Environmental Vulnerability and the Economic Implications of Climate Change for Tourism Development in the Central Drakensberg Region [CDR] of KwaZulu-Natal

Submitted in fulfilment of the requirements of the degree of Doctor of Philosophy in Management Sciences

In the

Department of Hospitality and Tourism
Faculty of Management Sciences at the Durban
University of Technology
Durban, South Africa

Nduduzo Andrias Ngxongo

September 2021

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Supervisor: Dr SN Chili (PhD)
Co-Supervisor: Professor PE Green (PhD)

Abstract

BACKGROUND AND AIM: In spite of the substantial amount of research that has been conducted in the last decade, misconceptions about the impacts particularly at a local level still abound. This study aimed to determine the extent to which climate change affected the environmental and economic facets of the Central Drakensberg Region [CDR] and the potential impacts these changes have had on the tourism industry. The tourism industry and the activities associated with it are highly weather-dependent and by extension, climate-dependent. Hence in recent times, there has been a growing concern over the impacts of climate change on the development of tourism. In South Africa, climate change is becoming more evident, causing flooding and extreme temperature and weather patterns. Likewise, Africa is widely considered to be highly vulnerable to climate change mainly because of its strong economic dependency on climate-related activities, destitute climate literacy and low adaptive capacity. The CDR, which is an increasingly popular tourist destination, is particularly vulnerable to the long-term impacts of climate change.

METHODOLOGY: The spatial setting of this research was the CDR, located in KwaZulu-Natal (KZN). The study fused two sampling techniques under the auspices of the non-probability sample method, namely: purposive and convenience sampling. The study's target population was N=450, thus a sample size of n=350 was determined appropriate. The respondents were categorized into two groups: namely experts [local municipality and tourism authorities] and stakeholders [tourists and/or visitors]. A quantitative research approach was employed with an exploratory paradigm design. The data collected was analysed using the latest Statistical Package for the Social Science (Version 25.0) at the time.

RESULTS: The primary findings revealed that the tourism industry in the CDR is at tremendous risk, particularly sensitive, significantly exposed, with minimal mitigation and adaptation mechanisms. Likewise, climate change in the area has a substantial impact on investment opportunities, long-term sustainability of protected species, habitats, and the tourism industry. In the absence of adaptation and mitigation, climate change is already having a detrimental economic impact on the region's growth and development prospects.

CONCLUSION: An integrated model was developed based on the aforementioned findings and is expected to be beneficial to tourism organizations and/or authorities in dealing with the devastating effects of climate change. Therefore, it is imperative that necessary provisions for impact adaptations and mitigations are implemented promptly, and that endeavors to develop a robust and multi-purpose adaptation strategy are prioritised.

RECOMMENDATIONS: Future research is recommended on the implementation of a Climate Services (CS) Framework, which is a technique that can be applied to strengthen decision-making processes to better prepare and acclimatize to the risks and impacts of changing climatic conditions. Likewise, the study recommends swift remedial actions and/or corrective measures in the form of climate change adaptation and mitigation models, Public-Private Partnerships (PPP), and climate change education and awareness.

KEYWORDS: Climate Change, Tourism Development, Economic Implications, Environmental Vulnerability

Declaration

I hereby declare that the thesis submitted for the Doctor of Philosophy Degree in Management Sciences: Tourism Management in the Department of Hospitality and Tourism Management, Faculty of Management Sciences at the Durban University of Technology is completely my own work and not of any other person, unless openly acknowledged (including the citation of published and unpublished sources). The work/thesis has not previously been submitted in any form to the Durban University of Technology or to any other institution for consideration or for any other purpose.

September 24, 2021

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Student Signature Date

MSc: Tourism

Approved for Final Submission

Supervisor: Date: September 26, 2021

_____

Dr. Nsizwazikhona S. Chili (Ph.D.)
Head of Department
Durban University of Technology

Co-supervisor: Date: 2021, Sept 29

_____

Professor Paul E. Green (Ph.D.)
Dean
Cape Peninsula University of Technology

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Opinions expressed and conclusions arrived at are those of the author and are not necessarily to be attributed to the NIHSS and SAHUDA.

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Dedication

This dissertation is dedicated to my beloved Mother, and family.

Bongekile F. Zulu

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Ngxongo, Nduduzo A.

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List of Acronyms

Acronyms	Full Words
CC	Climate Change
CS	Climate Services
CDIC	Central Drakensberg Information Centre
CDR	Central Drakensberg Region
CIT	Climate Index for Tourism
CPH	Cathedral Peak Hotel
DEA	Department of Environmental Affairs
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
ETUC	European Trade Union Confederation
ESD	Education for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
KZN	KwaZulu-Natal
MLRA	Multiple Linear Regression Analysis
NDEAT	National Department of Environmental Affairs and Tourism
NDT	National Department of Tourism
NTCCAP	National Tourism and Climate Change Action Plan
PPP	Public-Private Partnership
RCM	Rotated Component Matrix
RSA	Republic of South Africa
SADC	Southern African Development Community
SPSS	Statistical Package for the Social Sciences
UNWTO	United Nations World Tourism Organization
WHS	World Heritage Sites
WMO	World Meteorological Organization
WTO	World Tourism Organization
WTTC	World Travel and Tourism Council
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America

Chapter 1 of 8: Research Introduction and Background

1.1 Introduction to the Study

The republic of South Africa (RSA) is a popular tourist destination because of its amazing biodiversity and pleasant weather (Mansoor and Maroun 2016). Millions of people around the world are fascinated by countries wide-array of wetlands, rolling grasslands, voluminous stretches of mountains, world-renowned national parks, magnificent nature reserves, immaculate coastal beaches and the opportunity to participate in exciting activities like hiking and caving (Ramutsindela 2015: 2261). Likewise, all of these activities are utterly-dependent on favourable and pleasant weather conditions (Ziervogel et al. 2014). However, recent changes in climatic conditions may well place the country's booming tourism sector at risk (Mutana and Mukwada 2020). According to the World Travel and Tourism Council (WTTC) (2016b), in 2018, the tourism industry was expected to contribute more to the South African economy than in any previous period. According to the report, the rationale for the expected increase in revenue for South Africa and other nations was primarily premised on the tourism sector's improved global success.

In the local context, the WTTC (2020) estimated that the tourism sector brought in around R424.5bn ($30.1bn) to the overall South African economy in 2018, about 3% more than in 2017. In addition, the tourism sector in RSA supported over 1.5 million jobs in 2017, representing 9.5% of total employment in the country. The WTTC further emphasised the importance of tourism to the country's economy by affirming that almost 2.1 million jobs in SA by 2028 will depend on the tourism industry. Consequently, South Africa and other developing nations whose tourism economies are similarly reliant on desirable climatic conditions must take immediate action to navigate the scourge of climate change (Jamaliah and Powell 2017; Pandy 2017).

Cutting-edge and complex research studies on climate change are being conducted more today than in the past, with a strong focus on the correlation between the tourism sector and climate change (Ledley *et al.* 2017: 07). Tourism by nature is largely reliant on climatic conditions to flourish. In this manner, the negative impacts of climate change might have enormous financial implications. Therefore, developing nations whose economies are largely fueled by the tourism sector are more likely to be affected, as is the case with South Africa (Rogerson 2016). The renowned landscape of South Africa is a key element in attracting visitors., hence, the environment issues caused by climate change is therefore a key concern for South Africa. Amusan and Olutola (2017) postulate that changes in climatic conditions and their resultant effects threaten South Africa's environmental resources, infrastructure, ecosystem services, and biodiversity, all of which are intimately correlated to the country's tourism success.

This research investigation focuses on the relationship between climate change and tourism. Climate change is progressing at an exponential rate as a result of human activities, impacting on industrial, environmental and economic structures across all spheres, in a multitude of ways. According to Hall (2018: 51), tourism is one of the key industries that have come to experience the main consequences of climate change due to strong dependence on climatic conditions to attract visitors. In the absence of efficient counteracting strategies, the effects of climate change are expected to amplify, which will ultimately lead to additional damaging impacts (International Panel on Climate Change 2007a and 2007b; Tervo-Kankare et al. 2018; Cevik, Ghazanchyan and Selm 2020).

According to Palomo (2017) and Schwirplies and Ziegler (2017: 1276), the elevated and mountainous regions are highly susceptible to the effects of climatic conditions. Therefore, the Drakensberg mountain/region which reaches the greatest elevation in the region is a destination of amazing natural beauty, with white fluffy snow, an outdoor lifestyle (camping) and activities, warm weather and diverse in culture (Chili and Ngxongo 2017). It is also known for the famous rich culture and heritage of the san people (or Saan) in the area, also known as bushmen (Duval and Smith 2014). The wide-ranging collection of tourism activities in the region, including nature-based tourism, cultural and heritage tourism, sport-related activities, historical and geographical attractions make it one of the leading destinations for international, domestic and local tourists (Duval and Smith 2013: 136). Conversely, there is growing unease about the effects of climate change on the long-term economy and environment in the region. The rapid development of the tourism sector over the last decade is one of the notable and celebrated occurrences of this era. Tourism activities continue to grow progressively, notwithstanding some harmful elements such as climate change, which has some noticeably undesirable impacts on the industry.

Furthermore, the study endeavored to propose a model that would identify, manage and efficiently assist in mitigating the adverse effects of climate change, particularly in the tourism sector. This particular section of the study presents the introductory background to the general topic. It provides a thorough background to the research problem and in addition presents objectives that guide the direction of this investigation. The research questions and the research problem that the study sought to investigate are elaborated upon. Subsequently, key terminologies are defined as they relate to the variables of the study, followed by the rationale of the study. This section concludes by providing a summary of the methodology used in the study and also outlining the layout of the study.

In this research study, the main focus is on tourism development and climate change concepts within South Africa, Southern Africa, Africa at large and the Global contexts. In accord, Grimme *et al.* (2018) argues that Climate change is widely understood by experts, scholars, organisations and the international community to be one of the greatest challenges of our times.

Accordingly, this thesis investigates the impacts of climate change in the great Drakensberg Mountain region, with explicit emphasis on the economic impact and environmental vulnerability of the tourism industry due to changing climatic conditions. One of the aims of this research was for the researcher to propose an effective tourism-based model that may be used in future tourism research and practice. Having established the absence of a relevant theory for tourism research, this study employs the concept of "tourism climatology" as an exemplar for the study of tourism and climate change.

1.2 Background to the Study

It is an irrefutable fact that climate is a critical resource for the day-to-day progress and development of tourism, mainly for the economy, environment and winter tourism activities (Enrquez and Bestard 2020). Climate change is nowadays seen as one of the most significant issues that the global society will have to deal with in the 21st century (Scott and Lemieux 2010; Jamal and Watt 2011: 779; Bazylevych and Kupalovan 2014). The impacts of climate change are affecting ecosystems and communities on a global scale, and these impacts are projected to continue into the future (Dube and Nhamo 2019). Correspondingly, academic literature has acknowledged climate change as a major threat to many economic sectors, in particular tourism, which has been confirmed by the tourism scholars (Buckley 2012: 344).

With the recent research and scieintific progress of the 21st century, climate change research has gained prominence in recent decades in the African aspects of tourism business (Tervo-Kankare 2011; Dube and Nhamo 2018 2019; Fitchett *et al.* 2016a; Fitchett and Hoogendoorn 2018; Hambira *et al*. 2013; Pandy 2017; Pandy and Rogerson 2018; Tervo-Kankare *et al.* 2018a). Hlahla *et al.* (2019) contends, however, that the KZN's impact and adaptation regarding climate change remains modest at the level of municipal governance, and that relatively few studies have investigated the connection between tourism and climate in great detail. Therefore, it can be argued that the true nature of the vulnerability of tourism destinations and businesses to changing climatic conditions in the context of local areas remains largely unknown (Lethoko 2016). Similarly, climate change and tourism research in the global South is restricted, and has limitations including the scarcity of specialised tourism studies and the constraints of the availability and accessibility of free climate data and climate models' outputs (Hall 2018; Scott and Verkoeyen 2018). Nevertheless, Tol *et al*. (2013: 13) and Mathivha *et al.* (2017: 66) argue that although research studies on climate change and tourism in South Africa are to a certain extent inadequate, considerable steps have been made in advancing the subject area of tourism and climate change, and to improving the understanding of the impacts of changing climatic conditions. Therefore, an extensive review on the impact of climate change on tourism at all levels of industry is necessary to determine the extent to which climate potentially impacts the economic and environmental sustainability of the tourism industry. Furthermore, understanding potential dangers associated with climate change enables the tourism sector the opportunity to implement appropriate adaptation and mitigation strategies designed to safeguard the tourism business (Scott and Gossling 2015).

In corroborating the aforementioned global concerns, the Secretary-General of the United Nations World Tourism Organisation (UNTWO), Zurab Pololikashvili, stated that "climate change remains one of the most disastrous phenomena to threaten the tourism industry in the 21st century". Furthermore, as indicated by the Intergovernmental Panel on Climate Change (IPCC) (2014c: 1553), climate change is a "crisis multiplier" that has profound implications for international peace and stability, and is the greatest threat ever faced by modern humans. The IPCC estimates that by 2050, the impact of changing climatic conditions are going to be five times greater than what it currently is presently (Semenza and Ebi 2019). Sectors like tourism are more likely to suffer significantly because of their reliance on climatic conditions. For RSA, the National Department of Tourism (NDT) and National Department of Environmental Affairs and Tourism (NDEAT) have similarly affirmed climate change as the fundamental threat to major tourist destinations, World Heritage Sites (WHS), the environment and animal species that tourism in interconnected with (Ziervogel *et al.* 2014: 613). Climate change in SA is a major threat to well-being and socioeconomic development.

According to the National Department of Tourism (NDT) - National Tourism and Climate Change Action Plan (NTCCAP) (2011: 21), climate literature and models indicate that South Africa, mountains areas being most susceptible (Fort 2015), will in the long-term start experiencing accumulative heat waves, variations in frequencies and torrential downpours which may lead to floods, destruction to the infrastructure and an increase in the sea levels. The nature of these changes will have long-term negative effects on key national tourism destinations such as the physical appeal, activities, success, infrastructure formation and investment (Siddiqui ad Imran 2018). Such negative effects will gradually come to be noticeable locally and will distinctively affect individual tourism destinations, communities and businesses (NDT-NTCCAP 2011: 23). The Department of Environment Affairs (DEA) and the NDT have acknowledged the necessity of making certain that the tourism sector has the capability to emerge victorious against the anticipated negative effects of climate change (DEAT 2011: 22). The acknowledgement came through the understanding that any neglect or failure to competently respond to the potential catastrophe of changing climatic conditions will not only affect the environment, but will also place a sector which at this time contributes around R425.8bn or equivalent to 7.0% of the gross domestic product (GDP) in 2019, at risk, thereby weakening the sector's ability to contribute to the economy (Rogerson 2016).

In essence, the projected impact of climate change on South Africa's tourism sector must be measured and engaged with through continuous research and consultation (Ziervogel *et al.* 2014: 611). The natural alliance between the climate and tourism has been a subject of studies from as early as the 1930s (Toba 2009: 111). An analysis of global literature placed emphasis on the prominence of both weather and climate to tourism, as visitors frequently attribute their travel decisions to observed and present weather and/or climatic conditions.

Wilkins *et al.* (2017) further alluded to the fact that climate change conditions affect tourism patterns; travel seasons; tourism outflow; whether tourists can partake in tourist activities; fulfilment levels and their well-being. In many protected areas and destinations, the tourism business is closely interrelated with the natural environment, as is the case with the Central Drakensberg. Climate change, likewise, has a negative impact on a number of environmental resources that are key attractions for tourism in Central Drakensberg, such as snow conditions, wildlife productivity and biodiversity, water levels and quality. Thapa and Parajuli (2014a) argue that these phenomena have a significant impact on the environment which may, in turn, deter and discourage visitors, as well as to perpetuate contagious diseases, veld fires and extreme climate and weather events such as tropical cyclones. The United Nations World Tourism Organisation (UNWTO) and United Nations Environment Programme (UNEP) acknowledged and classified some of the critical impacts of climate change on tourism, namely warm temperatures, snow cover decrease, veld or forest fires, soil erosion and increased regularity of substantial rainfall in some areas (UNWTO-UNEP-WMO 2008). These impacts are expounded on in Chapter Three of this study. Optimistically, Rahmawati *et al.* (2019) argues that the impact of climate change can easily be managed and prevented if all the interested and affected role players in the tourism industry are actively seeking solutions simultaneously.

