

The Impact of Climate Change on Tourism Industry: A Case of Zanzibar

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Abstract: Tourism is now considered as a backbone of Zanzibar archipelagos economy which is now affected by climate change impacts. The purpose of the study was to assess the impact of climate change impacts on tourism industry in Zanzibar especially in Unguja Island by identifying the impacts of climate change, examined the measures taken to climate change impact, and to observe climate change by the tourists and interlink the tourist destination loyalty. The study design used qualitative design. Where by primary data was collected through 358 respondents using interview, questionnaires, and group discussion. And 9 key informants from different institutions responsible for tourism industry and climate change. The study finding revealed that, Overall the most observed impact of climate change was beach erosion (75%) followed by Destruction of infrastructure (63%), Sea level rise (61%) coral reef (57%) and temperature rise (56%). Although (61%) of the respondents rated climate change impacts at the average level in Zanzibar. To address the impact of the observed climate change, Sea wall, Mangrove/vegetation, Dykes and Irrigation were taken as measures to minimize their impacts so as to improve the tourist's destination loyalty.

Keywords: Climate change, tourism, destination loyalty, climate change impacts

1. INTRODUCTION

The tourism sector is one of the largest and fastest growing global industries and is a significant contributor to national and local economies around the world. The interface between climate and tourism is multifaceted and complex, as climate represents both a vital resource to be exploited and an important limiting factor that poses risks to be managed by the tourism industry and tourists alike [1].

Tourism is a weather and climate- sensitive industry [1]. Seasonality, extreme events and inter-annual climate variability have broad significance for global tourist flows, and there is general agreement that weather and climate can be both a resource and a limiting constraint for tourism [2]. According to [3] multiple weather parameters affect visitor satisfaction, within particular rain having an overriding (negative) impact.

Tourism destination and tourism operators are affected by climate variability and change in a number of ways [1]. For instance, climate change can affect tourism by affecting low lying beaches snow cover, coral reefs [4]. All tourism destinations are climate change sensitive to a degree, in that there are influenced by natural seasonality in demand, are affected positively or negatively by inter annual climate variability that brings heat waves, unseasonable cold, drought or storms and heavy rain, which can affect not only tourists comfort and safety, but also the product that attract tourists [1]. As it happened in Mediterranean area, which is a common area in the world doing well for tourist destinations which is about 120 million guests each year. Although, heat waves, droughts, storm and floods, which are anticipated to happen more repeatedly and tremendous, will definitely affect tourism as well as environmental conservation and human security in the region [5], currently is considered as one of the most vulnerable regions in the world to the effect of climate change in a local scale substantial arid, semi-arid

and coastal line increases vulnerability. In addition, overreliance of a lean natural resources base for tourism puts the sector into increasing risk [6]. More than that, most scientists and climate change professionals agree that climate change and increased climate variability are already occurring and having serious consequences for many African countries [7].

Tourist destination loyalty is often influenced by several factors include culture sightseeing and product, as it has been reported by [8] that, the climate, history, hotels and food of a particular destination are important prerequisites for tourists' positive impression and resulting loyalty. Zanzibar economy to a large extent depends to earn income from tourism-based activities various further studies needed to be conducted to identify the specific impacts of climate change in relation to climate change.

A. General Objective

To assess the effects of climate change on tourist's loyalty in Zanzibar tourism.

B. Specific objectives

- i. To identify the climate change impact on tourism in Zanzibar. .
- ii. To examine how the impact of climate change interlink with tourist's destination loyalty in Zanzibar.

C. Significance of the study

- i. The study will be beneficial to numerous tourism stakeholders, particularly academician, practitioners and some government agencies.
- ii. Academician: will add knowledge into the body of literatures and will give high light for areas that needs special research attention.

- iii. Practitioners and government agencies: Will open up their mind about the current debate in climate change effects and the destination loyalty of tourism and how they can implement to make Zanzibar to be the most appealing destination for the tourists.

2. RESEARCH METHODOLOGY

This chapter describes the outline of the general methodology adopted in this study. It describes the approach and techniques that have been used in the data collection. The chapter begins with that research design that can guide the researcher to end up with the correct conclusion of the research problem. Also presented in this chapter are research frameworks, study area, sampling techniques and population, sampling and sampling procedure. Moreover, the data collection methods, modalities of data analysis and ethical consideration were also presented in this chapter.

A. Study Area

Zanzibar is an archipelago made up of two main Islands of Unguja and Pemba Geographically. Unguja was chosen as a main point for this study since it is the most active tourist part in the Island compared to Pemba Island which is considered to be less active in this industry.

