changes in climate patterns, like December and January for me is a hot month but this year it is not as hot as expected. Rainy season was not as bad but July we had very heavy rains. (HO-10)

Climate change as far as I understand is global warming. The earth temperature is expected to increase over a period of time. ...I don't know if current weather events are associated by climate change or something else because we have had a

cold January unlike other years. I must say that I personally don't know whether the occurrence of past floods are as a result of climate change or not and if so I better be educated more on the relationship. (HO-12)

Climate change is a deviation of climatic and weather patterns from what is normal like changes in temperature, rainfall, etc. I understand currently there is an increase in temperature that would have dire consequence for the planet and mankind. What I don't know is the actual extent of the consequence and when it will occur. (HO-13)

It is global warming where temperatures are rising, sea level is rising, species are depleted or extinct, and such consequences are said to be occurring in different places of the world. (HO-14)

Climate change is also known as global warming which means a rise in temperature. We are told that climate change will lead to droughts and loss of biodiversity. Latest droughts that hit Turkana has been connected to climate change so I think it happening or very soon we will be able to experience it closer to us. (HO-15)

Climate change concerns global warming. There is a general trend that temperatures both land and sea level is rising and this would have devastating

impact on human life across the globe. Climate change is here with us because there are times for example last year December got cold unlike before. I think we need to do some evaluation about current climate trends to see what these changes might mean to us both in short and long-term. (HO-16)

Climate change is the change in weather events associated with general climate events. It has been said that the global temperatures are rising across the globe but this is rather a slow process over time. (HO-19)

While the tourism operators had different levels of understanding of climate change the scientists, researchers, government officials and tourism related association officials on the other hand were found well informed about climate change. Sea level rise, changes in temperature, water scarcity due to increased depletion of underground water resource, changes in precipitation and heat stress were considered to be affecting Mombasa and or has been forecasted to continue affecting Mombasa. Their reference was mainly on certain studies that have been conducted both by government and nongovernmental organizations.

Climate change is defined as climate variability due to anthropogenic forcing. It is a challenge facing humankind. The IPCC fourth report has revealed that climate change is real and already happening. There is a challenge in accurately predicting Climate Change but different societies are

experiencing some change. For the case of Mombasa the impacts includes flooding, frequent droughts, decline in crop yields, increase of vector-borne diseases, rising sea levels, loss of marine ecosystems like we have observed with corals. (Rs-NGO)

The reality is that climate change is here with us. You can be sure on of water stress, rise in temperature (sea) which is on record, stronger storm surges and sea waves etc. Sea level rise, changes in temperature, water scarcity because of ground water contamination and depletion of underground water due to increased depletion of underground water, changes in precipitation and heat stress is affecting Mombasa and the problem might be more in future. (CL-GOV)

So many scenarios on eco system degradation exist. ...Our eco system is endangered. Grass lands are getting much dryer, marine eco system is affected by human activities. (Rs-UNI)

Every place on the planet is vulnerable but Mombasa as an island is less vulnerable to sea level rise because it is on high cliff. Water stress will also be escalated by changing climate. If appropriate measures are not put in place then we might face

big challenges associated with. (Rs-GOV)

The issue of sea level rise in Mombasa County may not be a problem because of the topography of Mombasa which has no low lying areas but only in a few places. Therefore unless you are too close to the shore line you may not be affected in the new future. We don't know how much it might accelerate but for now Mombasa is safe. (Rs-GOV)

Climate change is defined as rise in global temperatures because of global warming. It results to melting of glacier ice sheets, loss of biodiversity due to drought water scarcity among other attributing factors. About climate change contributing to the environmental change I think its man's contribution because one water scarcity is because we have cleared our forests, eroded beach line is because we cleared the beach area to build hotels and guest houses, the death of corals fine that is climate change but what is man's contribution to climate change?...Everything from fossil fuels to deforestation. Let the truth be told, look at the locals how they have cleared the forested land for firewood and farming activities. It's regrettable. (CL-NGO)

Perception on recent media reports on 'Mombasa sinking due to climate change'

Recently there has been an alarmist report that Mombasa Island would go under due to sea level rise. The researcher was also keen to understand their perception on these reports that has been in the news highlights nationally. When they were asked about their perception on recent news reports that Mombasa would sink in the next twenty years which had been popularised by media houses based on a published research, a considerable number of tourism operators felt that they could not believe the reports because the report is still controversial.