Businesses, government and the communities in susceptible regions like the Central Drakensberg should be given an opportunity to gain knowledge about climate change and how it affects their everyday lives (Loehr and Becken 2021). Tourism depends upon the environment to develop, thus creating maximum awareness amongst community members, shareholders and government can be an efficient tool to solve or manage the major problems associated with climate change. Lekaota (2017) contends that through continuous engagement about the impact of climatic conditions in the tourism industry, applicable stakeholders can improve the mitigation processes of managing climate change. This in turn can establish the implications, reduce human impact, reduce CO_2 emissions, and ultimately protect the tourism industry from further deterioration (Ekpo and Olatunde-Aiyedun 2019).

Several authors (Becken and Hay 2007; Rogerson 2013: 17; Vukadinovic *et al.* 2017) underlined that the tourism is a vital constituent of the global economy, as well as for amusement and recreation. Undeniably, climate change is one of the fundamental powers that influence the direction of tourism. Hoogendoorn and Fitchett (2018) argues that the devastation of climate change is far overpowering the capability of the tourism industry, and may possibly cause wide-ranging negative impacts for many destinations and countries. The view of comprehending how climate change impacts the tourism industry is essential if role-players are to determine the clear-cut impact of climatic conditions on tourism. Tourism, being one of the most lucrative industries globally, has the potential to enhance living standards for host communities through employment and business opportunities (Hasan and Siddique 2016).

This nonetheless requires that the industry develop efficient methods of reducing the impacts of climate change and, more critically, minimize its contribution to climate change through the production of greenhouse gases (GHG) and the general ecological footstep of tourism. Siddiqui and Imran (2018) in accord with Semenza and Kristie (2019), anticipate that high temperatures, heavy rains and heat waves will become more prevalent in the near future. Humid tropical storms will become more powerful and increases in sea levels and the decline in snow cover in some areas is anticipated to prolong. Additionally, the number of countries and major tourism destinations affected by climatic events is anticipated to substantially increase. These projected climatic conditions underline the need for a more radical approach in the struggle against climate change negatively impacting tourism industry (UNWTO 2007c; Hopkins 2015).

1.3 Statement of the Problem

As pointed out earlier, the universal phenomenon of climate change is probably the ultimate economic and environmental challenge facing the planet in this day and age. Similarly, Fang *et al.* (2016: 619) concurred by asserting that climate change remains one of the single greatest environmental challenges confronting the sustainability of the global economy. Tragically, the tourism industry has been acknowledged as one of the most susceptible sectors to the impact of climate change alongside the agricultural sector and general biodiversity, which is troubling because the tourism sector is a key economic sector for many developing countries (WTTC 2016b).

More particularly, Africa is considered by several research scholars to be one of the most vulnerable regions to the ramifications of climate change (Hamilton and Tol 2007: 166; UNWTO-UNEP-WMO 2008; Toba 2009; Hope 2009: 457; Abede 2014: 33; Pandy and Rogerson 2018). According to the related literature, there is a visible lack of historical balance in the data and literature on the dynamics of the relationship that exists between tourism and climate change (Scott 2021). Such a gap has been identified to exist in most developing economies, which the African continent can very much relate to (Hope 2009: 454; Bewcket 2012: 11). Further down to the southern tip of the African continent, the area of Southern Africa is especially susceptible to the long-term impacts of changing climatic conditions (Abede 2014; Dube and Nhamo 2018). Hoogendoorn and Rogerson (2015: 104) and Rogerson (2016: 29) further assert that climate change is a disastrous reality that is desecrating the economic liberation of emerging local communities. In terms of vulnerability in the Global Climate Risk Index, South Africa was placed 24th (Eckstein *et al.* 2018). When compared to the previous year's ranking of 47, the current framework is failing to address the issue of climate change and the country is galloping toward a highly perilous scenario that can potentially destroy an already vulnerable tourism sector (Eckstein *et al.* 2018).

Moreover, Clemencon (2016: 17) reports that there is a high level of vagueness with regard to the long-term implications of climate change for tourism development, visitor flow, spending patterns, visitor attitude and behavior.

These subject areas, according to Buggy and McNamara (2016: 274), have largely not been examined meticulously enough on the continent of Africa, South Africa included. An important area in dire need of further exploration for tourism scholars relates to the climate, tourism and development relationship (Farid *et al.* 2016: 256). Similarly, Rogerson (2016: 326) and Chersich and Wright (2019) considers such research initiatives within the Southern African context as one of the most pressing subjects, where both the direct and indirect impacts and implications of climate change may be very severe quickly.

Chersich and Wright (2019) postulate that the prosperity and sustainability of the tourism industry is largely reliant on the sector's capacity to develop mitigation policies to deal with the issue of climate change. However, Shakeela and Becken (2015: 16) reported that climate change mitigation and adaptation research in Africa remains considerably less developed than in any other parts of the world, with risk assessment amongst tourism destination and stakeholders constantly concluding that there are low levels of awareness and understanding about climate change by tourism stakeholders, as well as little to no indication of strategic forecasting in anticipation of future changes in climate. The challenge is that in order for tourism stakeholders to act, there must be a motivation, and in order for there to be a motivation, there must be, at a foundation level, sophisticated awareness and understanding of climate change. Buggy and McNamara (2016: 274) underlined that awareness and knowledge of climate change and the associated impacts play an important role with regard to industry stakeholder's awareness and views of climate change, as well as on how the industry can be better suited and positioned to tackle to reality of climate change.

Notwithstanding the aforementioned concerns, the ability of the tourism sector to acclimatise and survive some of the wide-range effects of climate change calls for a relatively high adaptive and alleviation capacity in the sector (Hoogendoorn and Fitchett 2018). Nevertheless, the understanding of the mitigation and resourceful capacities to effectively acclimatise with impending climate conditions and the extensive environmental effects and economic deterioration remains undeveloped and unheeded (Moreno and Becken 2009; Ngcobo *et al.* 2012: 21; World Bank 2020). Therefore, given the mounting evidence and acknowledgement of the necessity for the tourism industry to adjust and accustom to future climatic change, research studies that specifically address the awareness and understanding needs, mitigation and adaptation policies and understanding of climate change impacts should be competently conducted and considered (Janet *et al.* 2013: 511; Grimm *et al.* 2018; Scott 2021).

It is also worth emphasizing and noting that the prominence of this area of investigation is vital at a period when the tourism sector has been recognized to be the largest service industry in the world (Meyer and Meyer 2015), generating specifically up to a hundred million rand (R100 000 000) annually to the Drakensberg economy (Mthembu 2011: 131). The tourism industry is by nature strongly reliant on the continuous preservation of environmental resources in order to continue attaining the economic and other sustainable benefits of tourism activities (Mabaso 2015).

Presently, little-to-nothing is known about the environmental and economic effects of climate change in the Central Drakensberg region. The climatic impact is considered to have the ability to pose long-term risks to the sustainability of tourism in the area. The Drakensberg region represents one of the most valuable tourism destinations in South Africa because of its world heritage status, famous winter snow and splendid conservation life. Additionally, the region signifies an important tourism destination for many tourists who are attracted to the history and culture of the San/bushman people.

Mthembu and Hlophe (2020) assert that the CDR and KZN as some of the country's major tourism destination still have to acclimatize with the natural occurrence of climate change that threatens to destroy the soul of the Zulu kingdom. In accord, Mukwada and Manatsa (2018) postulate that similar to famine and drought, the realisms of the effect of climate change on tourism remains a noticeable concern for the area of Drakensberg and mainly for the central part of the mountain, where the tourism industry has become a casualty of climate change. According to Scott and Gossling (2015), the persistent natural challenges of climatic change to tourism development appear to be a great problem that even current modern technology cannot resolve. Consequently, the country's tourism authorities still have a pressing obligation to methodically engage with the subject matter of climate change which is postulated to be one of the key indicators of tourism activities in the region. In addressing the issue, intensive engagement is essential in order to develop a collective solution that can be useful to the tourism industry. Governments and other relevant role-players must engage cooperatively to solve the issue of climate change (WTTC 2012a; Averchenkova *et al.* 2019).

Accordingly, there is a noticeable need to increase the dialogue linkages, quantify the impact economically and engage in research initiatives that focus on the alleviation and management of the actual and potential impact of climate change on tourism. Additionally, this research study offers an opportunity for conclusions that suggest suitable approaches to shield the tourism industry against the dynamism of climate change in CDR and beyond. The principal investigator of the study intended to determine the extent to which climate change impacts both environmental and economic aspects of the region and whether role-players can play a pivotal role in mitigating these impacts. Thus, this phenomenon calls for an exploration into the environmental and economic impacts of climate change on the tourism industry, with specific interest in the Central Drakensberg Region. In essence, without a sophisticated understanding of climate change impacts and its mitigation & adaptation issues, industry stakeholders and other tourism-related industries will not be able to create and implement effective climate change policies. It is important to note that these challenges are not an exception to African countries because similar difficulties are experienced across the globe.

1.4 Purpose of the Study

According to the van der Veeken *et al.* (2016), the average level of awareness in relation to the impact of climate change on tourism in South Africa is particularly low.

Nevertheless, the country is regarded as one of the world's most vulnerable countries in relation to the impact of climate change. Consequently, the primary purpose of this investigation is to advance an understanding of the relationship between tourism and climate change by focusing on its impact and implications. The study will also attempt to demonstrate how vulnerable the tourism sector is to both the environmental and economic impacts of climate change, thus resulting in the most devastating outcomes. A need to conduct further research on this topic is also recognized by industry experts who emphasise that "the long-standing relationship between tourism and climate change" needs to be scrutinised in order to develop an informed approach to the rampant undesirable impact of climate change on tourism (Stapleton *et al.* 2017).

The study of climate changes impact on tourism is essential for both the CDR and South Africa, particularly for Drakensberg as tourism is one of the prime economic drivers of the area. Thus, it is essential to explore the existing and potential climate change impact on the tourism industry, which can negatively affect both the visitor flow and cash flow to the area. Climate change in CDR is predicted to impact not only the tourism industry through decreases in snow level and increases in temperature, but also tourism flows. As a result of unstable climatic changes, visitors are more likely to choose other destinations or even a different region of the Drakensberg mountain. Therefore, with the clear purpose of contributing to the climate-tourism literature in the Drakensberg, which has not been highly researched, this dissertation aims to scrutinise the implications and impact of climate change on the tourism industry of CDR.

1.5 Research Objectives

This research study endeavors to investigate the impact of climate change on tourism with an approach that offers potential solutions, not only to tourism authorities and shareholders, but to all tourism destinations with similar characteristics. CDR has a number of attractions that are at great risk of being affected by climate change if no counteractive actions are introduced. In addition, this region possesses a number of economic-and environmental-related activities, which all together makes this study useful in the wider context of both tourism and climate change.

The Objectives of the Study are as Follows:

To assess the effects/impact of climate change on Central Drakensberg Region's tourism;

- To investigate the visitors'/tourists' and tourism establishments' awareness and understanding of climate changes impact on tourism in the Central Drakensberg Region;
- To determine the vulnerability of tourism activities to the impact of climate change in the Central Drakensberg Region;

- To investigate the tourism sector's mitigation and adaptation practices to climate change in the Central Drakensberg region;
- To evaluate the potential influence of climate change on the choice of tourists visiting the Central Drakensberg Region; and
- To develop a model that shows the impact of climate change on tourism development in the Central Drakensberg Region of KwaZulu-Natal.

1.6 Research Questions

A probing approach is the first step in the research procedure for the reason that research starts with a question that leads to a theory (Ratan *et al.* 2019). The interest of the researcher is prompted by the desire to study and identify the impact of climate change on tourism development. Therefore, specific research questions to be answered are the following:

- What are the general effects/impacts of climate change on the development of tourism in the Central Drakensberg Area?
- What are the tourism stakeholders' contemporary awareness and knowledge levels on climate change and tourism and what are the main knowledge gaps in relation to climate change?
- What mitigation and adaptation practices are currently in place to combat climate change impacts in the Central Drakensberg Region?
- What influence does climate change have on guests'/visitors' choice to visit the Central Drakensberg Region?
- How has the phenomena of climate change impacted tourism businesses in the Central Drakensberg in terms of economic and tourist sustainability?
- Does the Central Drakensberg Region require an innovative theoretical model for the assessment, prevention and mitigation of the negative impacts of climate change for tourism development?

1.7 Study Hypotheses

A hypothesis experiment is generally executed to statistically examine whether a claim is vindicated or not (Kolawol and Sekumade 2018). Hypotheses concentrate on the relationships between two variables, as well as the phenomenon causes under research (Assaf and Tsionas 2021). The statements of the hypotheses for the problem being researched are as follows:

Hypothesis 1:	There is a significant correlation between choosing an environmentally sustainable destination and increased climate change research investment.
Hypothesis 2:	There is a significant correlation between choosing an environmentally sustainable destination and vacation cancelation due to inclement climate conditions.

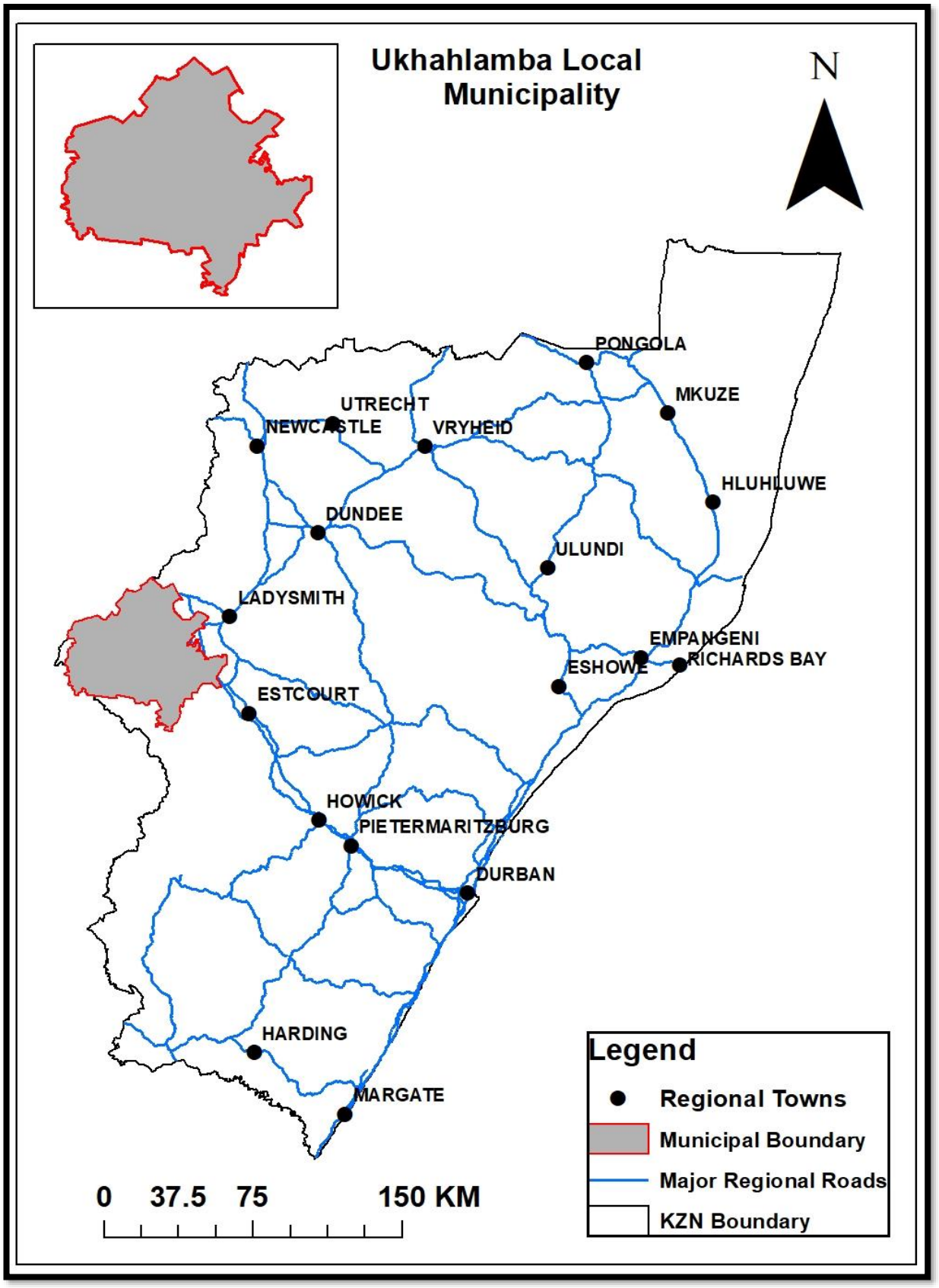
Hypothesis 3:	There is a significant correlation between choosing an environmentally sustainable destination and increased tourist expenditure.
Hypothesis 4:	There is a significant correlation between the quality of a destination's natural surroundings and its accessibility.
Hypothesis 5:	There is a significant correlation between climate change affecting visitor flow to tourism destinations and climate change reducing the profitability and efficiency of tourism.
Hypothesis 6:	There is a significant correlation between sustainable development with weather and climatic conditions.
Hypothesis 7:	There is a significant correlation between the impact of climate change on tourist spending behavior and tourism's financial success.
Hypothesis 8:	There is a significant correlation between investment opportunities and the tourism's prospects.
Hypothesis 9:	There is a significant correlation between the quality of the natural surroundings and the cultural and historical attractions in the region.