The qualitative part of this study covers all four tourism zone in Unguja. The four tourists' zones are North zone, North West Zone, North East Zone and South East Zone and Zanzibar stone town. On another hand quantitative data, the second phase of this research was collected at departure lounge within Karume international airport.

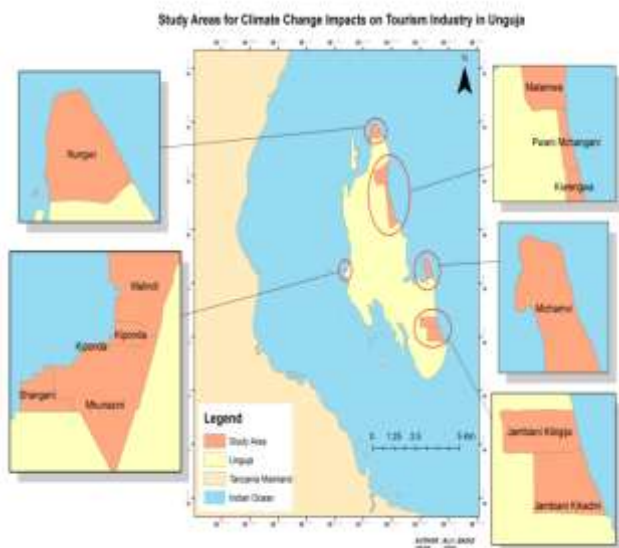


Figure 2.1: Map of study area

B. Study Population

The population of the qualitative phase comprised from the selected tourism stakeholders who resides in four tourists' zone (North zone, North West zone, North East Zone, South

East zones and Stone town) and Zanzibar Commission of Tourism, Hoteliers, tour operators, tour guides, environmental committee members and locals; whereas international tourists were the population of the quantitative phase.

C. Economic Activities and Social Facilities

All villagers (Nungwi, Matemwe, Kiwengwa, Pwani Mchangani, Paje, Jambiani, Michamvi and stone town) are depending on fishing and tourism activities like beach boys, tour guides and hotel workers with good facilities like roads, schools and hospitals.

D. Sampling procedure

Despite theoretical deficiencies of non-probability sampling, both phases of study adopted non-probability. Today non-probability sampling has shown a high growth rate than that of probability sampling [9]. The non-probability sampling methods are frequently used in various settings and situations. It is reported that non-probability sampling is the most dependable method that can lead to potentially useful information [10][11]

There are numerous methods of non-probability sampling. This study used a mixture of judgmental and convenience sampling. This is because these methods are commonly used especially when the sampling frame is not available. As literature indicates that the available database for consumers (including tourism consumers) is low incidence and it is hard to find comprehensive categories hence making it difficult to generate a sampling frame [9]. The selected sampling methods are the most applicable when the respondents do not reside in the country where the investigation is being conducted [12]

[13] Also reports that research methods should give the researcher a chance to choose respondents who are available, willing to participate, with self-inspiration and with solid knowledge that can provide correct, accurate and full information about the research phenomena. In addition, such a sampling method should be mainly used because of cost, convenience and an apprehension about using an inappropriate sampling frame [9] This present study, therefore, considers both judgmental and convenience sampling for all respondents while using in-depth interviews and focus group discussion the member was selected using snowballing.

E. Sample size

The number of respondents on qualitative research depends on the information gathered and its perceived adequacy in regard to saturation of new insights. The qualitative phase data was collected until no new themes emerged or concepts were generated. Furthermore, the quantitative part; international tourists were approached by exit survey regarding their views about the observable impacts of climate change and how these impacts could influence their decision to become loyal to Zanzibar.

In this study 300 international tourists were selected for quantitative data collection. The data were collected from international tourists at the Zanzibar airport after completion of immigration official procedures waiting to embark the plane. The selection of 300 international tourists was backed up by [14] who argue that 300 respondents meet the need of collecting required and sufficient information in social science research. However, the researcher adopted the sample size of 300 respondents to be in safe side in case of higher non-response rates.

The results show that most of the respondents from all tourism zones in Zanzibar replied that a number of climate change impacts are greatly impact on their areas. The impacts that were chosen to be potential effects from climate change is sea level rise, about 90% respondents explained that in south east zone sea level rise develop day to day [15]. While 100% respondents in North West zone did not agreed on sea level rise exist in their area. But in North east zone particularly Kilindi at Nungwi Sea show line is gradually increasing, indicating that this impact of climate change is not yet observed in the area.