I think these are scientific facts that have been recorded but what we don't know yet is how we will be affected as a country or at the community level. Although it is in the political scene that climate change will have a major impact on us it is not clear when this will happen. (HO-4)

I think that was propaganda or something to trigger anxiety. The claim was refuted by KEMFRI scientists but it's not something to be ignored either way. If there is some research that has confirmed that there is need to look it to it again and see how we will be affected as a region rather than pointing fingers. If Mombasa goes under that means a big percentage of hotel infrastructures will be affected. It is not a laughing matter but needs

to be addressed and we should know what exactly this means. (TA-1)

I think there might be some truth not from my observation but it is common sense that if the ice is melting where that water does go to? To the sea! Hence the sea will rise and that would have impacts in future, am I lying? Science may not be 100% true but it is giving us some food for thought. We should think about it and encourage more scientists to look into the matter than condemning their finding. (HO-17)

I have heard that Mombasa is sinking but I don't know the truth of such reports. It has been alleged and if that is true and that is what the scientists have discovered then I think we will have those problems in future. Mombasa is prone to flooding any way therefore the sea level rising will make the situation worse. (HO-18)

One oceanographer also rubbished the report saying Mombasa's topography is elevated and was safe at least in short term. He further claimed that the main issues that should concern Mombasa especially the island is the sinking of 'too many' boreholes and building of skyscrapers.

...We had a project funded by UNDP where we had a sensitivity mapping of the Kenyan coast. The project went to an extent of doing a tsunami damage prediction

where scenarios were developed i.e...Worst case scenario, moderate and minimum scenarios. In worst case scenario we considered our tidal range for Kenya which is about 4metres and the analysis showed no major impact on the coast. ...If I may take you back to the tsunami event of 2004 we were lucky because by the time the wave hit the Kenyan coast it was low. And because the tsunami tide was of about ½ metres it looked like a minor tide but the difference is that it was at high speed unlike normal tides that we face on daily basis. However in the spring tide which is about 4metres and a tsunami is generated that is what we may call worst case scenario but even with aerial imagery that we undertook Mombasa is seen as generally safe. Although areas that are low lying and infrastructure that is too close to the sea like the newly built marina in Nyalibeach may be affected (Rs-GOV)

The issue of sea level rise in Mombasa County may not be a problem because of the topography of Mombasa which has no low lying areas but only in a few places. Therefore unless you are too close to the shore line you may not be affected in the near future. We don't know how much it might accelerate but for now Mombasa is safe. (Rs-GOV)

Perceptions of possible impacts on their business operation

When asked if they thought climate change would affect their operations if the claims were true, most tourism business operators were not sure on confident specific aspects of climate change would affect their operations. However some were able to note the association of climate change associated water stress, a problem they have been facing from day to day. Others were noted that if some seasons turns to be too cold when normally they are supposed to be warm and sunny they may not appeal to the tourists. Others felt that loss of biodiversity would lead to fewer attractions and drought seasons would increase the cost of food items.

I have water running for 2 days in one week the rest of the days I have to buy from the traders who hawk water. As a hotel we have water stress since our borehole dried up we have to dig deeper now. If the county government doesn't supply us with water soon we will be forced to build massive storage facility. So if climate change will lead to water shortage due to prolonged drought then I will also have a problem too as an operator. (HO-4)

Somehow yes. Consider water shortage for example if climate change will lead to more dry spell then yes, if it will lead to more rain then yes and no in the sense that I will have more water for my operation but if it's too rainy then the destination will not appeal to those who want sunshine. But now the problem who knows what will happen? (HO-7)

Climate change is here with us because there is time for

example last year December got cold unlike before. I think we need to do some evaluation about current climate trends to see what these changes might mean to us both in short and long-term. (HO-9)

It probably will but I am not sure how long and when, but we have seen these weather patterns change. It is something we have thought about but we are just opening and we are trying to put our feet on the ground. (HO-10)

I think to some extent yes we have had very hot seasons and some have turned not too hot as normal so I think climate is changing. Moreover we have had dry spells where fruits and vegetables have been scarce. Water scarcity is also an issue for Mombasa region. (HO-14)

Yes I think it concerns me as an hotelier if drought will prevail that means cost of operation will go up because of high food costs. When it is too hot also the cost of cooling the hotel will go up. If we lose biodiversity in the marine then we will not have anything to show to our tourists. Those are some of the ways that we as hoteliers may be affected. (HO-1)

Preparedness and response strategies

The operators were also asked what plans they have or plan to have in future and majority didn't have any clear plans yet

but they expressed that they believe they would be able to respond to the challenges simultaneously as they face them. They believed they have the capacity to respond to the changes in case they are in small scale. Others reported that the much they could do is to share any long term climate change projections (if available to the owners of the hotel. This reveals the private tourism managers as agent whose interests in maintaining a sound return on investment as part of their 'big job'.