1.8 Spatial Setting Delimitation

The great Drakensberg Mountain consists of the uppermost highlands in the Southern part of Africa. The forename of this peak means “Dragon Mountains” in Afrikaans and is referred to as uKhahlamba in the Zulu language which means "barrier of spears" (Ndlovu 2020). The Drakensberg Mountain was officially declared a World Heritage Site (WHS) by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2000 as a result of its environmental and cultural multiplicity (Mthembu 2011: 96). The UKhahlamba/Drakensberg is a grand and exceptional range of mountains and hills, the greater part of which stretches out in KwaZulu-Natal, and is referred to as “the soul of the Zulu kingdom”.

The Drakensberg mountain can be divided into three sections – Central, Southern and Northern Drakensberg (Siyabona Africa 2015: 1). The spatial setting of the study is based in a singular tourism region in KwaZulu-Natal; the Central Drakensberg. This region makes up a large section of the uKhahlamba/Drakensberg mountain. Some of the most popular and eventful destinations in the region take account of Giants Castle, Kamberg, Highmore, Cathedral Peak, and Monks Cowl, some of which will be covered by the study. The rationale to select CDR is based on its geographical location and tourism uniqueness. The study covered only the majority of major tourism attractions in the region of CD in KwaZulu-Natal. Particularly, the study includes the subsequent tourist attractions; Cathedral Peak (Didima Resort and Cathedral Peak Hotel), Monks Cowl Nature Reserve (Country Club and Champagne Castle); and Injasuti (Giants Castle). The CDR is considered to be the most attractive region of the mountains and it is generally the earliest to experience the impacts of winter, with shiny white peaks after a cold freeze.

Figure 1. 1: Geographical Location of Central Drakensberg Regions



Source: Central Drakensberg Information Centre (2018)

1.9 Research Methodology Synopsis

The practices and techniques of research are fundamentally important to ensure reliable data collection instruments and analysis procedures are utilised. These methods are critical for validating the processes and the reliability of the study results. Research methodology is a methodical technique of solving a problem, with the aim of providing the work plan of the study (Mishra and Alok 2017). This part of the study presents the research methodology employed in the current study. The rationale of this section is to present the theoretical statement underpinning this study. The researcher explains why the methods used to collect data were preferred, as well as how they were designed and utilised. In more detail, the research strategy and methods are outlined, details of the participants are explained and the data collection process is outlined.

1.9.1 Research Design

The research study adopted a descriptive research design, which is a quantitative design category (Creswell and Clark 2007; Apuke 2017). The benefit of the quantitative research method is that this particular approach allows the study investigator to study and scrutinize the correlation between the two variables of climate change and tourism. According to Creswell and Guetterman (2018), the information collected can be utilised to look for cause and effect relationships, thus can be used to make necessary and informed predictions. “A research design is the logic that links the data to be collected and the conclusions to be drawn to the initial questions of a study. It ensures coherence. Another way of viewing a research design is to see it as an action plan for getting from the questions to conclusions” (Rowley 2002: 16).

1.9.2 Target Population and Study Sample

Asiamah (2017) describes a target audience or population as the whole group of individuals to which the principal researcher is interested in applying his/her conclusions. Babbie and Mouton (2010) further explicates that a study population refers to people that have been made up from all feasible elements, subjects or observations concerning a certain occurrence of interest to the principal researcher. Elements and subjects refer to those individual objects or variables that form the population. The target population of this study is made up of two groups: stakeholders and experts. Stakeholders include visitors/tourists and employees from the tourism establishments in the study area, whereas experts include local tourism authorities who are professionals dealing with tourism and climate change. This study fused two different sampling techniques under the auspices of a non-probability sample method, namely: purposive and convenience sampling.

The sample size of the study was n=350 respondents which were broken down into different categories: n=320 of the respondents were guests/travellers that visited the selected destinations; n=6 of the respondents were from the local municipality's, tourism department (the department only had 5 employees which means that they all participated); and the last of the respondents n=24 were from EKZNW's employees purposively selected either because of their direct and/or indirect involvement with tourism/climate change matters. Each of the 6 selected destinations had 4 participants in the study.

1.9.3 Data Collection Instrument

According to Sansoni (2011) and Young (2015), a questionnaire is defined as a document designed with the purpose of seeking specific information from respondents. For Ponto (2015: 169), questionnaires typically include a series of items reflecting the research aims, which may often include demographic questions in addition to valid and reliable research instruments. Since questionnaires have now been ascertained to be a relevant data collection instrument, this research study employed structured questionnaires that were were administered by the researcher. They were tailor-made for each segment group (Local municipality, visitors/tourists and Tourism authorities). The questionnaires were divided into 4 parts (Demographics, climate change impacts, environmental impacts/management of climate change and supplementary questions). Most of the questions were in a Likert scale format.

1.9.4 Study Validity and Reliability

In research, rigour can be explained as the trustworthiness or accuracy of a research investigation with regard to the planning, gathering of data, analysis of gathered information and reporting. In quantitative research, this can be achieved through the measurement of the validity and reliability. In addition, the significance of validity and reliability in research is essential, particularly when one is evaluating a measurement tool (Noble and Smith 2015).

1.9.4.1 *Validity*

Bonds-Raacke and Raacke (2012: 84) view validity as "the ability of your measurement to accurately measure what it is supposed to measure". For White and McBurney (2013: 141), "validity is an indication of accuracy in terms of the extent to which a research conclusion corresponds with reality". In an attempt to ensure validity in this research, a content validity method was employed which was further validated by the use of data triangulation. This helped in cross-checking the findings. In warranting the validity of the research findings, the questionnaire was piloted, in order to ensure that the questions were clearly understood and that the respondent does not come across any redundant complications when answering the questions.

1.9.4.2 *Reliability*

Reliability according to Yin (2014) involves conducting a study as if the research is being monitored, so that if another researcher does the same thing, the same findings and conclusions will emerge. For Leedy and Omrod (2010: 93), reliability is the "reproductivity of consistent results of a measurement under circumstances where the characteristics being measured have not changed". In this research, reliability was established through internal consistency by computing Cronbach Coefficient test. For this questionnaire, the coefficients of Cronbach's of the constructs were all higher than 0.70, thereby indicating an acceptable internal consistency of the measurements. Internal consistency is concerned with the scope to which items in the test or instrument are assessing the same thing (Bolarinwa 2015: 196).

1.9.5 Data Analysis

The information gathered from the study respondents (tourists, experts and stakeholders) was entered into a numerical software package called the Statistical Package for the Social Sciences (SPSS) version 25.0. In the academic sphere, SPSS is a recognized and prominent programme used in analysing data. A number of techniques were used to present quantitative data: frequency, percentage, mean and standard deviation as tools of descriptive data analysis. The main experiments conducted were the use of correlations, chi square tests, regression analysis, Pearson's Chi-square and Fisher's Exact Test, which are interpreted using the p-values.

1.10 Rationale for the Study

The tourism sector is a significant contributer to SA's economy (Nicholas *et al.* 2020). Consequently, tourism stakeholders have to enhance their awareness and understand of the threats to this sector, such as changing climatic conditions that has and continue to harmfully affect the tourism sector from all angles. Hence this research study endeavoured to scrutinise the impact of climate change on tourism. The tourism industry is at risk of various climate change impacts. Therefore, it is important that the sector stakeholders, tourism authorities and community members take firm action in becoming accustomed to climate change matters. The issue of climate change and tourism is of particular significance in Central Drakensberg, where many tourism activities are largely dependent on environmental resources. These resources are notably endangered by the negative impact of climate change, as changes to the environment due to climate may result in large capital losses for the tourism industry of the region, which threatens the livelihoods of many people in this region. The study sought to trigger a channel of communication amongst tourism role-players in South Africa and globally with hope to share ideas on how best the catastrophe of climate change can be mitigated. The current study contributes new insights and builds the knowledge base on how climate change influences tourism development in relation to economic and environmental sustainability.

In light of the empirical findings that will be presented in this research about the present climate change/tourism situation in South Africa, the outcomes of this study may contribute to an improved awareness and understanding of the multidimensional nature of the tourism sector's vulnerability to climate change and how it may transform over the coming decades in order to assist in coping with existing and potential changes. In addition, the study endeavoured to provide valuable prospects for tourism role-players in the region of the Central Drakensberg to expand their understanding, expertise and competence, to put in place effective adaptation and mitigation strategies that have the capacity to address the impact of climate change on economic and environmental sustainability. Moreover, the proposed study has a number of potential academic contributions for scholars, authorities and practitioners, particularly in the discipline of tourism geography. From a theoretical perspective, this study provides a basis for researchers to further test the integrated correlation between climate change, environmental and economic sustainability in the context of tourism development. Lastly, the research study provides a detailed case study that demonstrates practical mechanisms of climate change in tourism to be applied to other tourism destinations with a similar context.

Through focusing on the impact of climate change, the researcher developed a pioneering integrated theoretical model for CDR that can assist tourism authorities, businesses, municipalities and local communities to efficiently deal with the crisis of climate change productively. Furthermore, the model is hoped to contribute to a sustainable development strategy, in particular one that can deal with educating the community about climate change. The integrated model will be a useful tool in providing solutions to the current challenges of poor awareness and understanding levels, shortage of mitigation and adaptation strategies, economic and environmental challenges hindering the prosperity of tourism in the region. Though previous scholars who have carried out various research studies on climate change and tourism, they did not suggest any integrated model that incorporates environmental vulnerability, economic implications and mitigation strategies to speed-up the adaptation process.

Since no prior research investigation of this nature has been previously piloted, particularly in the great Drakensberg mountain, it is envisaged that this contribution will be useful to many tourism stakeholders, particularly tourism establishments in similar settings that can look for solutions to their questions in this study and grasp various aspects that will support them to acclimatize to the influences of climate change. This study can also serve as a guideline in decision-making and provide recommendations related to the implementation of mitigation and adaptation strategies, without negatively affecting the economic sustainability of tourism. Moreover, the outcomes of this study enhance the consciousness levels of other destinations in similar situations through providing an understanding of what needs to be done in relation to climate change adaptation. It also informs national, provincial and local governments about the importance of capacity-building initiatives in accelerating the implementation of counteractive and redressing measures aimed at curbing the long-term cataclysms of climate change.

1.11 Scope, Limitations and Delimitations of the Study

The spatial setting of this study was delimited to the Central Drakensberg Region, which is located in KwaZulu-Natal with a specific focus on climate change, economic implications, environmental vulnerability and tourism development respectively. The study did not investigate the social and political impacts of climate change. Climate change in the context of this study is referred to as any significant long-term change and/or variation in the expected patterns of average weather of an area (or region) over a significant period of time.

Precisely, the research project studied the Didima Resort, Cathedral Peak Hotel, Monks Cowl Nature Reserve, Giants Castle, Injisuthi and Queen Elizabeth Park. Additionally, other prominent respondents of the study included uKhahlamba Local Municipality (Tourism development Office) and Ezemvelo KwaZulu-Natal as the main tourism authorities responsible for the management and development of tourism in the region. Information was only collected from employees, locally-based businesses, visitors/tourists, community members, and experts from local and provincial government personnel. This study only covered employees with a minimum of 5 years working experience for any of the selected organizations/destination who are directly involved in the tourism industry. Junior employees, in-service training employees and employees from other departments (marketing, finance, procurement, human resources and so forth) who are not directly or indirectly involved in the tourism industry were excluded from this research.

1.12 Key Terminology and Concept Definition

The concern of speculation, uncertainty and misinterpretation in research should be eliminated in the introductory section of the study by defining the key concepts that guide the direction of the study (Ngxongo 2016: 8). In order for this research study to be meaningful and flawless, the researcher deemed it necessary to include the terminology section. The concepts also helped in limiting the study to only the relevant issues and to avoid abstruseness (Noori 2018). The following is a brief explanation of key concepts:

1.12.1 Tourism

The definition of ‘tourism’ varies from source to source, person to person, though some definitions buy tourism scholars and workers are more prominent than others. Macintosh and Goeldner (1995: 51) define tourism as the sum of the events and relationships that are inspired by the communication of visitors/tourists, business suppliers, host governments and local communities in the process of attracting and hosting these tourists and other visitors. Similarly, UNWTO (2001) and McKerracher (2018: 1239) outline “tourism” as a societal, educational and cost-effective experience which involves the carriage/movement of individuals to areas and countries or destinations outside their natural surroundings for individual or business reasons.

The people are referred to as visitors or tourists, and tourism by nature has everything to do with meeting their needs, including influencing their decisions-making, spending and behaviour patterns. Tourism is also seen as a practice of people, individuals, couples and groups travelling to and temporarily residing in spaces outside of their natural setting for vacationing, professional or other purposes for a duration of less than one year (Page 2003). Tourism is considered to be a key source that offers substantial benefits for the poor and can advance cultural self-importance, a sense of possession and control (Benavides and Perz-Ducy 2001). In the context of this research, tourism is applied to explain the interaction of tourists with the ecological surroundings of the region and the impact arising from the travel and stay of visitors in unusual settings.

1.12.2 Tourism Development

Tourism development is a progression that consists of the active participation of all relevant and interested parties or rather stakeholders, including a strong political management that will guarantee broad participation and harmony (Eccles and Costa 1996). Achieving effective tourism development as a constant course of action requires constant engagement, sourcing of funding and the buy-in of the host community. Khan (2005) defines tourism development is a continuing progression of preparing for the influx of tourists. It requires the preparation, construction and supervision of attractions, transportation, services and amenities that serve tourists. Tourism development is also considered to be the form of development that caters for the needs of today without compromising the capacity of upcoming generations to meet their own needs (Pham *et al.* 2010: 462). In the same way, UNEP and UNWTO (2002b) define tourism development as a form of tourism that takes full account of its present and upcoming financial, social and ecological impacts, while addressing the requirements of tourists, the sector and local community.

1.12.3 Climate Change

Grimm *et al*. (2018) assert that changing climatic conditions are considered to have a negative impact on the physical resources supporting tourism worldwide and promotes unwanted changes in tourism, not only in coastal areas but also for out-of-doors attractions. According to the World Meteorological Organization (WMO) (2006), climate can be expounded as the "standard weather" or more thoroughly as the numerical explanation with respect to the mean and variability of significant magnitudes over a period of time, anything from days to centuries. These occurrences are most often surface variables, such as heat, rainfall, as well as wind (Rahman 2013). Similarly, Climate change is defined as the alteration in climatic conditions caused directly or indirectly by human activities which, in addition to ordinary climate inconsistency, is observed over comparable time periods (Riedy 2016). In the context of this research, the concept of changing climatic conditions is explained as any variation in global or regional weather activities/patterns. Such variations are largely attributed to the recent upsurge in heat waves and/or high temperatures, as well as the high emission of greenhouse gases.

1.12.4 Environmental Concept in the Context of Tourism

The significance of the environment can never be overlooked because it is the main source of tourism, particularly because most attractions are directly and indirectly dependent on the environment in order to take place. Buckley (2012) describes the environment as the surrounding non-living and living species in a geographical space, comprising physical, natural and chemical elements. In addition, the concept of environment can be seen as the natural and physical environment, and the relationship of people within that environment. The interaction between humans and the environmental has a number of favourable and unfavourable impacts on the environment. Goodland (2005: 121) defines these impacts as the potential unfavourable effects caused by a development or industrial expansion or by the discharge of detrimental gases in the environment.