F. Research Design

Research design is an abstract arrangement by which a research is conducted and it constitutes the guidance for collection, measurement as well as analysis of data and finally aggregation of data into information [16] this research adopted a mixed methods research approach that combines both qualitative and quantitative research methods. It consists of two major parts or phases, each of which is logically linked to the objective of this study. The first phase intended to examine the impacts of the climate change in Zanzibar tourism circuit by involves exploratory interviews and consultative discussions with different selected tourism stakeholders. While the second phase intended to examine the current tourist opinion about; what they have been observed as a major impact of climate change and how these can or cannot effects them to become loyal to Zanzibar as a most growing destination in today global tourism market.

G. Research Frame work.

The first phase, the qualitative phase was designed to achieve the first two specific objectives established in chapter one. In this phase different tourism stakeholders were interviewed to identify the severe impacts of climate change in Zanzibar and different measures that were taken to save the Zanzibar tourism situation.

The second phase began with the questionnaires which was logically captured the tourists' opinion about; what they have been observed as a major impact of climate change and how these can or cannot effects their decision to become loyal to Zanzibar as a most rapid and growing destination in today global tourism arena.

H. Data collection methods and instruments

In this study both primary and secondary data were used. The researcher employed questionnaires and interview as research methods and tools to collect primary data from the field while secondary data were obtained through institutions responsible for environment and institution responsible for tourism, also by reviewing the works of scholars who have written on the impact of climate change on tourism. Those data collection methods enabled the researcher to explore the gapes that exist between the literature and the study itself. The data was collected in two phases

In phase one, the exploratory qualitative approach was employed to get a deeper understanding of the impact of climate change on tourism, whereby Zanzibar tourism zones, Zanzibar stone town heritage site and the Commission of Tourism were used to collect information regarding the study. Various stakeholders were consulted to explore the information. These stakeholders included commission of tourism, Hoteliers environmental committee members and Tour guide. The respondents from those institutions were selected using purposive sampling. They were selected in terms of their experience of the field and with regard to their consent to participate. Where the primary data and information were qualitatively collected through an interview and 40 respondents were participated during the interview from different areas, including 3 members from each of the following zones North Zone, North West Zone, North East Zone , South East zone, and Zanzibar Stone Town and 2 members from each of the different institutions including Commission of tourism, environmental committee members, tour guides, tour operator and hoteliers, this method was used to acquire more understanding of the impact of climate change on tourism industry in Zanzibar.

In second phase data was collected about qualitative relationship of climate change impact and tourism performance in Zanzibar. About 300 respondents participated in this study which was considerable large sample. The information obtained include how tourist's perception about the attractiveness of the destination, satisfaction and their intention to re-visit or willingness to recommend others, can be effected by the climate change.

I. Interview

The researcher carried out personal interviews to collect data from the respondent. Interviews provided in-depth information about a particular research issues or questions. The interviews focused on the following groups; Commission of Tourism, Hoteliers and Environmental committee members as to get deep information for the study. Each office was informed through official letter to prepare for the interview. The shehia leader from all zones provided support to inform all the respondents selected for interview. This provided each participant with the time to prepare for the interview.

J. Focus group discussion

Focus group discussion is a group of between 6 to 10 people guided by a researcher in which group members talked freely about a certain topic or issue [17] this method was employed so as to validate the information collected, to get deeper understanding of the study and to get opportunity to hear the opinion of other people. Five (5) zones of participants were involved, the number of zones include North zone, North West zone, North East Zone, South East Zone and stone town where impacts of climate change were identified. The total of 10 participants were involved, one participant from each selected zone involved in the group discussion, whereby four participants from tourism zone, two, from Zanzibar stone town, two from Department of Environment and two from Zanzibar Environmental Management Authority (ZEMA).

K. Reliability and Validity

The validity of the research tool was highly emphasized in this research. Broadly, it refers to the degree to which the research instrument measures what it is intended to measure [9]. In this study, the validity was established through the panel validation of judgmental decision of group of experts in the field of tourism and environmental science. This group of experts includes Department of Environment, some of tourism decision makers such as members from Zanzibar Commission of Tourism (ZCT). The survey instrument also was sent to my supervisors and other academicians in Zanzibar University for their valuable comments and inputs. Reliability refers to the capability of a research instrument to yields consistent results [9] For this study, a pilot test was made to test for internal consistency of the research instrument. The questionnaire was distributed to 20 respondent selected from international tourists at departure lounge in Kisauni International Airport. These tourists were already finalized the immigration formalities.

L. Data analysis

Qualitative data were analyzed through the use of thematic analysis. These data were noted in the diary book and audio recording. The audio recording was thoroughly reviewed and transcribed into text. Obviously, the data were categorized under themes that correspond with the key consideration within conceptual framework. The key themes in qualitative phase were impacts of climate change and possible measures to rescue the tourism situation. The emerging themes were listed and then analyzed based to the observed patterns that were related to the relevant available literature and theories.