The only thing we do is to share that kind of information. Bear in mind that this hotel doesn't belong to me but I make it my responsibility to share that kind of information with the directors. They are young and are able to see that the future holds to them and I believe they can do something before things get worse. (HO-1)

I don't have any plans in place but I think we need to go back to the drawing board and try understanding the current demand/travel patterns. I don't know if we are losing to competition or security threat or there is a change in global travel markets. We don't have any environmental related plans but we have insured our business to events that would destruct our establishment. (HO-8)

In case we get these risks in future i think we shall handle them as they occur. For example the floods issue we shall

address with better drainage systems, use of emergency in house personnel to guide evacuation, etc. I just pray that it doesn't get me in danger due to global warming. You know the problem is that you may not act if you don't know. What if it doesn't happen? (HO-13)

I think we don't have much but we can manage what we can when it happens. We are also insured to take care of possible damages. (HO-16)

We do not have any plans that we can say because we have not anticipated such occurrence in the future. (TO-2)

While the local operators showed little or no specific adaptation strategies, the government side revealed active plans and actions in line with projected climate change effects including drought, sea level rise, water shortage and loss of biodiversity. Despite lack of actual ground follow-up by the researcher, some government officials said that actions such as water harvesting, large scale water capture and storage, dams and boreholes have been planned and some being implemented in response to growing water stress in the region. Construction of sea walls and beach enrichment through restoration of mangrove forests have either been proposed or being implemented as one government official in the water sector suggests.

With these changes in land use we have had some rivers drying up completely or seasonally. It is therefore critical that we address this issue that has contributed

to climate change. ...In terms of water, when we talk of climate change the water sector is badly hit. It is the most seriously affected resource. Water stress is becoming a very serious issue especially here at the coast. I am aware that the Coastal Development Authority which is in charge of development projects at the Kenyan coast working on water projects to curb the ever increasing stress. The CDA is constructing a mega dam on Mwache River in Kwale County. ...the dam is part of the second phase of water security and climate resilience project funded by the World Bank at a cost of about Ksh. 17 Billion. The dam shall ensure 100% piped water supply in Kwale and Mombasa counties and other parts of the coast. The aim of the project is to ensure reliable water supply in the neighbouring communities which have been affected adversely by changing climate manifested in long drought period due to reduced precipitation. The project shall also involve rehabilitation of the water catchment areas in Mwache area. (W-GOV)

Information source adequacy

The managers were also asked which sources they receive their information and it was revealed that despite availability of formal organization of the destination through association which act as representatives who act as their contact point with government and other non tourism stakeholders. Most tourism

operators said that much of the information and knowledge gained on changes in the environment and issues of climate change through daily encounters, 'luck', local dailies, and radio. Two operators also acknowledged receiving information from other government institutions mainly Kenya Wildlife Service (KWS) and KEMFRI. The tourism associations said they have had multi stakeholder's forum where they were sensitized about climate change. However they expressed lack of adequate information on the whole issue surrounding climate change especially how climate change will affect their destination.

I think I need to be informed as a hotelier or hotel manager what does the environmental change and things like climate change imply to the industry. There is some information going round that Mombasa is sinking and with the rate it is sinking we heard that scientists have estimated that half or a big chunk will be under water but this has been contested by the local leaders that it is a fabrication by the researchers while the Kenya Marine and Fisheries Research Institute (KEMFRI) conflicts with the allegation by the scientists who reported this. I am little bit confused because you never know who is telling the truth. That's why sometimes the green politics have become very unpopular, travel magazine, news papers, radio, TV etc. We have forums around where we are also invited like the ecotourism society forums, etc.
(HO-4)

...we have limited information especially that concerns long term impacts of climate

change. At the organisational level I may not be in a position to forecast climate changes and in fact I am more concern with the daily operations that brings business. If future events will affect my business I would be glad to be informed. (TA-1)

We encounter the changes on daily basis; we are also informed by conservationists, the government and also researchers who are doing research about the environment. (HO-17)

I may say we don't have much information about the changes in the environment as such. But in case there is that information it has never reached us. ...we observe, we hear on the news, read news paper like it was alleged that Mombasa would be under water in the next few years.
(HO- 12)