1.12.5 Economic Concept in the Context of Tourism

The tourism industry is indisputably one of the most significant and lucrative industries for developing countries, and South Africa is no exception (Meyer 2021). The tourism industry has the potential to improve the country's economy and significantly influence its environment, both positively and negatively (Comerio and Strozzi 2019). Tourism has progressively improved over the last two decades, contributing enormously to the South African economy. Tourism specifically impacts South Africa's economy in three major national spaces: Gross Domestic Product (GDP), employment opportunities and attracting suitable investments to the country (Nocholas *et al*. 2020).

Similarly, Rasool *et al.* (2021) posits that the relationship between the environment and climate has a number of impacts on the economic climate of a region or a country. In the context of this study, the concept of economy is studied in terms of the direct or indirect impact of a particular event on the financial performance/outputs of a particular region, whether it be locally or globally. The process commonly assesses variations in industry revenue, organizational income, personal earnings and employment rates. This research study specifically focused on the economic and environmental impacts of climate change on the tourism industry of CDR. More notably; climate change has the capacity to destroy the country's economy and its environment unless counteractive measures are in place.

1.13 Organisation of Thesis

The research study is presented in eight (8) chapters. The format of each chapter commences with an introduction, followed by the discussion sub-division and a conclusion with a chapter summary that is linked to the next chapter. Additionally, an outline of every section is subsequently offered in the last part of all chapters. The chapters are further explicated below.

1.13.1 Chapter 1: Research Introduction and Background

The opening chapter presents an overview of relationship of climate change and tourism, research context of the variables, and background of the research. The nature of the research problem, rationale for the study, research objectives and specific research questions are also declared. The chapter concludes by providing definitions of key terms and concepts that are used throughout the study; the scope of the study and the conclusion (outline).

1.13.2 Chapter 2: Spatial Setting of the Study Area

This chapter outlines the spatial setting of the study area, which is the Central Drakensberg Region, paying special attention to the historical environmental background information, current state of natural components, tourism sector and layout map of the area, including the location of the study area. The rationale for including this chapter is to familiarize readers with the settings of the region being investigated, as well as to provide updated information on the current condition as far as climate change and tourism is concerned.

1.13.3 Chapter 3: Literature Review of the Study

Chapter Three outlines the topic of climate change and its impact on tourism development in general. It provides a wide outline of the significance of climate change in tourism development and the relationship between the two variables. Furthermore, the chapter offers a deep understanding of the environmental and economic impact of climate change in tourism. Previous findings and studies relating to climate change are discussed in this section. The literature cited supports the theoretical argument being made and demonstrates that the research has a grasp of the major ideas and findings that pertain to the topic at hand. This chapter is presented in two parts: the first aspect of the discussion focuses on climate change, whereas the second aspect focuses on the impact of climate change. The chapter concludes with the international perspective of climate change and tourism.

1.13.4 Chapter 4: Conceptual Framework

This chapter provides sufficient details about the conceptual framework “tourism climatology”, which informs and directs the study. The chapter reviews the theoretical inclinations of this study, with a view to creating and contextualizing the conceptual underpinning within the tenets of this study. The chapter commences with a conversation on the lack of a theoretical framework for the tourism discipline and then proceeds to the actual exploration of the conceptual framework adopted.

1.13.5 Chapter 5: Research Methodology

Chapter Five provides details about the methodological procedures that were utilised in this particular study. Subsequent to that, it offers a thorough narrative of the research approaches that were utilised in the research study. Other sections of this chapter include: the study paradigm, research design, detailed information on participants, research design, measures, sampling type, data collection instruments, materials, procedure and analysis methods. The pilot study is also provided in this chapter, together with the ethical consideration of the study. The selection of the preferred methodologies in this study is supported by the relevant literature.

1.13.6 Chapter 6: Results - Analysis and Presentation of Data

Chapter Six presents an analysis of the findings from the field work and the data instrument (structured-questionnaire) that was used to solicit information from the respondents. The findings present the views, opinions and information solicited from the participants in the study (community members, tourism authorities, tourists, businesses in the area, government officials and academics). The findings are analysed, in line with the research objectives and questions. Results will be presented without interpretation; as interpretation is reserved for the discussion chapter. As part of the presentation of the outcomes, this section outlines the findings in relation to climate change and the subsequent impact on tourism, the environment and the economy of CDR.

1.13.7 Chapter 7: Discussion on the Findings

This chapter presents a detailed discussion of the data analysed in the previous chapter and the detailed implications of the outcomes and/or conclusions arising from the analysis of the responses gathered from the respondents. The results are presented using descriptive statistical data, reliability analysis and the literature review are used to make sense of the outcomes in order to strengthen the discussion and to compare the findings with previous findings from other researchers.

1.13.8 Chapter 8: Summary of Findings, Conclusion and Recommendations

This section presents the main underlying principle for conducting this research study as it presents the novelty component of the study. It is globally acknowledged that good doctoral research must be able to provide new information as a contribution either the field or the body of knowledge in general. Thus, this section discusses the proposed theoretical model that can be exploited to efficiently manage the effects of climate change, as well as to protect the tourism industry from the effects of climatic conditions in the CDR and beyond. This model can also be used to determine the vulnerability of the region as far as climate change and tourism is concerned. This chapter also provides an overall conclusion of all the chapters, the results and the implication of the outcomes as it relates to the study area.

This is the concluding chapter of the study which offers a synthesis of the research. Each of the aforementioned objectives (Chapter 1) will be discussed and interpreted according to the general outcome of the study, as well as the literature review. The limitations and potential implications of this study for further research will be presented, followed by the recommendations and possible strategies that could be implemented in dealing with the detrimental phenomenon of climate change in the region.

1.14 Chapter Summary

The chapter began with a discussion of the concepts of climate change and tourism, emphasising climate change as a major threat to the development of the tourism industry globally. Weather and climate are essential ingredients for tourism as the industry is largely dependent on climatic conditions to attract visitors and investors. Even though there have been some efforts to deal with the growing concern of climate change in a number of destinations, particularly those positioned in rural and mountains regions, most destinations are still susceptible to the detrimental effects on climate change.

This study sought to extend the body of knowledge and understanding about the impact of climate change on tourism, especially in developing countries where the tourism industry is very volatile. This chapter outlined the main concepts, direction, variables and arguments as they relate to climate change and tourism. A brief introduction to the general topic including the contextual background and the statement of the problem were all outlined. The determination and objectives of the investigation were presented, along with a summary of the research methodology. The chapter concluded with an outline of the structure of the research project.

Chapter 2 of 8: Spatial Settings of the Study Area

2.1 Introduction

The principal spatial setting of this study is the Central Drakensberg Region (CDR) which is considered to be the most attractive region of the Drakensberg Mountain. The landscape dimensions of Drakensberg Mountain consist of up to three main segments: namely the Northern, Central (which is the focus of the study) and Southern Drakensberg. These regions take account of diverse parks and reserves, and is situated in close proximity to municipalities such as Bergville, Ladysmith, Estcourt, Winterton, Mooi River and so forth. The mountains equally attract domestic and intercontinental visitors, who come to witness and experience the regional scenic splendour, rich history of the san people, stunning vegetation, cultural history and the fluffy winter snow (Mutana and Mukwada 2017). The DCR is a distinctive tourism destination with its own environmental characteristic that include a variety of ecologically magnificent scenery. The CDR occupies a large section of the uKhahlamba Drakensberg Mountain with prominent tourism destinations consisting of Giants Castle, Monks Cowl, Cathedral Peak and the Kamberg (uKhahlamba Drakensberg Park: Integrated Management Plan 2019). The geographical location of CDR by some means affects the natural landscape patters that lead to natural predicaments like climate change.

CDR falls under the jurisdiction of uKhahlamba Municipality, with Bergville and Winterton being the two major towns in close proximity to the region. Presently, the tourism industry in the region represents one of the most productive industries, with an annual net worth of over R100 million (UKhahlamba Local Municipality 2016). Tourism is also the key source of employment for many people in the surrounding villages. It is common knowledge that CDR is characterized by fluffy winter snow, outstanding natural landscapes, and an incomparable diversity of animal and plant species (Brand *et al.* 2019). The high-altitude location of the region makes it vulnerable to natural adversities like climate change, which in turn affect the development of tourism. The consequential impacts of climatic conditions on tourism are usually extreme, damaging and costly to mend.

The economic and the environmental rudiments of CDR are the two most vulnerable segments that endure the bulk effects of climate change. The development and the prosperity of the tourism sector in the CRD are certainly dependent on environmental features, thus climatic impacts to tourism should be strictly examined. This chapter therefore outlines the spatial setting of CDR with special emphasis on the essential facets that are interrelated with climate change, tourism development in the region, economic and environmental components in the framework of climate change.

2.2 Background of the Central Drakensberg Region

The Central Drakensberg Region is well known to have one of the most outstanding natural ecosystems in the country, situated in the innermost part of the uKhahlamba constituency (Knight, Grab and Carbutt 2018). The majestic CDR represents a significant segment of the Drakensberg Mountain, which is a World Heritage Site (WHS) as officially proclaimed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2001 (Duval and Smith 2013). The region is prominent for its inclusive, communal and sports-interrelated resorts. The CDR proffers a wide variety of adventurous activities and eco-related activities. The area is characterised by tall peaks roofed in snow, waterfalls, rock art, indigenous & exotic animal and plant species. The area is also celebrated for its rock art paintings, which signify a wealthy history of the San people who once lived in the region. The CDR possesses the most concentration of San people art in the country, with Giants Castle boasting the most accessible paintings stored in the Bushman's cave museum, founded in 1903 (Ndlovu 2020). Figure 2.1 is an original illustration of the san people's art paintings.

Figure 2. 1: Rock Art Painting Extracted from Giants Castle

Source: Giants Castle (2017)

The CDR embraces thousands of rock painting spots. The most primitive of the rock art paintings are estimated to be about 3000 years old and they form part of the tourism products offered by the region (George 2013: 53). As mentioned earlier, tourism development has for many years been a catalyst to numerous social and economic challenges in the region. The industry remains the most lucrative and noteworthy sector in the region (Mabaso 2015). The concept of tourism has benefited the region enormously, including the host communities, through employment, business opportunities, infrastructural development and economic freedom (Mutana and Mukwanda 2020).

The physical position and the superb ecosystem of the area make it effortless for the region to be one of the leading tourism destinations in the country, although in recent times the global tourism growth, particularly in peaky regions, has been confronted by a number of challenges, including that of climate change (UKhahlamba Local Municipality 2016).

The great Drakensberg Mountain is divided into three sections, according to Siyabona Africa (2017: 1): the southern region, which offers a wide range of attractions and activities such as mountain biking, horseback riding, trout fishing, a wealth of San Rock Art, local arts and crafts, and much more. The second portion is the northern sector, which consists of a cluster of mountains known as the Amphitheatre, with the CDR being the mountain's biggest section by a mile. The two sections are usually confused as they merge at some part of the region. However, the CDR has some of the worlds renowned peaks, namely Cathedral Peak, Giant Castles, Monks Cowl and Champagne Sport. Collectively, these peaks in the CDR provide one of the highest ranging spots in South Africa. CDR encloses fantastic spectacles, rocky cliffs and lofty waterfalls. Last is the southern section, which is as beautiful as the other two regions, boasting the most dazzling attractions that include the imposing Sani Pass and the famous Himeville Museum (Siyabona Africa 2017).

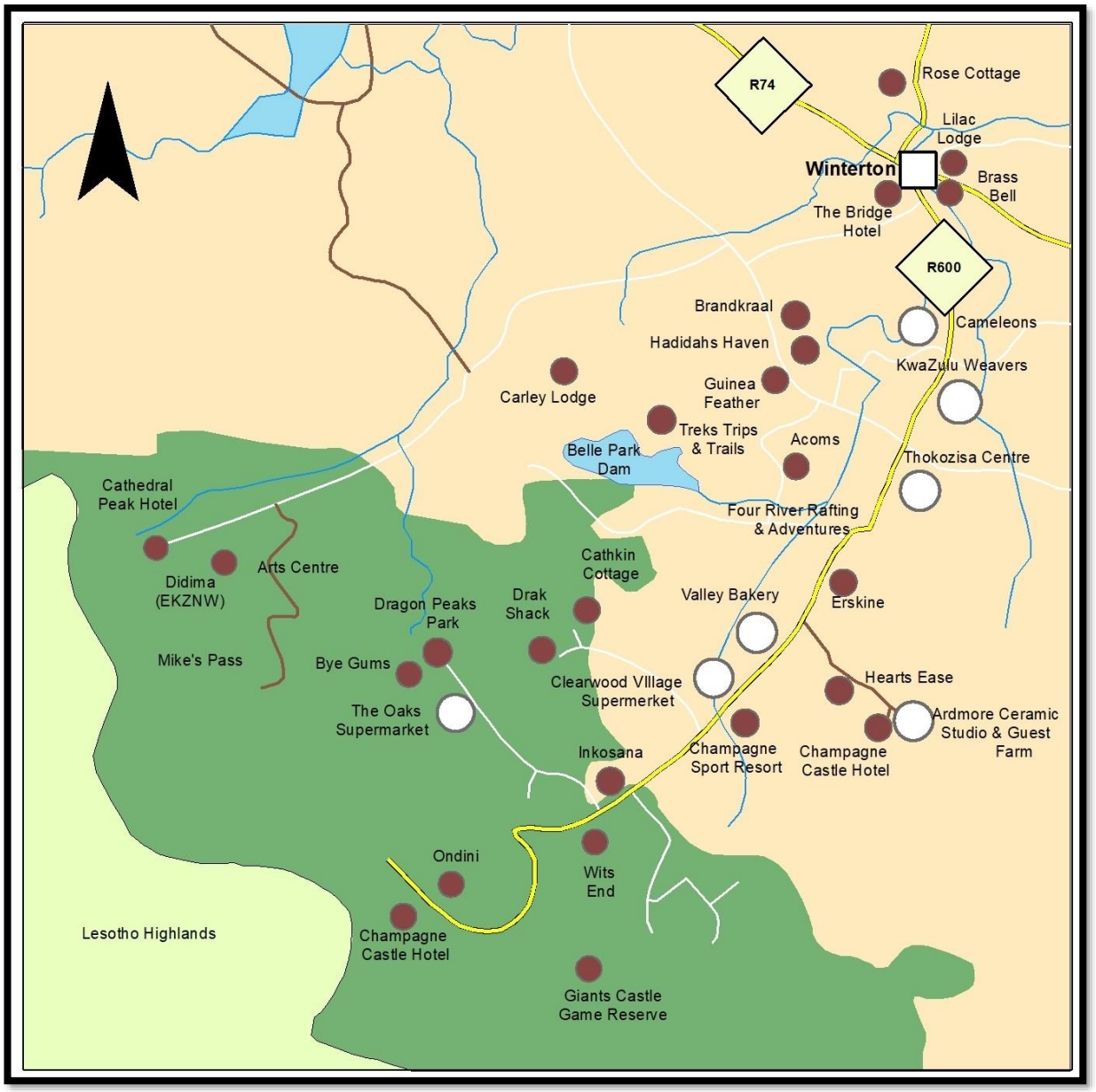
The maximum coverage of the region embraces other major tourism attractions, including the celebrated Mlambonja Wilderness region, the Mdedelo Wilderness region that includes the Cathkin Peak which is 3,149m above the surface level, Highmoor, Kamberg and the Mkhomazi Wilderness region. The eagerly anticipated cableway is set to overlie in both the northern and central regions of the Drakensberg, with a significant boost for tourism development (George 2013: 35). Similarly, the wished-for cableway has the potential to inflict major environmental threat to the area which can lead to climate change that can work against the development of tourism in the region.

2.3 Spatial Characteristics of Central Drakensberg

According to Brand *et al.* (2019), the CDR is a frosty area and is generally roofed in winter snow for successive months; changing the region into a hotspot tourism dreamland. The physical attributes of the area make it rather popular amongst tourists for rock climbing, hiking trails, fishing, camping sites and holiday-making. The CDR forms part of the famous uKhahlamba Drakensberg Mountain situated in Kwa-Zulu Natal. It lies in the central region of the mountains (Proos *et al.* 2017). The region extends over a distance of about 350 kilometers, with some its peaks reaching an average height of 300m. The area is considered as the heartbeat and the jewel of the Drakensberg.