Data from the questionnaires were analyzed through the use of statistical package for Social Scientists (SPSS) version 20.0, where were coded and classified. The data was well checked in order to avoid statistic problem during data analysis. That data should be check for accuracy in order to fulfill the assumptions for data analysis. In this process the data was coded, checking for accuracy for data entry (outliers), missing values, sample adequacy (The Kaiser – Meyer – Oklin; KMO), validity as well as reliability. Mean,

frequencies and percentages were used to summarize presentation of the data collected through questionnaires. Summary statistics including simple tables and histograms were used to present the findings.

M. Qualitative finding

1. The qualitative data generated from interviews were analyzed using thematic analysis. [18] Explained that thematic analysis is most useful method for analyzing and identifying qualitative data. This method of analysis associated with the following steps based on [19]:-
 - I. Familiarization, the researcher read and read across all the interview transcripts to familiarize with the data related to the environmental committee members of tourism zones.
 - II. Generating initial codes: this stage leads the researcher checking at the answers obtained from each interviewee and coded each response by underlying and highlighting important words using colored markers into categories, such as using red colored maker for impacts of climate change and yellow color for recommendation given by the respondents during data collection.
 - III. Searching for themes: afterward the researcher developed the process of differentiating the coded responses and grouping them into similar categories on paper according to their respective marked color. Moreover, the researcher sought out the relevant themes from those codes obtained. The results from thematic analysis show that a good number of study participants were aware on the climate change impacts. Based on that results 24 list of impacts of climate change were identified as shown in the table below and the researcher used the same items in the list to formulate questionnaires for the quantitative data.

3. RESULTS AND DISCUSSION

A. Zanzibar as a tourist destination

Zanzibar has produced much advertisement for tourism industry which leads many tourists to be interested to visit Zanzibar. In this regard the researcher got interested for this topic by questioning “how did you know Zanzibar as tourist destination”.

When responding to the question how did you know about Zanzibar, this reveal that trade shows/exhibitions 80%, internet 76%, word of mouth 75%, tour operators 42%, print brochures 26%, conference 13% and books 11%, that is to say; trade shows/exhibition is the most prominent advertisement which lead Zanzibar to be known by many of the respondents who said yes, lead Zanzibar to be more famous tourist destination in East Africa through many

tourists exhibition such as festival, Zanzibar International Film Festival (ZIFF), Mwaka Kogwa, Sauti ya Busara, Cultural Festival, Mangapwani Festival and Makunduchi Food Festival those make Zanzibar to be well known archipelago place for tourist destination in the world. Also revealed that these festivals are very enjoyable for the tourists which inspire them to talk with their friends and families about the pristine nature of Zanzibar (Maliva, 2016). Moreover, respondents show that, internet was the second selected way of sharing information of knowing Zanzibar which shows (76%); It means that; the strategy of installing of national fiber internet system has been improved internet system by browsing Zanzibar’s tourist’s attractive sites [20]

This indicates that word of mouth is not behind on to make Zanzibar to be known. This clarify that that most visitors prefer to get quick information of a destination in order to know the security of a destination, beauty and also to get correct information from the main speaker who is loyal to recommend the beauty of Zanzibar. However, other visitors have already been experienced about the climate of Zanzibar which leads to inform others to get the real pictures of a specific destination. This statement has been concurred with the elaboration of [21] which says that; families and friends have been recognized as organic image formation agents, and it has been emphasized that this word of mouth information is among the relied sources of information for destination choice. A tour operator is the linkage of communication whereby tourists get information through brochures, internet, safari tours and International Conferences.

Table 3.1.1: tourist visiting Zanzibar

Item	Frequency	Percentage Yes
First time	68	22.7
Second time	37	12.3
Third time	5	1.7
More than 3 times	0	0

Data source: Field survey, 2019

The study findings revealed that 23 % of the visitors came to Zanzibar for the first time visit, followed by 12% second time visit, beside that 2% third time visited. This show that most of the visitors from the table 3.1 were their first time to visit Zanzibar, perhaps they heard about this beautiful Island information through tourist attractiveness sites or may be some other visitors have recommended to them or have got word of mouth from other people who had visited Zanzibar before. From the discussion with tour operator, one of the respondents discovered that, the first time visitors usually come to Zanzibar in a group. Fortunately, this statement is also supported by [22] which show that first time visitors

come with package tours because they are not familiar with the destination areas.