We usually read from news papers, magazines, education forums by conservationists while others we encounter them from our day to day activities. Like the growing dumpsite is visible for everyone to see. (TO- 2)

I don't think we have much especially on the issue of climate change or global warming. Someone needs to explain to me what i will lose as a hotelier in future so that I can plan for it. (HO-13)

Not at all... If there is information they are clashing with each other where one group is saying we shall have floods while the other say we shall have dry spell. Mombasa will go under water

while others object those studies so we don't know what to believe. Hence we cannot act if we don't know anything. All we are able to do now is to wait for fate to take its course. (HO- 18)

Not really... Sometimes they don't warn us about the rain and we are caught off guard. (BTA-1)

I think we have all we need to know for now unless there are new developments that we should know. We care about the environment and we believe our business is environmental dependant and we need to take care of it. We are involved in beach management project initiated by KWS which we are stakeholders. From them we get information on best practices in order to minimise environmental degradation. We have close link with the KWS who have been doing some research on beach change which is recorded periodically. They have informed us on the health of our corals which they claim it has improved since the El Nino occurrence in 1997. The corals are healthier which is good for fish traders and boat tour operators. (BTA-1)

Initiatives to combat climate change

When asked what they are doing in response to climate change. Mitigation activities were the major theme. Activities like beach cleaning, tree planting, and facility adjustment to 'green' standards were popularly mentioned.

Through the association of

hotel keepers, KFTO, MCTA, we do clean up and we record the garbage amounts. There is also an input from the government through legislation that deal with the environment and I think that is the most responsible institution. However there is a lot of corruption in the government institutions that allow approval of poor environmental friendly acts (HO-1).

The environment within our organization we are able to handle it on a day to day basis but there are other players out there who don't care about having a clean environment. Collectively, at least twice in a year we get together and clean up the beach together. Through the association of hotel keepers, KFTO, MCTA, we do clean up and we record the garbage amounts. (HO-5)

We are going towards eco friendly and eco saving products and whenever we can save on energy we are doing so at the moment. We are coming up in non routine change of linen unlike before. We inform guests about the possibility for linen change and if they wish to be changed regularly we ask them to notify us. We also have key card systems such that once you remove your card everything switches off including the air

condition. (HO-10)

We are a green certified hotel. We have re designed our facility to ensure maximum use of natural light we have cut on energy costs through use of solar panels. We also involve ourselves in public clean up where our staffs go to the streets to clean with the rest of volunteers. We have been involved in tree planting activities as well and we continue advocating for green environment consciousness among our staff. (HO-15)

I am involved in environmental restoration programmes like tree planting. We have also changed the hotel systems to be environmental friendly. (HO-19)

Opinions on individual action versus collective action in climate change adaptation.

When asked on their opinion whether climate change response should be an individual or collective action majority were in support for the opinion that it should be a collective action. However a minority tasked the government for the responsibility of mitigation and adapting the destination.

I think it would be better addressed if we have a collaborative efforts from the conservation managers to tell us what they know about environmental change, the government to help us in funding projects that would combat climate, while the

metrological department to give us the possible future events that would affect this region.(HO-3)

It is a collective affair because if I plant one tree while the other person cuts one tree it means we have done nothing but if we all take initiative to plant trees then we reduce carbon. There is also a need to educate all the stakeholders what climate change means and what should we do to address it. (HO-4)

I think we need to come up as regional stakeholders in addressing the environmental changes such as pollution, waste management, deforestation etc. (AO-1)

I believe it is the government role. I think they must be having a department that deals with climate change, disaster management. (HO-9)

There is what that we can address at our organizational level especially the ones that affects us directly and needs small resource to address it like the erosion on the beach front, high tides, etc but catastrophic events like tsunami occurrence I bet we are not able to handle that. (HO-14)

It is a collective action I believe, we live in one globe that we must protect, we share same air and other resources that we should use responsibly.

(TO-1)

Other raised issues

A key challenge to the region's development was the continuous implementation of an expired McLaughlin plan of 1979-2006. This plan was used to guide land use within the stipulated period, but the plan faced many challenges including rapid urbanization and population growth. However, there was optimism that a new plan that is under way will be available in the new future. In this plan, recommendation for controlled land use and integration of climate proofing measures are being incorporated to ensure resilience to climate change impacts as suggested by the directory of the Coastal Development Authority.