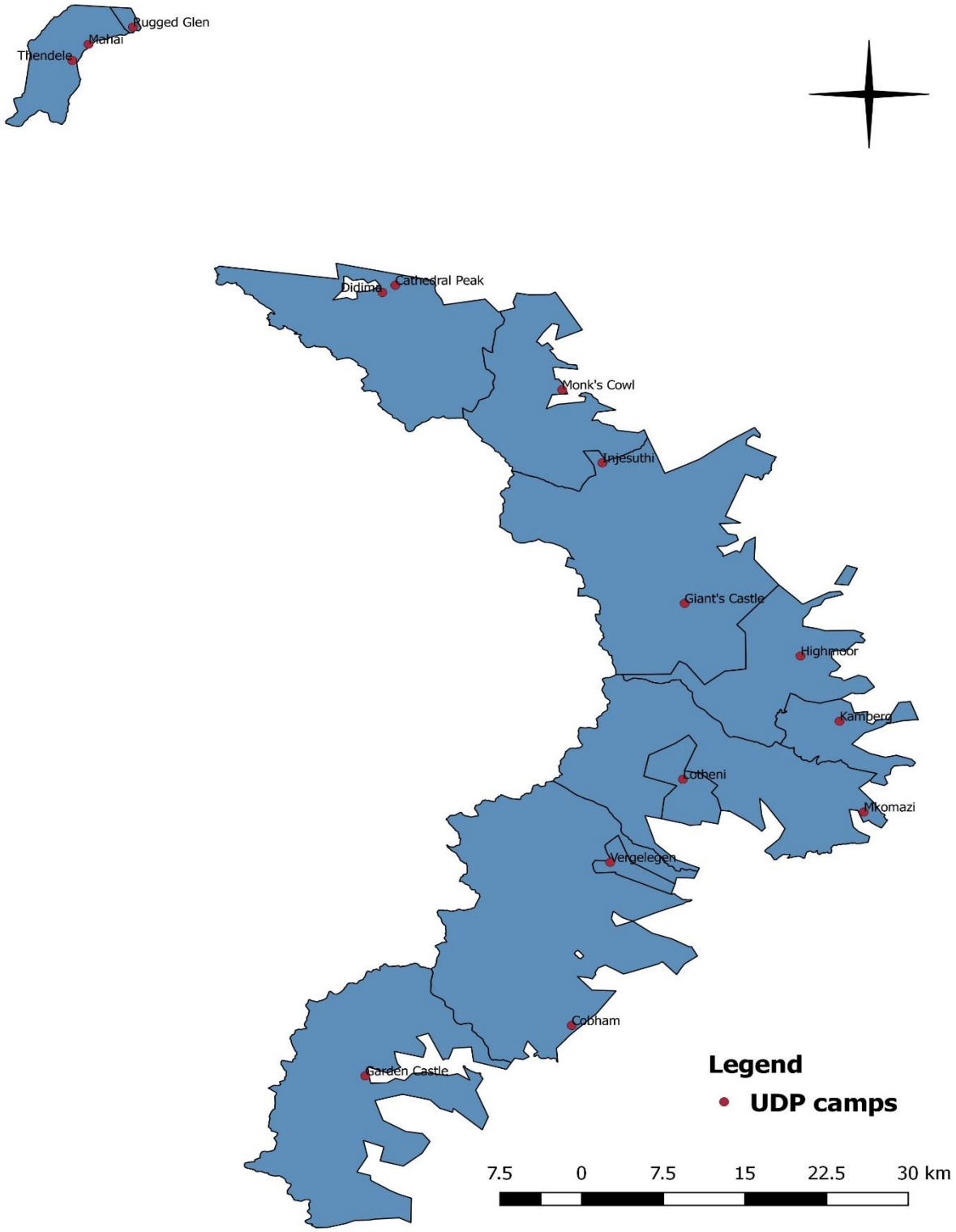
The area also serves as the main commercial and tourism one-stop-shop for tourists and the neighboring villages. The development of tourism and conservation of ecosystem in the region is mainly influenced by climatic conditions (Ezeuduji *et al.* 2017). Below is the illustration of the geographical location of the region with its surrounding towns.

Figure 2. 2: Location of CDR



Source: Drakensberg Tourism Bookings (2016)

Figure 2. 3: EKZNW Protected Areas Location



Source: EKZNW (2019)

2.3.1 Flora and Fauna

The incredible loveliness of CDR is directly correlated with the distinctively affluent assortment of plant and animal species which has afforded the region one of the prominent status; the WHS status (Brand *et al.* 2019). The fauna and flora of the CDR is a home to an incredible variety of both indigenous and exotic species, with an altitude that varies from 1280m to 3500m and the variety of the topography is great (Williams 2017: 66). The contributing factors like the weather, soil and grasslands are very much instrumental in generating the captivating multiplicity of plants and animal life in the region.

A remarkable number of 2153 of plant species has been identified in CDR, 299 bird species can be found with at least ten species (White winged fluff tail, Cape parrot and yellow breasted pipit) declared "endangered" species (Wildlife of the Berg 2016). The region is also a habitat to a variety of mammal species, with 48 different types including zebras, jackals, clawless otters, eland and leopards. Grippingly, the region is moreover a home to over 24 different snake species. The majority of snake species in the area are toxic and indigenous to the area (UKhahlamba Local Municipality 2016).

Figure 2. 4: CDR Flora and Fauna

Source: Kwazulu-Natal Wildlife (2016)

The largest part of CDR makes up the wilderness region of the Natal Drakensberg Park which has a large quantity of flora and fauna. The largest collection of antelope species, duikers and the Oribis can all be found in the region (Patel 2019). Having said that, CDR is indeed blessed with a great quantity of plant life, as well as some of the world's most eye-catching landscapes and an overflowing amount of bushman art work qualifies the CDR as one the leading tourism destinations universally (KZNW 2014a).

2.3.2 Climatic Attributes of Central Drakensberg

The north-central sections of the mountain are associated with fairly good climatic conditions as in the foothill of CDR there are great areas of good atmosphere. In the region; appropriate climate is more prevalent in the central band of the region; this includes neighbouring towns like Winterton and Bergville (Ahmed and Mukwada 2019). The CDR spring season (September-October) is said to be very attractive period in the region because of the exquisiteness which is characterised by overflowing wild flowers and multi-coloured watsonia, whereas the autumn (April-May) season is regarded as the most pleasant climate in the region particularly because it is characterised by red velvet blossom and high-altitude confetti's. Furthermore, autumn season is also associated with low cloud and intense fog and a great amount of snow (Peak high mountaineering 2016)

CDR's wintry weather season (June-August) is characterised by cold, dry and heavy winds, representing one of the coldest weather conditions with temperatures sinking below zero degree Celsius. Contrarily, winter is also the busiest time in the region as thousands of tourists come to witness the snowfall (Noome and Fitchett 2019). Additionally, Ndlovu *et al.* (2021) further acknowledge that the CDR's yearly precipitation is 643mm, mostly in summer and the average temperatures in the region fluctuate around 10 degrees Celsius, to 22.1 degree Celsius with the hottest month being November.

2.3.3 Snow in the Central Drakensberg Region (CDR)

Winter snow in CDR is one of the superlative natural phenomena that defines the environmental superiority of the region (Mulder and Grab 2009). The snow is a major contributor to the overall factors that are drawing tourists to visit Drakensberg annually. In the past, the CDR was believed to experience monthly snow (annually) due to the high-altitude climatic conditions (Stander *et al.* 2016). Nowadays, because of global warming and varying climate conditions, snow in the region is slightly inconsistence, thus causing major environmental and economic impacts on tourism development (UKhahlamba Local Municipality 2016: 145). The region's landscape has the ability to transform into a white winter wonderland of inspirational natural occurrence. As depicted in Figure 2.5 below, the description of wintery snow cover in the region is a once-in-a-life-time experience that is truly fascinating.

Figure 2. 5: Snow Cover in CDR

Source: Rooms for Africa (2011)

Climate change conditions are extremely detrimental to snow formation and continuation because of high temperatures in the atmosphere which counteract the tourism agenda (Trenberth 2011: 129). Temperatures are incredibly high in summer season. However nowadays even in winter, many regions are experiencing high temperatures that can only lead to less snow. A recent climate study by Debarbieux *et al.* (2014: 108) revealed that in most countries, particularly in mountainous regions, the snow period is gradually decreasing as a result of unfavourable climatic conditions. Regrettably, due to the global warming crisis, the winter season is getting shorter, more rainfall is happening, which all lead to a decline in snow (Lackner *et al.* 2021). A High volume of rainfall is capable of causing flood risks and can inflict major economic, social and environmental challenges on the tourism industry and host communities. The reduction of snow cover in the region has a significant impact on the tourism sector, as snow cover is one of the main attractions for visitors to the area. The number of tourists that come in, as well as their spending patterns, may potentially decrease considerably (Cai *et al.* 2019).

2.4 Climate Change in the Central Drakensberg Region

The CDR, which forms part of a large section of the UKhahlamba Mountain is characterised by a fairly excellent climate (UKhahlamba Local Municipality 2016: 43). The problem of climate change is not an isolated concern for South Africa only, but is a worldwide occurrence, damaging the environment, landscapes, protected areas, as well as other climate change susceptible sectors (i.e. agriculture). The reality of this natural calamity would normally manifest in different forms and magnitudes, depending on the weather and climate conditions of the area. As of late in the CDR, unfavourable climatic related events have increased, including floods and storms (Craig 2019: 167) Climate change for the purpose of this research and as earlier mentioned, is perceived to be any variations in weather and/or climate conditions, including excessive periods of high temperatures, natural disasters and other climate-related conditions. These are only expected to intensify in the near future.

According to the UKhahlamba Local Municipality (2016), climate change in the CDR is gradually changing and precipitation is anticipated to amplify throughout the region. Moreover, temperatures are expected to increase, which in turn will lead to demands for water in the atmosphere. The increase in rainfall will harken the possibility of episodic and excessive flood occurrences. Flooding however comes with some negative impacts, negatively impacting the environment in the form of the gradual destruction of soil and a harmful impact on water quality (Zanni and Ryley 2015). The damaging impact of climate change on the tourism sector can possibly lead to a decline in visitor numbers, interrupt cash flow and proceeds, and ultimately lead to employment loss for some people. Climate change is a major concern for the region and the industry is facing a phenomenon that cannot be controlled and that requires adaptation and mitigation strategies to maintain long-term tourism activities under a new climate regime. Other expected impacts of climate change in the region are:

- Decline in snow cover and intermittent temperatures;
- Hot, arid and windy conditions that can lead to an unruly veld-fires;
- Insufficient water supply and quality due to shortage of precipitation;
- Minimal soil humidity due to high temperatures in the region;
- Temperature-oriented impacts on tourism development; and
- A possible manifestation of deadly viruses that can put off visitors.

Grab (2013) further posits that, from late to near future, there has been an increase in more severe rainwater, increase in snowcaps melting, coral bleaching, flooding, and rising sea levels, which are all causing changes to the tourism industry. These conditions are expected to prevail for most part of the near future thus the anticipated impacts of climate change imply that CDR may possibly grow to be a high flood-risk region due to the rapid increase of rainfall flooding and unexpected thunderstorms. Climate change is a universal occurrence, impacting the environment, territories and eco-systems, and is expected to appear in a number of methods (Intergovernmental Panel on Climate Change (IPCC) 2014a). Intense weather patterns are greater than ever in magnitude, regularity and concentration as a direct end-result of climate change. The implication of climate change phenomena will confront the adaptive capability and flexibility of regions, towns and territories particularly with respect to tourism development.

2.5 Tourism Development in the Central Drakensberg Region

Besides agriculture, which regrettably remains largely exclusive, the tourism sector is gradually emerging to be one of the key economic drivers for the CDR. The region is a branch of the Drakensberg-UKhahlamba Mountain, a World Heritage Site as declared by UNESCO in 2001 (Mabaso 2015: 123). The tourism industry remains the backbone and is a key indicator of progress and prosperity for the most part of the Drakensberg park through employment opportunities, business opportunities, attracting both domestic and foreign investments and by contributing towards community advancement goals (Ngxongo 2016: 145).

According to Proos *et al.* (2017), the tourism sector of the region is characterised by bushman paintings; unique environmental assets (snow, landscape and Rocky Mountains); various forms of accommodation facilities; abundant animal and plant species; hiking and picnic spots; and leisure, indoor and outdoor activities. Mutana and Mukwada (2017) concurred firmly that "the CDR is widely considered as largely the most eye-catching section of mountains" possibly due to the reality that most of the renowned attractions are in this region. Moreover, it is generally the earliest region to experience the impacts of wintry weather, with white peaks of snow following an icy chill. The region boasts some of the best tourism destinations in the province, including Spioenkop, Royal Natal National Park, Giants Castle, Injisuthi, Monks Cowl, Didima Resort, Champagne Castle and Cathedral Peak. Therefore, proving that tourism is indeed playing a more pivotal role in the local economy of the region (Mthembu 2011: 229).

The outstanding beauty of the CDR is the prime tourist attraction that draws a regular flow of tourists throughout the year (Ngxongo and Chili 2017). The region, in addition to that, is exceptionally prosperous in Bushmen paintings, boasting the largest collection of such art in the range of 35 000 and 40 000 paintings that date back at least 40 000 years ago (George 2013). CDR is largely considered as the entryway to the tourism activities of the mountain (KwaZulu-Natal Top Business 2010) and plays a progressively significant role in the domestic economy of UKhahlamba Local Municipality, with some destinations of emerging importance to tourism including the Mnweni Valley region. Hundreds of thousands of domestic and international tourists visit the majestic CDR with the bulk of visitors coming from Germany, the United Kingdom and Holland. The majority of domestic visitors that visit the region are from Gauteng (Tourism KwaZulu-Natal Annual Report 2017: 118). The mountains are incredibly celebrated mainly for day and overnight hiking trails and rock climbing. Subsequently, the tourism sector is the focal source of livelihood for many communities in and around the area as the expenditure from visitors contributes immensely to the economic sustainability of the region (Mabaso 2005; Mthembu 2011; Ngxongo 2016). The tourism industry has directly and indirectly contributed to the enhancement of human lives in the region through employment opportunities, community-based business opportunities and, most importantly, the infrastructural development of surrounding communities (Rogerson 2013: 223).

Tourism KwaZulu-Natal and the Department of Economic Development and Tourism continue to unearth distinctive means to further expand and market KZN tourism both locally and internationally. A number of progressive and beneficial development proposals have been presented for additional tourism opportunities in this region, including the cable car (Graham Muller Associates 2013). The development of tourism in the region is expected to receive a major boost due to the much-anticipated planned Drakensberg cable car. According to the KZN Department of Economic Development, Tourism and Environmental Affairs (KZNEDTEA), the rationale for this form of attraction is to unleash the tourism potential of the area and place provincial tourism on the countrywide and inter-continental tourism map.

2.6 Environmental Management in the CDR

UKhahlamba Drakensberg Mountain has the CDR, which is incredibly prosperous in natural resources, ecosystems and an astonishing landscape. Therefore, all these attributes positively contribute to the economic expansion of both the area and the province through tourism (Mabaso 2015: 61). In a situation where CDR is to continue enjoying the benefits of tourism, one effective approach is to protect, preserve and maintain the natural environment against natural and human imposed phenomena. The Drakensberg Mountain was officially declared a WHS in November 2001 due to its environmental uniqueness, geological, cultural and biological multiplicity (Armitage 2005; UKhahlamba Local Municipality 2016: 56). Providentially, a great deal of the ecological attributes is found at the CDR, hence the region also shares some responsibility to safeguard, uphold, manage and look after the area. According to UKhahlamba Local Municipality (2016: 121), the official authority that was affirmed to preside over the environmental affairs of the region is EKZNW.

The National Environmental Act (NEMA) of 1998, amended in 2009 also provides support to the region with education on effective environmental management through disseminating pertinent information, promoting community involvement and by encouraging beneficial partnerships between private-public sectors (Ezeuduji *et al.* 2017). The local municipality of the region has developed strong associations with other national environmental bodies like the Department of Economic Development and Tourism, Department of Environmental Affairs and the Department of Agriculture. Government representatives from the respective departments are deployed in local municipalities with the intention of bringing about effectual environmental management in the region. According to Diederichs and Mander (2004: 91), the Department of Agriculture has a joint program with the municipality that exclusively look out for environmental matters within the region. Rational utilisation of natural resources in the region is the one of primary functions of the municipality through absolute support of various environmental initiative, including Arbour Day, World Environment Day and Water Conservation Initiatives. The municipality is also actively involved in various environmental administration forums at all levels, including the Regional Tourism Forum and the uThukela Climate Change Forum.