Table 3.2: The time of staying in Zanzibar

Item	Frequency	Percentage
1-3days	68	22.7
one week	203	67.7
Month	28	9.3
More than month	1	0.3
Total	300	100

The respondents in this study differ in their views on time to stay to the destination area whereby 68% had stayed one week, 28% stayed 1-2days, 9% stayed one month while small amount 0.3% stayed more than a month. The findings indicate that the high average length for visitors to stay in Zanzibar is one week. The study revealed that majority of tourists spent only one week in Zanzibar destination because the tourist attractive areas are easily accessible at any point of Zanzibar islands. For example, if tourists are at Nungwi and they want to do a wind surfing at Paje; it takes less than one hour to reach at the area of the beach of Paje. Furthermore, the availability of transports from one destination to another does not make tourist to delay on one point of visit site in any place of Tanzania especially Zanzibar. This concurs with the report [22] which states that the high average length to stay visitor in the United Republic of Tanzania is seven nights.

B. climate change impacts

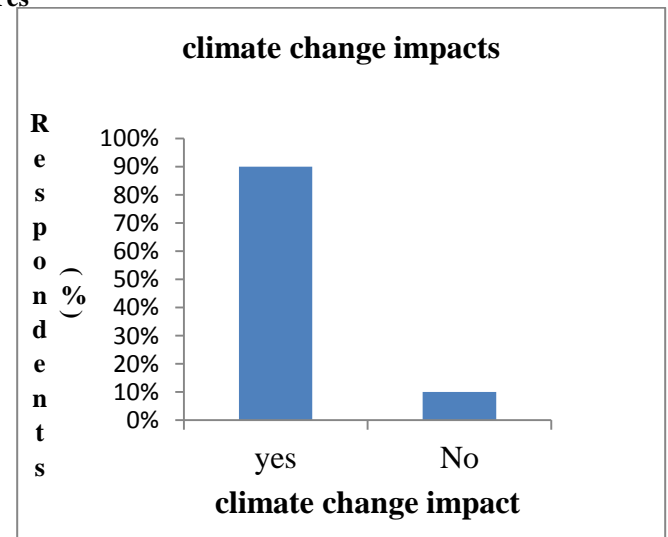


Figure 3.1. Climate change impact observation

However in North east zone particularly Kilindi at Nungwi Sea show line is gradually increasing, indicating that this impact of climate change is not yet observed in the area.

The climate changes impacts mentioned by local community are:-

C. Beach erosion

The tourists explained that the main impact of climate change in Zanzibar is beach erosion as revealed by 78% of the respondents and the least is seasonal change which is agreed by 1.0% of respondents. However, food security, reduction of fish stock and decrease of underground water are climate change impacts that are mentioned by local community but the tourists did not mention them as climate change impacts. The large part of Zanzibar coast especially on the sand beach has been eroded by sea water. Beach erosion is taking place at high rate in some area of the Island affecting beaches and has been reported in several localities in Unguja example Kiwengwa Jambiani, Uroa and Nungwi with reports that the beach had receded more than 100 meters [23] However, the observed coastal erosion is also due to damage on fringing reefs and loss of mangroves (which increase waves access) as well as loss of other coastal vegetation [24] One of the respondents revealed that sea level rise erode the pristine beaches and coastline of Zanzibar. However, beach sand mining and destruction of coastal vegetation accelerated the impact of climate change especially on the coastline. The report of rapid assessment on beach erosion revealed that the high rate of beach erosion where by an average of 89m of coastal land has been eroded for the period of 50 years.

D. Destruction of infrastructure

Another impact of climate change in Zanzibar is destruction of infrastructure. This has been exposed by 63% of the respondents. The respondents from the interview exposed that “during high tide, sea water has reached in the areas where it did not use to reach before. A number of stone fences, houses and other infrastructures have been ruined by the sea water” Zanzibar is particularly vulnerable because it has an extensive coastline and large low lying areas around 20% of Unguja and 30% of Pemba is below 5 meters above sea level [25]. The infrastructure journalist report states that rising sea level will have consequences for essential infrastructure in low lying areas. Critical infrastructure such as transport, housing, electricity and water will be at major risk from sea level rise, flood and extreme temperatures [26]

E. Sea level rise

Sea level rise is another impact of climate change. This has been claimed by 61% of the respondents. Zanzibar coastline is particularly at risk as for Unguja around 328 km² is below the 5 meters contour line and for Pemba, around 286 km² is below. From the interview the respondents revealed that “the level of the sea has risen due to thermal expansion and melting of glaciers caused by persistently higher temperatures” He added by stating that “some beaches

especially on the South coast are not accessible by the tourist during high tides due to extensive sea level rise that occupies the surrounding beaches which are favorable to tourists for relaxation, swimming, beach sports among others. Moreover, respondents from the climate change section revealed that “there have been cases and through observation that many facilities, infrastructures and some vegetation’s including coconut trees, mangroves and casuarinas have been destroyed due to sea level rise in many coastal areas of Zanzibar. “ This goes along with Christina Nunez in her article stated that when sea level rise as rapidly as they have been, even a small increase can have devastating effects on coastal habitats farther in land, it can cause destructive erosion, wetland flooding, aquifer and agricultural soil contamination with salt, and lost habitat for fish, birds, and plants [27]