Mombasa as a region, before the current borders that is the Mombasa county, uses the 1976 (McLaughlin) master plan prepared by a British expert by that name. The initial plan was ment to oversea development of the city for 30 years time period from the 1976 when the plan was adopted. That means the plan had been projected to guide city development until 2006. The plan had been designed to cater for about 300,000 residents with clear demarcation of land parcels for different social economic activities. However currently at the expiry of the plan timeline the population has grown tremendously about four folds to about 1.2m inhabitants in the city. This rapid urbanization and population growth has messed up everything that had been projected. Land use change has been experienced over time and that's why you can see more areas meant for agriculture has already been

cleared and structures housing built most of which are not approved by the department of planning. ...Land change use will be reviewed and that will be factored in the new plan. As we speak we have been granted ksh.120m from the Japanese government for the development of the new master plan. The new plan is estimated to be ready in two years time starting February 2014. We embrace the new planning needs and we are working hard to realize that. (D-GOV)

Discussion

Based on the insights from the interviews, it's undisputable that natural environmental resources are acknowledged as important component of coastal tourism. These resources include the traditional sun, sand and sea and 'good weather' as an important motivation for the tourists to visit the destination. This is in line with previous supply and demand side research in tourism where 'good weather' and coastal landscape are found to be an important zone for tourism activities hence attracting development of tourism related infrastructures, ([Gossling et al. 2006b](#); [McEvoy et al. 2008](#); [Uyarra et al. 2005](#); [Trawöger 2014](#)).

Climate change has been projected to have serious consequences on the tourism industry (IPCC, 2007; ([Simpson et al. 2008](#); [Scott et al. 2012](#))). It produces direct climatic impacts which affect the suitability of a destination, indirect environmental change which limits tourism resources and impacts of mitigation policies which affects the demand and alters global travel patterns ([Scott et al. 2012](#)). Some destinations are already experiencing these impacts e.g. in ski region ([Wyss et al. 2014](#)). In this research, despite lack of clear understanding of climate change impact

and how it may be affecting or ought to affect Mombasa as a tourist destination, tourism managers claim that temperature change, change in precipitation, loss of biodiversity, a drop in fresh food supplies, floods, change in beach structure and water stress has been experienced at the destination. They also believe that if current forecasts are true, it would have dire consequences on their destination in future, but the question of 'when?' lingers.

Nonetheless, tourism managers did not stipulate clear strategic plans in response to these impacts. This indicates that they may not be experiencing severe impacts that would warrant their attention, but some efforts in autonomous adaptation were revealed. This study supports arguments by Weaver (2011) who argues that the tourism sector faces the challenges of uncertainty, adequate 'tangible Villains' and evidence of clear identifiable signs of impacts of climate change. Similar sentiments have been noted by (Trawöger 2014) where ski business operators did not feel an 'immediate threat', but would this be also attributed to competing issues that are more 'immediate'?

Pertaining major concerns at the destination, it is revealed that tourism operators' immediate concern revolve around return on investment in their day to day operation and to some extent environmental changes. Nevertheless, changes that are beyond their control may not draw immediate attention unless they have a direct effect on their business. Therefore, it may be presumed that in this region environmental change and climate change may be competing with other issues such as rising cost of operations, competition, drop in demand, loss of destination's attractiveness among other things that operators face in their day to day running of the business and their adaptation strategies are ought to be shaped by the impact they have on their business operation. This has been observed in other regions like ski regions where loss of snow levels due to climate

change operators have been proactive in developing adaptation plans because their businesses are directly threatened by climate change as some studies suggests, (e.g. [Wyss et al. 2014](#); [Trawöger 2014](#)).

These findings are also opening up to serious questions whether the tourism operators would be more proactive in adaptation in case the signs for climate impact were vivid in future. In this study it is noted that some operators believed they would respond as the impacts are experienced which reveals an underlying perception of control over perceived risks. To this discussion the problem of perceived risk and actions presents a complex phenomenon, but previous research has shown that perception of control has a direct relationship with the optimistic biasness. This is demonstrated by (Klein, Helweg-Larsen 2002) who in a meta study of 27 independent samples found a greater perceived control was significantly related to optimistic biasness.