The central region of the mountain is characterised by breath-taking but sensitive environmental landscapes that require the tourism development to thrive (Van der Duim and Henkens 2007; Linde 2009). Hence, tourism officials in cooperation with environmental authorities ought to preserve the harmful impacts of climatic conditions that seek to negatively affect tourism. According to Le Roux (2012), development programs in sensitive areas including the CDR should not be legally recognised because it destroys the environmental beauty, which in turn compromises the future potential of tourism.

In general, the effective administration of natural resources, particularly the ecosystem, is extremely fundamental for the enhancement of tourism and the economy of a region, although such administrative measures are costly to maintain. There is a necessity for a more concentrated investigation of environmental practices within the entire Drakensberg region in order to allow the development of suitable management methods (Mutana and Mukwada 2019).

2.7 Chapter Summary

In conclusion, this chapter has provided a discussion relating to the spatial settings of the study area, beginning with an introduction to CDR. The background and the characteristics are outlined, followed by location outlines of the study area. The chapter also discussed the environmental attributes of the area, with a special focus on flora and fauna and snow, followed by a discussion on different regions (spatial analysis) within the Central Drakensberg area. An assessment of the current status of climate change, tourism development and environmental management strategies are discussed in detail. CDR as the selected study area under investigation has numerous ecological units, that present this region as a unique destination in the Province of KwaZulu-Natal. It offers world-class tourism facilities, a rich history and the art of the bushman people, towering rocky cliffs, magnificent landscapes, white fluffy snow, and priceless guest experiences. The region is considered to be vulnerable to the impact of climate change due to its nature and geographical location. Tourists and visitors from all corners of the earth are expected to visit this part of KwaZulu-Natal (KZN) because of its environmental attributes and exceptionality.

Correspondingly, this world-renowned tourism destination is in danger of major environmental and economic decline as a result of climatic conditions that directly and indirectly affect tourism development in the area. Tourism authorities, particularly EKZNW in partnership with other affected stakeholders including local government, the private sector and the community, ought to devise efficient strategies that will combat the impact of climate change in the area.

The subsequent chapter of the study covers the literature review with an aim to provide an in-depth understanding of what other authors have discovered, interpreted and written on the subject matter of tourism development, climate change and environmental concerns in the context of climatic conditions.

Chapter 3 of 8: Literature Review

3.1 Introduction

Snyder (2019) posits that conducting a literature review is an attempt to demonstrate one's knowledge about a particular field of study, theories, as well as related variables and phenomena. It further informs the student of the influential researchers and research groups in the field. This review chapter critically explores both seminal and recently published works relating to the main objective of the study: to investigate the impact of climate change in tourism. Studies, articles, writings and many other academic works have been produced on the impact of climate change on the contemporary world. As Nwankwoala (2015: 224) postulate, human lives are directly linked to the climate: Hence, one can arguably state that human endeavors are currently changing the climate and as such, climate change in turn impacts on the ecosystems of the world. With this assertion, it becomes evident that while climate change may severely impact on several sectors of the ecosystems, the impact on tourism is equally dire.

Since some other studies have been published within this area, where necessary this study addresses similarities and differences within the purview of the topical study. Amongst other key subject matter, this study addresses themes on climate change and tourism with a major focus on South Africa in an attempt to contextualize the scope of this study. Lastly, the chapter substantiates the context of this study as a direction to the upcoming analysis chapter. In the review process, important information regarding the research is critiqued.

3.2 Tourism and Climate Change: An Overview

Hamilton (2005) and Sofronov (2018) states that tourism has become one of the world's major cultural and economic activities, hence tourism is an important part of the modern world. Thus, making it worthy of an academic investigation from different domain. This study has identified the aspects of climate change as a key area of studying tourism. There have been several scholarly attempts at defining tourism. However, just as there have been diverse contributions, there have also been several perspectives to the definition, thus making it difficult to lay an absolute claim as to what "tourism" is. One such attempt includes Smith's (1998: 183), which defines "tourism as the aggregate of all business that directly provides goods or services to facilitate business, pleasure and leisure activities away from the home environment". However, a more popular and still relevant definition is provided by the World Tourism Organization (1994), perceiving tourism as "comprising the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes." In a similar vein, Ogilvie (1933) and Shaw and Williams (1994) perceive tourism as activities involving "people on temporary trips away from home, who also spend money derived from their home area and not from the place being visited".

Another contribution by Mathieson and Wall (1982) recognizes tourism as "the temporary movement to destinations outside the normal home and workplace; the activities undertaken during the stay; and the facilities created to cater for the needs of tourists."

The above definitions are seminal, and have on the one hand discussed tourism as a pleasurable activity, and whilst the other hand, observe the same from an economic perspective. It thus becomes arguable that tourism is an important phenomenon for profit-making entities, as well as pleasure seeking tourists. More importantly for this study is to not only view tourism as an activity, but also as an academic discipline where meaningful studies are produced. Hence making it evident that pioneer definitions are inadequate as they merely take into cognizance the physical and economic factors of tourism, a point also conceded by Taillon (2014) and Laws and Scott (2015) when they assert that tourism is a new addition to academia and therefore a discipline or potential discipline. Taillon's point cannot be neglected as tourism has grown over the years and if tourism activities are to be sustained, research work should be conducted on tourism with the constant objective of contributing new elements to the field, especially as a way of improving and progressing tourism affairs. Given the above, the recurrent discussions around climate change posits enough reason to conduct a study on the impact of climate change on tourism. Without such studies, tourism activities may decline geometrically should the change in climate have a dreadful impact on tourism due to the changes in environment.

While this research tries to demonstrate a connection between Climate Change, environment and tourism in the next section, it is of course important to create a quick background on the concept of climate change. Rahman (2013: 1) notes that Climate Change has been undoubtedly the most illustrious environmental issue facing today's world since the late 20th century. Werndl (2016) describes climate as the weather conditions that can be expected at a certain time and place. Thus, Climate Change according to Nwakwoala (2015) suggests a long change in the average weather pattern over a specific region/and a significant period of time (i.e. a change in the statistical distribution of weather patterns when that change lasts for an extended period of time). Vlassopoulos (2012) extends beyond acceding to climate change as environmental degradation, further believing that it is a development issue, a migration issue and a security issue. Going by the tenets of this definition, the issue of climate change cannot be frivolously discarded because of the possible enormous effects on the environment. In an attempt to contextualize the effects of climate change in this study, discourse will be made from time to time to the correlation between climate change and tourism.

3.3 Correlation Between Climate Change, Environment and Tourism

Having discussed the concepts of climate change and tourism, it becomes necessary to clarify the connection between these two entities in relation to the environment. Generally, people are attached to their environments. As such, every happening in a particular environment may have a direct or indirect impact on the people of such an environment.

In other words, changes in a particular environment play enormous roles on the habitat of such environment. Since tourism relies on environments, it is logical to note that changes in the environment will equally affect tourism affairs. Climate change is a phenomenon propelled by human beings. Shahzad (2015) acknowledge that climate change is due primarily to human-induced emissions of heat-trapping gases. Nwakwoala (2015: 224) admits that human activities are changing the climate as there has been a continuous rise in global temperature over the last century. She notes that situations of oil spillage and gas flaring all over the environment are obvious earth warming. Nwakwoala's study delves significantly into the causes of climate change by outlining several factors contributing to the change in climate. She maintains that climate change is a result of human environmental pollution. In her study, she outlines the key areas causing pollution to the environment by categorising these factors under four headings, namely: air pollution, water pollution, noise pollution and soil pollution. Nwakwoala clearly explains these factors and for ease of understanding, the researcher briefly reproduces her factors:

3.3.1 Air Pollution

Nwakwoala (2015: 227) states that air pollution is often a consequence of the abandoned burning of fuels such as coal, oil, petrol and wood. She argues that the emission of these gaseous pollutants includes:

i. **Sulphur dioxide and nitrogen oxides:** Nwakwoala (2015) notes that the burning of fossil fuels such as coal, oil, natural gases and could have adverse consequences for plants and animals' lives, thus causing respiratory diseases.

ii. **Carbon dioxide:** CO2 occurs when the sun's rays hit the earth's surface, but are reflected back into space. They are thus trapped in the atmosphere. The sun rays cannot escape from the earth's atmosphere and the earth heats up. Nwakwoala (2015) argues that the possible effect is that the worlds' temperature may rise and icebergs may melt, leading to an increase in the quantity of water in the oceans.

iii. **Carbon monoxide:** The exhausts of motor vehicles and other forms of engines that emit such gases are the sources of carbon monoxide, which when breathed in, reduces the capacity of the blood to transport oxygen around the body. Hence this is dangerous and could be the reason for most deaths, especially when people are in areas without cross-ventilation.

iv. **Lead:** Nwakwaola (2015) mentions that lead can be found in food, water and even air. She states further that a long-time accumulation of lead in the body's systems could lead to high concentrations of lead, which may result in cramps and sometimes coma and death.

v. **Dust and Fumes:** Nwakwaola (2015) states that when dust is released into the atmosphere due to activities such as construction, sweeping, mining, cement industrial sites and other sites, they can be the major reason of lung cancer in industrial workers who inhale them for a long time.

On the other hand, fumes normally generated by incineration and industrial plants are gaseous products or include airborne solid particles that are smaller than dust. Nwakwaola (2015) stipulates that fumes cause severe irritation of the respiratory system in humans.

vi. **Pollen grains**: Pollen grains are believed to be released by flowers. Since they are in small sizes, they can travel a very long distance. When they are inhaled, Nwakwaola (2015) notes that they can trigger allergic reactions in humans.

3.3.2 Water Pollution

Nwakwaola (2015: 229) argues that rivers, streams and lakes are polluted by waste materials dumped into them by humans, which in turn affects the communities that live in such areas. She discusses the various actions that can cause water pollution, amongst such are:

i. **Sewage:** Untreated sewage discharged into rivers and lakes causes the breeding of bacteria that grow and multiply using up the oxygen in the water, they cause fish and other organisms in the water to die. Nwakwaola (2015) believes that untreated sewage causes diseases like cholera and typhoid, which sometimes get into wells, bore-holes and sources of drinking water, which may result in epidemics.

ii. **Fertilizers:** These are chemicals used by farmers to increase crops yields. Nwakwaola (2015) opines that the over-use of chemical fertilizers may cause water pollution in the sense that fertilizers that are not absorbed by crops may be washed away by rainwater into nearby rivers and lakes. These are harmful to water organisms.

iii. **Inorganic wastes:** These include industrial wastes such as poisonous metals like mercury, arsenic and cadmium, which are disposed of in rivers, streams and lakes. As such, eating contaminated fish from these can result in mercury poisoning.

iv. **Pesticides:** These are substances used to kill pests that destroy crops on farms. When applied to farms, they can be carried by rain water into rivers, streams and lakes and as a result, poison fish or animals that drink the water or feed on the contaminated fish, thus causing serious health hazards.

3.3.3 Noise Pollution

According to Nwakwaola (2015: 229), this is a type of pollution whereby excessively loud and unpleasant sounds are produced. There are heavy machineries, construction sites and mining activities that produce noise as well as the noise of gadgets like electrical microphones, radios, etc. To Nwakwaola (2015), these cause noise pollutions which create harm for humans. For instance, prolonged exposure to noise can result in a severe loss of hearing, emotional stress, irritability, lack of sleep or insomnia, high blood pressure and psychological disturbances.

3.3.4 Soil Pollution

Nwakwaola (2015), describes soil pollution as the spread of chemical substances and other waste materials from factories into the soil. She observes that the existence of these substances implies that the soil may lose its fertility and lead to the leaking of nutrients into water, as well wee as the death of plants, crops or even animals. The author writes further that the cutting down of trees may also result in soil erosion, thus affecting agricultural production and causing flooding. When erosion occurs, Nwakwaola (2015) states that plant life cannot be supported and other organisms that rely on plants and weeds for food are equally damaged as the land remains barren.

Nwakwaola (2015) should be commended for such a comprehensive study. Her study undoubtedly explores the overt and covert causes of climate change. In the same study, she did not only discuss the causes of climate change, but also explicates the consequences and implications of the factors contributing to Climate Change, thus creating a connection between Climate Change and the environment. Now that it is obvious that Climate Change has major impacts on the environment and that tourism activities are guided often by the natural environment, it is envisaged that Climate Change would as such have enormous consequences on tourism activities and tourism industries at large.

Rayamajhi (2012: 62) explores the link between climate change and tourism. In the study, he argues that climate strongly influences the tourism and recreation sector because climate not only influences the environmental resources that are the foundation for tourism/recreation, but also the length and quality of tourism and recreation seasons, the health of tourists and even the quality of tourism experiences. This point is echoed by Moreno (2010) that Climate and Tourism share affinity and that their connection is even significant for coastal tourism, mountain tourism and nature-based tourism. Moreno (2010) indicates that all tourism activities are to a certain extent influenced by weather conditions. From a similar perspective, Simpson (2008: 12) posits that “tourism is considered to be a highly climate-sensitive economic sector similar to agriculture, insurance, energy and transportation”. Simpson (2008) states further that “climate change is not a remote future event for tourism, as the varied impacts of a changing climate are even now becoming evident at destinations around the world”. Rayamajhi (2012: 60) concludes that since the weather and environment are important to leisure demand, tourism as a sector may be affected by the change in climate. Given Rayamajhi’s position, the next section discusses how climate is of importance to tourism. In a more recent contribution, Pandy (2017: 1) stipulates that climate change may alter or undermine the natural resource base upon which many forms of tourism are constructed. Saarinen *et al.* (2012) further warn that most tourism-based businesses the world over will ultimately need to consider and implement some form of relevant adaptation strategy in the future.

3.4 Impact of Climate Change: A Mainstream Perspective

Climate change is not only a phenomenon of tourism. As a matter of fact, it is a phenomenon associated with different spheres of life. Ma and Kirilenko (2020) highlights that climate change has the prospects to alter, in a fundamental way, not only tourism, but several aspects of society and the earth's environment. Moreno's (2010) position makes it worthy to thus view climate change from a mainstream perspective. In their work, Mishra *et al.* (2010: 239) maintain that climate change is a reality and that its results will be observed across different sectors, amongst which are water resources, industries and in fact social arenas. Mishra *et al.* (2010) study argues that climate change will equally affect people, irrespective of their contribution to the cause of global warming and climate change. Their work must be commended for including the impact climate change is likely to have on people, rather than focus only on the impact of climate change on different industrial sectors. They thus conclude that climate change is not just a scientific issue, but also a social issue.

Similarly, to Mishra *et al.* (2010) and Carnes *et al.* (2014: 1088) avows that "the litany of adverse consequences that could occur within the lives of people alive today is both staggering and sobering. These consequences include increased weather-related damage, infrastructure, loss of land and wetlands, rising sea levels, entire forests either lost or converting to entirely different types of forest, large insect infestations, more wildfires, loss of cold water fisheries, ocean acidification, more frequent and severe heat waves, flow rate changes in our rivers and streams, drought and scarce water, an increase of disease pathogens and invasive pests and plants, a degradation of water quality and an increase in air pollution and airborne allergens."

Dwelling on the agricultural sector, since "agriculture is considered the most weather-dependent of all human activities" (Hansen 2002) and "since climate is a primary determinant for agricultural produces, the possible effect of climate change on crop productivity is an additional strain on the global food system, which is already facing the difficult challenge of increasing food production with changing consumption patterns and growing scarcity of water and land" (Beddington 2010). Climate is an important factor for agricultural productivity and as such, environmental changes are bound to affect plant and animal production (Shongwe *et al.* 2014). Kumsa and Jones (2010) suggest that with the increase in droughts and floods associated with climate change, agricultural production will reduce and the state of food insecurity and malnutrition will rise. Calzadilla *et al.* (2014: 24) thus add that changes in regional water endowments and soil moisture will affect the productivity of cropland, leading to changes in food production and international trade patterns.

Focusing on Africa as a continent, even Africa will not escape the adversity that climate change will aggravate. Climate change could impact negatively on water resources, land quality, forestation and ecosystems, which may threaten livelihoods and food security, making it foremost a development issue. Simbanegavi and Arndt (2014), from an economic perspective, clarify that climate change will negatively impact Africa's growth and development, particularly in the absence of adaptation and mitigation.