F. Coral reef destruction

About 58% of the respondents said that Coral reef destruction is also the impact of climate change. The respondent from tourism sector revealed that “Some of the tourists visit Zanzibar specifically to visit the reefs themselves, to swim over garden over the coral amongst hordes of fish only to see the beauty of coral reef. Coral reefs also act as barriers against strong waves storms, protecting the beaches and peoples who live around”. Other respondents from interview stated “that one of the impacts of climate change is the increase of sea surface temperature that cause coral reef bleaching which lead to massive die out of coral. It observed that coral reefs have been bleached due to increased sea surface temperature, when corals are put under thermal stress, causing them to expel the algae that live within their tissues [28]

However, [29] argued that divers are directly or indirectly damaging the reefs life with some of their thoughtless behavior due to some divers’ lack of proper training; it is done unknowingly at times. She argues that a diver needs to have a passion for nature when diving on a coral reef [29] generally; destruction of coral reefs in Zanzibar could affect the number of tourist who visits Zanzibar for scuba diving.

G. Temperature

Temperature is another impact of climate change. This has been revealed by 56% of the respondents. The respondent from the group discussion explained that temperature nowadays is becoming higher in every coming year, that plants and animals are extremely affected; human health as well as environment in general, actually this situation can lead to have crop failure and scarcity of animal feeds. Moreover, temperature could cause heart disease, asthma diseases and other complication as well as deaths. Generally, Zanzibar is experiencing high temperature due to climate change impacts.

H. Destruction of settlement

The destruction of settlement is also the climate change impacts as revealed by 37% of the respondents. However,

62.7% of the respondent from the questionnaire said that destruction of settlement is not the impact of climate change. [31] Concurs with the minority of respondents when reported that coastal settlements in the Australian coast were between 157,000 and 247,000 residential buildings exposed to inundation in a projected future sea-level rise of 1.1 m. Furthermore, gradually increase sea levels rise, and more intense storms and cyclones create risks to coastal settlements, water resources, plants and human health [30] From the table above 23% indicate that, the respondents agreed that the extreme wind is among the impact of climate change in Zanzibar. From the interview one of the tour guide revealed that “Most of tourists who visits spend most of their time at beaches and engage themselves in recreational activities such as surfing, cruising, fishing and snorkeling they have confirmed that strong wind interferes with water sports activities to the extent that sometimes they have to cancel their schedule due to strong wind [32] report that the analyses of the 20 years’ monthly averages of the surface wind speed shows that the frequency of the number of months where the morning/evening monthly averages had exceeded 10 knots was higher during the 1998 – 2007.

I. Sea surface temperature

From the findings, another impact of climate change is the increase of sea surface temperature. This has been identified by 22% of the respondents, “that respondents revealed that the sea surface temperature has increased and led to significant impacts including coral reef bleaching and deterioration of the sea weed quality”. Moreover, one of the respondent revealed that “tourists who dive especially who come to and go from Zanzibar confirm that the sea surface temperature has increased compare to temperature they used to”. In addition, analysis of satellite data indicates that sea surface temperature has been increasing faster in the Western Indian Ocean than in the Eastern Indian Ocean over the last 25 years [25].

J. Salt water intrusion

Table 8 shows that 16% of respondents agreed that salt water intrusion is among the impact of climate change this has been indicated by the most of respondents from the questionnaire. The head of the climate change unit noted saying “there are about 148 areas (125 Pemba, 23 Unguja) that have been affected by salt water intrusion in Zanzibar coastline” this has also been noted in [25]. Moreover, continued by adding that “salt water intrusion has impacted tourism sector negatively as among the areas intruded by salt water are potential area for tourism activities and investment”. However, changing weather patterns may have a role in the increased intrusion, example from the increased peak wave heights, these effects also need to be seen against a background of socioeconomic development, population growth, land pressures, coastal development (hotels), natural resource loss (particularly mangrove loss but also damage to reefs), low maintenance regimes of existing protection, and natural processes, i.e. They are not due only (or indeed

mostly) to climate change. There are a greater number of salt water intrusion sites on Pemba (with flooding by sea water during spring tides) which may be due to the nature or the rock formation, but may also be due to the loss of protecting mangroves, the planting in more marginal land, and the reduction in stream flows due to upstream irrigation [25].