Climate change is a global phenomenon but its impacts are local (Parry 2007). Efforts have been made to encourage local actions in adaptation to climate change at least at global policy level. In research have also shown 'bottom up' and 'community based' approaches have resulted to better and efficient adaptation strategies (e.g. [Heltberg et al. 2012](#); [Horn, Simmons 2002](#), [Picketts et al. 2012](#)). These approaches are supported in adaptation tools/frameworks for regional tourism sustainable-adaptation where collective engagement have been favoured, (Njoroge 2014b). In this case it is revealed that, currently, initiatives for collective actions have not been planned or implemented within the tourism sector and related sector. However, the government side has had considerable engagement in multi-sector research, planning and adaptation projects. This is exhibited where the Coastal Development Authority (CDA), National Environmental Management Authority (NEMA), Coast Water Service Board (CWSB), Kenya Forestry Service (KFS), Kenya Wildlife

Service (KWS) among other stakeholders have been involved in adaptation projects in collaboration with Development partner and Non Governmental Organizations (NGO) especially in Integrated coast zone management programme (ICZMP), Mwache Multipurpose Dam for domestic and industrial water supply and irrigation water dam-funded by the Worlds Bank and The new city planning project-funded by the Japanese government where climate change aspects have or are being slotted in . On the other hand most of the tourism respondents have underlined sinking of wells, use of water trucks and building of water storage facilities in response to water stress. Some facilities also have considered an extension of the beach wall to protect them from harsh storm surges. This concurs with previous studies have indicated individual and household levels engage in autonomous adaptation while the governments engage in planned adaptation (Suckall et al. 2014; Ilbery et al. 1997); (Smit, Wandel 2006).

Previous research on tourism operators response strategies to climate change have indicated most stakeholders underline their actions in mitigation activities and adaptation which have not been well conceptualized (Becken 2005). This case is no different. Most tourism operators said that they are engaging in 'green practices' like tree planting, beach cleaning, energy and water use reduction, waste reduction among other strategic initiatives.

Previous tourism studies have noted an increase in awareness in climate change among tourism stakeholders in general (exhibited in the literature). This is a contrary trend on global public awareness of climate change, which is declining, as reported by Ratter et al. 2012). This case may not provide a comparative evaluation to this specific region because there are no previous studies that have attempted to explore the perception of tourism operators and relevant stakeholders in the region by the time when this study was conducted. Nevertheless, there is a clear

cut between two categories of regional stakeholders. They may be summarized as 'more informed believers' mostly conservationist, researchers and government'; few informed believers mostly tourism business operators; and Majority uninformed believers among tourism stakeholders and 'few skeptics and/or confused'; a possible polarization of opinion among relevantly homogeneous groups within tourism as observed in similar studies of the Alps tourism region (Trawöger 2014).

Despite the existence of a formal structure of association and linkage for representation in government, there has been an imbalance flow of information from respective authorities dedicated to climate change policy especially the government. It is evident that certain government authorities have a considerable amount of information about climate change, but this information fails to reach the operators. Although it may be too quick to judge for now because the Kenya's Climate Change Bill of 2014 is still underway and there may be lack of clear frameworks for information sharing and actions .However, whilst the operators are found to have limited understanding of climate change and its impacts on the tourism sector, they are willing to be engaged and to be informed better on the phenomenon.

Conclusion

The main aim of this research was evaluating tourism stakeholders and relevant stakeholder's narratives on past environmental change and their impacts, understanding, problem framing, perceptions of climate change and actions towards climate change impacts. To this end it will be concluded that: First, there is a clear imbalance of knowledge understanding of climate change among tourism operators and relevant government stakeholders. Despite this, through the narratives it was revealed that the destination has been experiencing extreme weather events associated with

El Nino rains which have presented flood risks to the destination in the past. Moreover, changing weather conditions has also been felt with what has always been a warm season felt cold which coincides with the peak season for this destination. Furthermore long drought has also affected food and water supply in the region. No serious sea level rise risks were reported but beach formation has been affected due to human activities along the coast line.

Secondly, there are no plans for adaptation among tourism operators, but the government confirmed to be in the process of 'climate proofing' the region especially in the water sector through the construction of a mega dam in Mwache area and coast zone management through mangrove forest and coral restoration, among others. It is therefore expected that the tourism managers will be passive to climate change and tend to be reactive to its impacts.

It is also worth noting that although the use of interviews have been successful in this study, there is a need for development of a standard interview questions to enable comparative studies.

Finally it will be concluded that the region is still at learning phase. I therefore recommend that:

1. There is a need for a regional integrated climate change impact analysis
2. There is a need for raising awareness of climate change and more important the possible impacts to the destination.
3. There is a need to develop a platform for information exchange among different stakeholders.
4. Further research in social cultural aspect of risk behaviors to foresee future actions among stakeholders.
5. Finally there is the need for forging planned-collective adaptation action for the destination

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