They call for concerted efforts by African policy-makers and development partners to help Africa build adaptive capacity to reduce vulnerability as climate finance is a critical ingredient in the effort to build Africa's adaptive capacity, as well as in mitigation of negative impacts. The authors note that the uptake of available climate funding for Africa has been slow, partly because of the weak capacity of countries in Africa to implement adaptation measures. Gemeda and Sima (2015: 256) investigated the impact of climate change on the African continent. In their study, they predict that the temperature on the African continent will rise drastically over the next 100 years and that there will be an increasing occurrence of flooding and drought. Gemeda and Sima (2015: 256) further note that these instances and others can cause a great setback for the development of African nations. They further expect climate change to cause even larger damage to the economy of African countries. Thus, they call for further attention to be given to climate change adaptation and mitigation options in order to alleviate the consequences of global warming in Africa.

The above studies further confirm that climate change as a phenomenon is figuratively a 'one-size fit all'. This implies that the effects of climate change are general and not limited to a specific field. A point strengthened by Malla (2008: 69) and Hall *et al.* (2014) is that climate change is imminent and as such, there is a need of impact identification and adoption to cope with susceptibilities in the agricultural sector. Citing an example of Nepal, which is a less developed country, Malla (2008) states that the country is currently leaning towards a susceptible situation due to climate change. The author however cautions that although the effects of climate change cannot be totally managed, a gradual change in human habit towards a low-carbon economy can reduce possible disasters.

3.5 Tourism and its Importance

Tourism and its importance cannot be over-emphasized. As such, academics from different domains have explored the importance of tourism from different perspectives. In an economic dimension, Bunghez (2016: 1) opines that "tourism represents, in the context of contemporary civilization, through its content and its role, a distinct area of activity and a segment of essential importance in the economic and social life of the majority of countries in the world". Bunghez's (2016) study aims at analysing the multiple connections and implications of tourism in the economic field.

He states that in the economic context of the 21st century, tourism is a crucial aspect of the structure of the modern-day economic mechanism that plays a vital role in the development and modernization of the economy and society. Bhungez (2016: 2) asserts this position by stressing that "there are countries whose economy relies largely on tourism as it is integrated in contemporary economies, thus making the economic impact extremely relevant". Bhungez (2016: 6) postulates that "tourism can support the economic development of both the local community and the economy of a country, through earnings from domestic or foreign visitors".

Bunghez (2016: 3) highlights key points to reinforce his study. “He maintains that a considerable advantage of tourism in stimulating economic growth is depicted by the increase in the number of available jobs in that tourist destination, both directly and indirectly, within the companies which provide services necessary for tourists”. Evidently, a visible benefit of tourist activities within a destination is represented by the jobs involved, such as the administration of hotels, restaurants, stores and transportation. In his further clarification, it is stated that “creation of new employment opportunities generated by the development of a tourist destination results in an increase in the standard of living amongst the local population, which in its turn leads to an increase in consumer spending”.

In Bhungez’s (2016: 3) study, he argues that a tourist destination can generate important revenues in the form of taxes and fees paid by companies who operate around such attractions. He stipulates that this is achieved through successive entries of money coming in from tourists, which represents income derived from these sectors. In his conclusion, Bhungez (2016) lays a claim finalising that “the emergence of a new tourism landmark or destination exerts a positive influence on the local economy and, in a broader meaning, on the entire national economy”. Clearly, he believes that the process contributes to an increase in activity in branches that are directly related to tourism by stimulating the local workforce and boosting the production of goods and services.

Dwyer *et al.* (2015) concurs with Bhungez (2016), confirming that tourism is a tool for economic growth and stability and also for job creation. With a specific focus on Nigeria, he sees tourism as a way of improving Nigeria’s gross domestic product by increasing production and creating a good environment for foreign investors. Thus, implying that if well developed, tourism can change the economy of Nigeria and further make the country a strong nation through the inflow of tourist and in turn, aid the government in creating or putting into place all the necessary infrastructure required for a suitable economy. A point also conceded by Comerio and Strozzi (2019) is that the economic impact of tourism cannot be overlooked as it contributes greatly to the economy globally. His argument is that the impact of tourism on any economy is evident, citing the Olympics games as an example of how a host country can showcase its tourist potential, thus opening avenues for foreign investors to add value to the economy.

Mandic *et al.* (2018) further exposes a new importance of tourism as it can ensure infrastructural development in the country. Shashi (2006) makes an important contribution that with tourism, the host community benefits “by means of exhibiting their natural resources, thereby adding value to the economy in terms of the development and infrastructures, as well as creating jobs and improving the lives of its citizens”. Shashi opines that tourism and economics are inseparable elements. Tourism is an avenue for the host country to sell its value to the rest of the world and in that process, attract tourists and direct foreign investment.

Similar to Nikolla and Miko (2013) and Bhungez (2016); in a closely related study, investigates the importance of tourism in community development. They also observe tourism as one of the main sectors in the economic system. From a different view, they perceive tourism as an innovative instrument for sustainable development and more importantly, as a domain that can generate ideas for the betterment of the local society. Kim *et al*. (2013) also admit that the underlying assumption is that tourism development has consequences for local residents' well-being.

In their study on the role and impact of tourism on local economic development, Meyer and Meyer (2015: 197) found that "tourism is specifically seen as a tool to promote economic development and alleviate poverty as an alternative to other traditional economic sectors such as industrialization". They explain that countries and regions have managed to grow their economies with increased economic participation through the development of tourism. Moreover, Reddy *et al*. (2014) noted that "in the modern globalized world, tourism is considered as one of the largest, fastest growing and dynamic economic sectors, attracting external economic activities". In another study, tourism is seen as a regional development tool to assist in the creation of new local economic activities (Richardson 2010). Distinctly, tourism plays "a significant role in the economies of many developing countries as the sector contributes towards economic growth, employment and income" (Reddy *et al.* 2014). Narrowing this review down to South Africa, Makochekanwa (2013: 43) on the tourism situation in Southern African Development Community:

> "Tourism contributes significantly to the GDP, export earnings, employment, human and physical capital investment of SADC countries. Global estimates show that tourism has the potential to contribute on average around 12% to a country's GDP. As will be shown later, the contribution of the tourism sector towards GDP in most SADC countries is above the global average, with the share of tourism in total economic activities being the highest in the Seychelles (above 50% of GDP), followed by Mauritius (more than 25% of GDP)."

Focusing on South Africa as a nation, Meyer and Meyer (2015: 211) point out that "many social issues such as poverty, unemployment and the lack of skills training can be improved with growth within the tourism sector of a region". They guarantee that the tourism industry could improve on the employment challenges and entrepreneurship development, which are two of the major problems in South Africa. Richardson (2012) also agrees that tourism development is continually considered as an important tool in promoting economic growth, alleviating poverty and advancing food security. In a closely related study, Butler and Rogerson (2016: 277) state that "with the high levels of unemployment in South Africa, any sources of new employment opportunities are to be welcomed, especially in the country". They further reveal that although "some jobs in tourism are low-skilled and low-paying, a significant majority of the jobs were permanent full-time positions that in several scenarios had been held for more than a decade".

Commendably, their research highlights the growth potential that several local residents were afforded in their places of work through tourism employment. Essentially, they submit that the regular incomes fostered through employment in tourism afforded a financial platform for the pursuit of qualifications or ambitions that were completely unrelated to the tourism sector. To further confirm, Perry and Potgieter (2013) reveal that tourism is a growing sector and contributes significantly to South Africa's economy. They attest that tourism has emerged as a key job creation and development strategy in South Africa.

Specifically focusing on KwaZulu-Natal, Dube (1997), Tourism KwaZulu-Natal (TKZN) (2016), Makhaola and Gerwel (2017) similarly states that the province has the potential to be the largest contributor to the GDP of the country through tourism. However, she cautions that for the province to successfully contribute to economic growth, it must be properly developed and managed and must further ensure that the tourism industry's economic viability benefits all communities. Since Dube's research was conducted several years ago, it can be argued that the province has flourished in its tourism affairs. However, for tourism activities to continue effectively, urgent questions regarding the impact of climate change on tourism should be answered. Hence, the necessity of this study.

Drawing on the above discussions, most developing countries have now focused their attention on tourism as an alternative for economic growth (Kruja *et al*. 2012). It is therefore crystal clear that tourism has become a formidable force in the economic standards of nations and communities. Importantly, tourism activities have to be monitored, sustained and preserved if a country is to enjoy the extensive benefits of tourism. Since tourism should be preserved, this indicates that every imminent danger to the effective running of tourism activities must be tackled with immediate remedies. It is no longer news that climate change poses a great threat to the development of tourism activities. It is however not contestable that the benefits associated with tourism should not be undervalued. Given these perspectives, a study on how to preserve tourism activities in South Africa from the threats of climate change becomes crucial.

3.6 Impact of Climate Change on the Tourism Industry

Climate information has been found to be instrumental for tourists' destination choice decision-making. Becken (2010) reviews the importance of climate to tourism. In a bid to retain Becken's appraisal, this work attempts a verbatim reproduction of Becken's short review because of the affinity it shares with this study:

> Even though most tourism demand studies focus on economic variables (Crouch 1994; Lim et al. 2008), climate has been identified as a key driver for tourism and an important destination attribute (Hu and Ritchie 1992) Climate is either the main tourism resource, for example in the case of beach destinations (Kozak *et al.* 2008), or it acts as a facilitator that makes tourism activities possible and enjoyable (Gómez Martin 2005).

> The importance of climatic attributes for tourist destinations is reflected in advertising materials (Gómez Martín 2005), as well as destination image construction (Pike 2002). While Barbados sells 'good weather' with a money-back guarantee (Scott and Lemieux 2009), other destinations have learned to turn potential disadvantages into successful niches. Tarifa in Spain has capitalised on its frequent and intense wind (unfavourable for beach tourism) to become a Mecca for windsurfing (Gómez Martín 2005).

Becken's appraisal of materials directly talks to the benefit of a superb climate to tourism. It is apparent that a bad climate may not entice tourists for diverse reasons, thus making it evident that other than the choice of destination, climate is also a factor often considered by tourists. Scholars around the world have equally contributed to this belief. For Amelung *et al.* (2007), "climate change significantly affects the tourism industry, most importantly due to its effect on the attractiveness of tourism destinations and tourist flows". Amelung *et al*. (2007), further argue that "tourism depends on natural resources, such as water, coastlines, landscapes, biodiversity, etc. and can thus influence the potential attraction of destinations". Suffice it to say that, as important as these factors are in attracting tourists, the change in climate threatens the loss of some of these relevant natural resources (Hoogendoorn and Fitchett 2016). Edgell and McCormick (2016) reveal that the recognition of the role that climate and weather play in tourism has escalated with the growing understanding that climate change is a powerful factor shaping tourism activities.

Aylen *et al.* (2014) intimates that "weather and climate are very important for tourism and outdoor activities and the interrelation is especially significant for coastal recreation as climate influences the temporal distribution of tourists through the year and determines the environmental context in which tourism activities develop. He states further that weather has an effect on the timing of certain activities and it influences participation rates as for many activities, a minimum value for certain weather parameters is required, citing examples of warm and sunny weather for swimming and sunbathing". For Atzori *et al.* (2019), "visitor satisfaction is also influenced by weather conditions and because of this interdependency between weather and recreation, the profitability of climate-dependent segments of the tourism sector – such as coastal and marine recreation – is also at risk".

On the impact of ecosystem services in high mountain areas, Palomo (2017) opines that such areas are profoundly affected by climate change as it affects specific ecosystem services that "benefit local communities and tourists through impacts on food and feed, water availability, natural hazards regulation, spirituality and cultural identity, aesthetics and recreation". Thus, he concludes that climate change impacts on infrastructure and accessibility also affect ecosystem services. Furthermore, Maraseni (2012) and Palomo (2017) similarly affirms that local communities in high mountain areas are especially vulnerable to climate change impacts because they have limited livelihood options and low adaptive capacity.

Siddiqui and Imran (2018) admit that climate is a necessary resource for tourism and as such, climate change would have a profound impact on tourism. Their study examines the impact of climate change on tourism in Germany, the UK and Ireland. Amelung and Moreno (2012) are of the opinion that due to climate change, tourists from these countries would spend more holidays in the home country as climate change could reduce the number of international arrivals. From a different view, Wilkins *et al.* (2017) concede that "tourism is an important sector to many parts of the world and as such, has the potential to substantially impact local communities". Thus, they expect climate change to influence tourism since weather patterns help determine where and when people travel. Wilkins *et al.* (2017) indicate that "warmer temperatures increased tourism spending in the summer and fall, but had more varying results during winter. Findings suggest that tourism businesses in relatively colder destinations could capitalize on potential gains in warmer months".

According to Cegnar (2007), tourism is not only a "branch of the economy, but it is also for human entertainment, relaxation, and recreation". This explains why the consequences of climate change are all-encompassing. Grant (2015) notes that "climate is one of the essential parameters influencing tourism, therefore impacting tourist destinations as well as places contemplating involvement in tourism". He maintains that many destinations will lose appeal, while others will increase their potential to attract masses of tourists. At the same time, amongst the presently popular places, some could become dangerous or associated with a high health risk. Importantly, Cegnar (2007) stipulates that climate change could possibly also affect the availability of vital resources, for example drinking water, and will have some impact on the propagation of diseases like malaria, dengue fever, etc.

Cegnar's (2007) study attempts an in-depth investigation of the impact of tourism by viewing the consequences of climate change from different perspectives. Apart from his discussion on the tourism industry, the author further examines the environmental impact of climate change on the society at large, thus touching on the salient issues contributing to the decisions of tourists. Seetanah and Fauzel (2019) buttresses that since environmental values, economic well-being, and tourist health are interdependent, the decisions of tourists as far as tourist destinations are concerned are associated with safety and security problems derived from not only social unrest, delinquency, terrorism, but also natural disasters and health hazards, which are closely related to climate variability and climate change.

Cegnar's (2007) study should be commended for a general comprehensive assessment of the impact of climate change on tourism. While the study could be challenged from one perspective – that there is no actual case study, the study was however clear in clarifying particular factors that could influence tourists' choices. Cegnar (2007) pontificates that the change in climate is expected to spread some diseases. Thus, it is reasonable to expect an increase in the need for information on preventive measures for tourists in order to avoid some risks associated with climate change, namely as:

(i) Natural catastrophes and extreme weather conditions can endanger visitors' wellbeing, property, and lives;

(ii) Altitude changes can cause complications;

(iii) Increased risk of food- and water-borne infections, as well as other infectious diseases, as well as respiratory and cardiovascular diseases, injuries, and premature deaths as a result of extreme weather; and

(iv) Problems with thermo-regulatory systems and hydrogen balance, as well as their adaptation and desensitisation (Semenza and Ebi 2019).

In another study, Mishev and Mochurova (2010) carried out investigations on climate change impacts on tourism. They consider tourism a victim of climate change. The study proves that a clean environment and favourable weather conditions are crucial to visitor satisfaction and are a fundamental factor for the development of the tourism sector. Just like Cegnar (2007). Moreover, Mishev and Mochurova (2010) explicate that climate change could negatively affect countries and regions that depend largely on revenues from tourism while at the same time, bringing benefits to places that are currently not popular with tourists. The authors present statistical representations to support their claims.

The authors prove convincingly that while the world's aggregate number of domestic tourists may not change due to climate change, individual countries may face dramatic impacts that grow rapidly over time. Mishev and Mochurova (2010), using the *European Trade Union Confederation (ETUC)* (2007) report on climate change and employment impact on employment in Europe as a parameter, presents the potential effects of climate change on economic activity in the tourism sector:

Table 3. 1: Economic Impacts of Climate Change on Tourism Employment

Geographical location	Main climatic drivers	Expected potential impacts on economic activity	Level of confidence
Nordic regions, Eastern Europe	Rising temperature, changes in precipitation	Positive impact on tourism demand	Medium
Mediterranean regions, costal resorts	Rising temperature, changes in precipitation, sea level rise Rising temperature in summer	Negative impact on tourism demand during summer Negative impact on tourism demand during summer, positive impact in spring and autumn	Medium Medium-low
Low altitude mountain resorts	Rising temperature, changes in precipitation	Negative impact on winter tourism activities	Medium-high
High altitude mountain resorts	Rising temperature, changes in precipitation	Possible positive impact on snow-related activities	Medium

Source: Mishev and Mochurova (2010)

In a tabular form, the authors demonstrated the economic impacts on the employment situation in the tourism sector, but encourage academics to draw some general conclusions from the table in that it is possible that certain tourism destinations will suffer from uncomfortable tourist conditions, while others and probably new destinations offering alternative forms of tourism and summer mountain vacations might benefit from climate change.