K. Unpredictable rainfall

The findings show that 12% of the respondents revealed that unpredictable rainfall is the impact of climate change. “From the focused group discussion participants stated that erratic rainfall together with unpredictable rainfall on and offset season affects tourism activities. A case in point some of the tourists avoid coming to Zanzibar during rainfall season due to protecting themselves from the outbreak of disease such as cholera. Unpredictable rainfall season affect schedules and programme’ that tourist arranged”. Nevertheless, tourists do not like visiting or sightseeing Zanzibar when it is raining. Hence, erratic rainfall irritates tourists as well affecting livelihood activities of those communities engaging themselves in tourism activities. The United Republic of Tanzania National Adaptation Programme of Action [33] reports that rainfall pattern in Tanzania has become much more unpredictable with some areas/zones receiving extremely minimum and maximum rainfall per year. Similarly, [34] report an increase in the average intensity of rainfall, a small increase in the maximum number of consecutive wet days and a small increase in the maximum number of consecutive dry days.

L. Water insecurity

Another impact of climate change that has been revealed by 12% of the respondent is water insecurity. “One of the interviewee explained that the principal of water supply in Zanzibar is ground water which can be found in different aquifers such as springs, boreholes, caves and wells”. The ground water depends on percolation of water from precipitation, which flows to the ground water system. Hence, shifting, lowering and unpredictable rainfall has great impacts on the ground percolation to the aquifer and hence affects production of water supply in Zanzibar. Also added that “the main tourist’s zones such as Nungwi, Kendwa, Matemwe, Jambiani and Bwejuu are being faced by fresh water scarcity due to salt water intrusion into fresh water sources that forced some of the hotels especially on North and East coast to order water outside of their zones through water tank vehicles that increase running cost of the hotels”. For covering the costs, the price for some of the items that are purchased by the tourists is increased. This explanation is in line with [35] stated that, there is drying up of some water bodies, intrusion of sea water into fresh water bodies including ground water [35][36].

M. Flood

As displayed by the table 8, flood is among of the impact of climate change in Zanzibar as revealed by 12% of the respondents. The interviewee stated that “the Urban West

Region of Zanzibar is the most area hit by flood during heavy rains (Masika) as well as short rains (Vuli). The Urban West Region is the navel point of tourism in Zanzibar, hence, historical site, cultural diversity, critical infrastructures lie in this Region. Therefore, flooding impact tourism bring bad image to these areas". [37] Report that the highest ever recorded precipitation events on the island was recorded in 2005, with a flood that seriously damaged at least 1,000 homes and displaced 10,000 people. Moreover, the other heavy rainfall events recorded in 2011 that led to major impacts, including the damage of road infrastructure [37].

N. Crop failure

Furthermore, table 8 (6%) of the respondents revealed that Crop failure is among the impact of climate change in Zanzibar. "During the interview with the tour guide, "confirmed that low rainfall, extreme wind and high temperature impacted the growth of many spice trees and plants such as Cardamom (*Elettaria cardamom*) Vanilla (*V. planifolia*), Mangosteen (*Garcinia mangostana*) that are mostly visited by tourists when doing spice tours, he explained that low rainfall extreme wind and high temperature affects blossoming and impeding the grow of those spices. Sometimes these spices are not available on site hence tourists cannot take some as a gift or souvenir". Moreover, it was revealed by tourism officer that "sometimes hotels are facing the shortage of food supplies especially local fruits and vegetable because local farmers cannot produce the required amount of supply due to crop failure as a result of climate change". This affect the reputation of hotels as well as increasing the running cost of the hotel. However, [38] argue that farming in Zanzibar is dominated by small-scale subsistence farming, with an average land holding of less than 0.5 hectare per agricultural household, with low productivity due to a combination of poor crops, lack of fertilizer, lack of technologies, lack of infrastructure, limited access to finance; inadequate provision of agricultural support, etc. It is also primarily rain-fed, which increase the vulnerability to climate variability.

Lastly, some of the variable relating to the impacts of climate change including Seasonal change; Food security, Reduction of fish stocks and decrease of underground water were not answered in the questionnaires; However, respondents from the interview revealed that seasonal change impacts tourism as it interfere with their schedule and interact their program especially when it is heavily raining in a period where rainfall is not expected; Moreover, decrease of underground water was brought out by one of the respondent that the water volume from the most of the natural springs and water caves have reduced due to the high temperature. This leads to the shortage of water supply in the tourist hotels that force the hotel investors to buy water from somewhere else far from the respective areas. This makes hotels owner to incur more running cost that is retrieved from other item and services such as food accommodation.

O. The impact of climate change interlinks with tourist's destination loyalty in Zanzibar.

The purpose of this variable in this study is to examine how the impact of climate change interlinks with tourist's destination loyalty in Zanzibar by asking the respondent about their revisit and willingness to recommend others based on climate change impacts.

The results from the table 3.3 show that, majority of Data respondents (tourists) from the study which is 98 % will still recommend Zanzibar if someone ask for their advice; 98% will speak positive thing about Zanzibar; 96% they will encourage their friends and relatives to visit Zanzibar; 77% they intend to return to Zanzibar in the next vacation; 71% they agreed that Zanzibar is their first choice among the destinations, 40% agree that they would come to Zanzibar continuously even if the price will increase in this destination and 45% as it has been revealed in table 3.3 that apart from the impact of climate change in Zanzibar they prefer to pay bigger price in Zanzibar than in any other destination. This show that climate impacts felt by tourists in one way or another, but those impacts have not affected the number of tourists who visit Zanzibar. For example, in 2016 about 376,242 tourists visited Zanzibar. The number of visitors increased by 15 % to 433474 in the year 2017 [40]. In 2018 alone, about 520,809 which increased about 20% of tourists visited Zanzibar [39], in 2019 about 47,824 this shows that the number of tourists who came to Zanzibar varied in every year depending upon the situation. However, in 2019 there is increasing number of visitors who came to Zanzibar from 2018 to 2019 [41].

Table: 3.3. Impacts of climate change interlink with

Item	Agree	Neutral	Disagree
Positivity about Zanzibar	98.0	1.7	0.3
Recommendation for Zanzibar	98.7	1.0	0.3
Encouragement to visit Zanzibar	96.0	3.7	0.3
Intention to return to Zanzibar	77.3	14.0	8.7
coming continually regardless the price	49.7	31.3	19.0
preferring to pay bigger price in Zanzibar	45.0	33.7	21.3
Zanzibar as first choice among the destinations	71.3	23.3	5.3

tourist's destination loyalty in Zanzibar in Percentage

Source: Field survey, 2017

P. The level of climate change impact in Zanzibar according to Tourists experience gained from the trip.

To determine how tourist rated the level of climate change impact in Zanzibar, a Likert scale of seven statements were constructed. Finally, the general attitude of all respondents

were presented after computing the average level of very high, above average, average, below average, low, very low and not affected.

Findings as presented in the table 3.4 indicate that, most of the respondents perceived different in their view on rating level of climate, fifty percent (50%) of the respondent rated impacts of climate change in average level, followed by 17% above average while 10% rated very high impact of climate change. This implies that Zanzibar is not left from climate change impacts in these coming years. According [25] there are threats to tourism hotels and infrastructure from beach erosion and sea level rise in these years to the key tourist areas including North East Coast (Kiwengwa, Mnemba), South East Coast (Jambiani, Paje) and Stone Town. However, the minority perceived the lowest level was 2% of respondents rated the impacts of climate change has no effect in Zanzibar. Perhaps these minority of respondents their time to spend in the destination was very short or they could not visit to the areas where have not been affected.

Table 3.4: The level of climate change impact in Zanzibar

Item	Frequency	Percent
Very high	31	10.3
Above average	51	17.0
Average	150	50.0
Below average	25	8.3
Low	17	5.7
Very low	21	7.0
Not effected	5	1.7
Total	300	100.0

Data source: Field survey, 2019

4. CONCLUSION

In order to achieve the objectives of this study, the study dwelt on questions related to what are the climate change impacts on tourism in Zanzibar? What are the precaution measures taken to counter climate change impacts in Zanzibar? What are the most observable impacts of climate change, observed by tourists in Zanzibar? What is the relationship of observable impacts of climate change on tourism industry? The study has shown that climate change impacts in Zanzibar affect tourism sector by eroding the coastline, bleaching coral reefs, destroying infrastructures, imposing extreme events such as flood, extreme wind and high temperature. The impacts of climate change have also affected water resources, investments and settlements that

interlink directly with the development of tourism sector. However, as much as climate change impose impact on tourism sector, the number of tourists visits Zanzibar is still increasing every year as well as varying in some years. This is due to excellent promotion of Zanzibar as a fine tourist destination promoted by the Revolutionary Government of Zanzibar and the natural beauty that Zanzibar still endow. Moreover, Revolutionary Government of Zanzibar has taken various initiatives to curb the impact of climate change in Zanzibar including construction protection seawalls and Dykes, Mangrove plantation, establishment of marine conservation areas among others.

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