Nickerson *et al.* (2011: 7) study also indicates that "certain tourism areas will be affected more by climate change than other areas such as mountains (lack of snow); islands and beaches (higher water levels and erosion); warm climates getting too hot; and cold climates warming up". They argue that, in a way, this "changes the types of tourism such as snow-skiing, beach recreation and hiking, while possibly eliminating some recreation, such as snowmobiling." Nickerson *et al.* (2011: 11) clearly surmise several negative impacts of climate change:

> "Visitor numbers will likely increase in the northern part of the northern hemisphere and the southern part of the southern hemisphere. Destination seasonality will affect length of visitation; Ski areas will shrink; mountain tourism will lengthen; and land managers will need to address capacity issues on public lands due to extended seasonal use. Also, ecological shifts caused by climate change will alter the type of recreation and the impact that visitors could have on the land. For instance, fishing opportunities may reduce as rivers and lakes witness reductions in water levels (hence a lack of snow melt), which in turn causes warmer waters which is unbearable for many fish. Consequently, as river and lake water levels fall, conflicts for water use will increase thus affecting recreation, irrigation and drinking water. As such, destinations dependent on water recreation will face several challenges as experts predict that droughts will happen more frequently with more severity (Nickerson 2011: 7)."

Focusing on Nepal, Anup (2017) scrutinizes climate change and its impact. It is known that climate change has affected Nepal extensively owing to the "increased frequency of natural disasters, rise in temperature and change in rainfall patterns, shifting of tree lines and unfavorable weather change phenomena, agriculture, hydropower, tourism and livelihood of people in Nepal" (Anup 2017: 25). Summarily, the author argues that climate change brings more risks than opportunities by causing regional and seasonal shifts in tourist flows. He ascertains that climate change had caused a shift in the destination choice of tourists. He further envisages that it would continue to decrease the flow of tourists in the long-term and decreases income from tourism.

As such, it would cause an adverse impact on livelihood of tourism dependent people. Anup (2017: 25) concludes that the adverse impact of climate change on tourism is significant and the tourism sector in Nepal should put appropriate preventive and rescue measures in place. The Nepal situation is a practical confirmation that the issue of climate change is not a myth. More than the fact that climate change is real is that the consequences of climate change will affect virtually all sectors. Sharma (2009) and Thapa (2015) shares the same sentiments as Anup (2017), that climate change had affected agriculture, hydropower, tourism and the livelihood of local people in Nepal due to the decrease in snow-fall and snow cover and changes in temperature which is a result of the sudden change in the pattern of rainfall. Shivakoti *et al.* (2015) state that "climate change had adversely affected female, children, disadvantaged people, the poor, marginalized and smallholder farmers due to the lack of coping capacity". Anup (2017: 37) also notes that "due to the unfavorable climate change phenomena, there is an impact on trekking and mountaineering tourism in Nepal as untimely and high-intensing rainfall and snowfall had caused a serious threat to mountaineers, trekkers and travellers". Anup maintains that tourists will change their holiday destination from unpleasant weather to fine weather locations and the developing and developed countries that depend on tourism as a major source of income will therefore be affected from the changing climatic scenario (Anup 2017: 38).

In his assessment of climate change's impact on the economy of Barbados, Moore (2011) notes that climate change policies have the tendency to reduce tourism mobility in a few areas of the country as some recent policies of the United Kingdom have increased the price of flights to Barbados, which would consequently affect tourism in Barbados. In a similar vein, Simpson *et al.* (2011) establish that tourists may perceive certain Caribbean destinations to be too hot during some seasons as the heat may be intolerable in a few areas. Simpson *et al.* (2011) concede that the increase in temperature will cause competition in tourism in the Mediterranean and Caribbean region. For Scott (2012) the change in climate may increase tourism costs in temperate regions and of course decrease tourism costs in warmer regions.

In an attempt to profile the effects of climate change on tourism in Africa, Munyiri (2015) studies the vulnerability and adaptation of the tourism sector to climate change in Nairobi, coastal and central tourist circuits in Kenya. Munyiri's (2015) study presents evidence that with the emergence of climate change, Africa is considered one of the most vulnerable regions in the world. With respect to Kenya, her research indicates that climate change impacts are currently affecting the tourism sector in the country and that, glaringly, the supply side (Kenya Tourism) is more affected by these impacts than the demand side. The author also notes that hotel managers generally reported that climate change had adversely impacted on tourism resources, activities, infrastructure, services and facilities.

Munyiri (2015: 256-257) breaks her points down when she explains that the "tourism resources affected in Kenya are wildlife, beach and sceneries which are rated very highly by hotel managers; tourism services affected include road transport, air transport and hospitality services which are also rated highly; tourist activities that have been highly impacted were beach activities, game drives, sightseeing, adventure, trekking/walking, animal riding and camping; and the tourism infrastructure affected are roads, telecommunications, sewer systems and airports/ airstrips which have all been highly affected by climate change indicators". For Munyiri (2015: 257), the main indicators affecting the tourism industry in Kenya are increase in temperatures; changes in rainfall patterns, droughts and floods. Droughts are severe, frequent and prolonged, causing variation in weather patterns, reduced levels of water and habitat loss thereby resulting in a loss, of species habitats, increased water stress, damage to attractions, reduced agricultural production, a loss of livelihoods, a loss of biodiversity, an increase in diseases and reduced landscape beauty, as well as changes in high temperature which are associated with uncomfortable weather variations.

Uchegbu and Ejikeme (2013: 370) share that "some African countries rely heavily on tourism as their main source of revenue and because the effects of climate change on tourism do cause changes in the ecosystems and natural resources needed to sustain the tourism economy, the impacts of climate change need to be prepared for". They identify impacts such as beach erosion; saline intrusion; droughts, flash floods and landslides; coral-reef bleaching; less productive fisheries and agricultural systems; changes in the preferences of tourists, etc. resulting from natural disasters such as rising sea levels, flooding, desertification, erosion and other health-related problems. Uchegbu and Ejikeme (2013) observe that since modern tourist centers and cities are planned to make them more environmentally friendly and sustainable, Africa also needs to implement strategies that adequately address the severe and radical changes in local and African climate patterns.

On South Africa, Turpie *et al.* (2002) and Lehman (2020) records that the country relies heavily on its natural resource base to attract tourism and that wildlife is the primary reason for visiting the country by a wide majority of tourists, thus recognizing the impact of climate change as having a significant decrease in tourism for the country. In a closely related study, Rogerson (2016) argue that the change in climate would be an economic disaster for South Africa, especially in view of the country's over-reliance on coal as the source of energy provision. The state of tourism in the economy of South Africa cannot be over-emphasized. Mabaso (2015) also conceded that tourism constitutes one of the major determinants of overall long-run economic growth in South Africa. Amusan and Olutola (2017: 10) argue that "the South African tourism sector currently faces a number of climate-connected challenges". The authors further reveal that the sector is at the risk of climate change and its untoward externalities, especially those that connect with the environment. Moreover, the capacity of the sector as a growth and development sustainability enabler is threatened by climate change.

To them, climate change will impact severely on the country's major tourism attractions such as coastlines, beaches, wildlife and biodiversity, including a variety of species, amongst others". Having examined diverse scholarly contributions on the impact of climate change on tourism, this research hopes to contribute significantly by focusing specifically on the KwaZulu-Natal province of South Africa with the intention of proffering solutions as way of reducing the threats posed by climate change.

3.7 Management Response Strategy in the Tourism Sector

It has been established that climate change is a really complex issue. Since the advent of climate change is meant to be accepted, there is thus a need to manage the consequences effectively and thus reduce the negative impact thereof. Harry and Morad (2013: 358) note that mitigation and adaptation are the two approaches to climate change with the interrelationships between them leading to sustainable development. According to Anderson (2013), mitigation aims at tackling the main cause of climate change and increases in greenhouse emissions, in order to offset the likely effects of the problem on nature and human beings.

According to (Atzori *et al.* 2018), "adaptation is about reducing the effects of climate change on both human and natural systems; and mitigation is about reducing the causes of climate change by decreasing the anthropogenic impact on the climate system". The authors emphasise that the consequences of an apparently warming world means that there is a need for mitigation and adaptation. Anderson (2013) posits that it refers to 'reducing the vulnerability of natural and human systems to the impacts of climate change and adapting to a changing climate through adjustments in social, ecological or economic systems'.

In an attempt to mitigate climate change, Fankhauser (2017) proposes that an important factor in the success of mitigation strategies is the ability of companies and industries to innovate and adopt renewable energies and incorporate new energy saving technologies. From a similar perspective, Becken (2005) suggests "the use of solar panels, low energy lighting, room keys to operate lights, light sensors and the simultaneous education and consciousness of tourists and employees in the problem of climate change and in the use of these technologies as the key to reducing the carbon print of tourism, especially of the accommodation sub-sector".

In adapting to climate change, Hamilton (2007), takes an economic point of view for companies involved in beach tourism, recommending that "soft measures may be more beneficial than hard solutions, as hard measures cause a relevant environmental impact which could reduce the price that tourists would be willing to pay for accommodation, which would mean a financial loss for companies". For Hamilton (2007) hard engineering solutions include the construction of dykes and wave breakers, while soft engineering measures include beach nourishment.

Turton *et al.* (2010), in an attempt to be prepared for climate change, proposes that leading tourism agencies should advocate and be proactive in integrating destination management into government planning processes. For Pentelow and Scott (2011), policy-making and wider environmental management practices can contribute to both mitigation and adaptation through accumulating funds to support adaptation or to contribute to mitigation efforts through re-forestation in a destination. Bhattarai (2015: 355) surmises that "the appropriate adaptation and mitigation measures have to be followed to minimize the risk of climate change whilst trying to save all forms of tourism".

Hernandez and Ryan (2011); Bhattarai (2015) and Chersich and Wright (2019) similarly advocate for new studies to be conducted on the mitigation and adaptation of climate change. They concede that the global impact of climate on tourism has received little attention by researchers and that a majority of companies are still in a preliminary phase in terms of implementing adaptation and mitigation measures. As such, they argue that there is a requirement to examine the determinants of these strategies in organisations, as well as their associated outcomes. Furthermore, they note that there is a need to examine tourist preferences in terms of activities and destinations; the impacts of climate change; and whether and how this affects tourist-consumer decision-making. Thus, academic research should focus mostly on specific and individual solutions to address the impact of climate change on tourism.

In a South African study, Garland (2014) stipulates that "addressing inequalities and poverty in South Africa is critical to ensure that the health impacts from climate change are mitigated, particularly as current evidence suggests that the largest health risks are possibly amongst communities already most impacted by climate-related diseases". Garland (2014) presumes that there is very little knowledge on the extent and magnitude of health risks associated with climate change in South Africa, as one does not know how increasing temperatures have already affected public health. Given Garland's position, the need to mitigate climate change becomes even more imminent. Ziervogel *et al.* (2014: 615) clearly summarise the situation around adaptation in South Africa. They write:

> "Adaptation cannot be disentangled from South Africa's national development objectives. Considerable opportunities exist for linking adaptation to development and employment activities that are already underway, producing multiple benefits. Where possible, adaptation responses should focus on multiple synergies—prioritizing activities that fulfill a range of objectives, of which climate adaptation is one. Climate change adaptation requires forward-looking decision-making that marries scientific diagnoses and technical innovation with social organization and political debate around competing value systems.

> Experimentation, learning and the capacity to shift practices in the light of new findings need to be seen as part of the adaptation process. Excellent examples of such practices are emerging in particular instances across government departments, businesses, and civil society, driven by innovative and forward-thinking individuals. The challenge remains how to enable these innovative approaches to occur at scales that will make a significant difference to South Africa's resilience in the face of climate change" (Ziervogel *et al.* 2014: 615)."

Anderson (2013) enunciates further that educational interventions are most successful when they focus on local, tangible and actionable aspects of sustainable development, climate change and environmental education, especially those that can be addressed by individual behaviour. Scholars, in their quest to project how to deal with the aftermath of climate change, have proposed several mitigation and adaptation response strategy. This study contributes significantly to prior contributions by focusing specifically and extensively on the KwaZulu-Natal province of South Africa.

3.8 Gap in Tourism and Climate Change Research

Moreno (2010: 6) discloses that "although the tourism sector is showing an increasing interest in climate change and is likely to be prepared now to incorporate climate change considerations into its operations, basic information about the influence that weather conditions have on key tourism stakeholders –from tourists to governments– is still missing. Therefore, consistent, structured and integrated approaches to assess the vulnerability of tourism to climate change and its key stakeholders lack a solid ground." According to Hernandez and Ryan (2011) and Hambira *et al.* (2013), "the tourism industry and the businesses, communities and individuals that drive tourist economies throughout the world, at both the level of supply and demand, need to be made aware of the very real risks and impacts associated with climate change and be encouraged to take action, as the current 'business as usual approach' is unsustainable and ultimately dangerous in the long-term".

Hernandez and Ryan (2011); Hall (2008) and Hall (2015) identify a gap in studies relating to the impacts of climate change in tourism as existing literature is not only old, but also scanty. As such, there is a need for more research. They observe that existing studies seem to place specific focus on different aspects of tourism, with very few studies examining tourism and climate change as one embodiment. The authors maintain that there is a need for greater effort to examine studies on climate change and tourism. As such, they make a general call for a greater research focus in order to identify the entire array of measures and to avoid the increasing focus on very narrow solutions and a limited range of destinations.

In their study, Csete and Szécsi (2015) note that "the tourism industry has an important role to play in reducing and mitigating environmental impacts in order to avoid extremely dangerous levels of climate change being reached, while still crucially maintaining the growth and profitability that have made the industry such an important source of employment and economic development". Moreover, Shakeela and Becken (2015) call on the tourism industry to invest in implementing adaptive strategies that seek to safeguard the livelihoods of people employed and active within it from the vast and highly integrated impacts of climate change and the closely related issue of global environmental change.

Roe *et al.* (2014) identify that researchers have given relatively limited thought to climate conditions or factors that threaten the existence of tourism with researchers merely interested in crises and disasters that have the potential to completely undermine the efforts that go into improving the sustainability of tourism. This is however strange, as Uyarra, C^ote, Viner and Watkinson, (2005) earlier recognized that the "key risk facing tourism sustainability is global climate change, as changing climate conditions and consequent environmental changes influence destination choice and enjoyment". Saarinen *et al.* (2013: 244) regard such academic efforts on climate change and tourism especially within Southern Africa, as "one of the most urgent issues in the context of developing countries, where the impacts of climate change may be very severe in the relatively near future".

Similarly, Vogel (2009: 82) observes that there are "very few detailed surveys and assessments that focus on the perceptions, implications, opportunities and challenges of climate change from the tourism perspective" as few private sector players have "undertaken a serious 'reflection' on adaptation and climate change and the implications of climate risk for overall business strategy and the risk management environment" (Vogel 2009: 82). From these views, Pandy (2017: 3) establishes that "given the importance attached to tourism for job creation in South Africa in terms of the country's New Growth Path and the priorities for sectoral development, it is remarkable that questions about climate change and tourism enterprise adaptation have received so far minimal attention by local tourism scholars."

Despite increasing attention to the tourism and climate change relationship since the 1990s, the field is still relatively unexplored (Moreno 2010: 6). In fact, "it has been noted that tourism is lagging a decade behind other sectors with regard to impact assessments and more significantly adaptation and mitigation" (Ceron and Scott 2007). It is thus within this context that the current study hopes to investigate the environmental and economic impact of climate change on the development of tourism in the Central Drakensberg Region of the KwaZulu-Natal province of South Africa. Ultimately, findings from this study would contribute enormously to reducing the paucity of academic literature on climate change and tourism.

Moghal (2015: 3) posits that, "as the tourism sector is highly exposed to climate change, further research is needed regarding its adaptation, particularly in countries where tourism is a major component of future development strategies." Moghal (2015) identifies the need for additional research on climatic and non-climatic stressors that influence the vulnerability of tourism-dependent communities and their households, including methods that facilitate comparative assessments. Moreno's (2010) conclusion in his thesis clearly surmises the current state of studies on climate change and tourism. He writes:

> "Our understanding of the relationships between climate and coastal tourism is still limited. The need to improve our knowledge about this link is strongly intensified by the increasing evidence that the climate is changing. With a potential impact on all the actors directly and indirectly involved in or related to tourism from demand to offer, from tourism providers to other sectors (such as agriculture), climate change is seen as one of the major challenges the industry will have to face in the coming years" (Moreno 2010: 153).

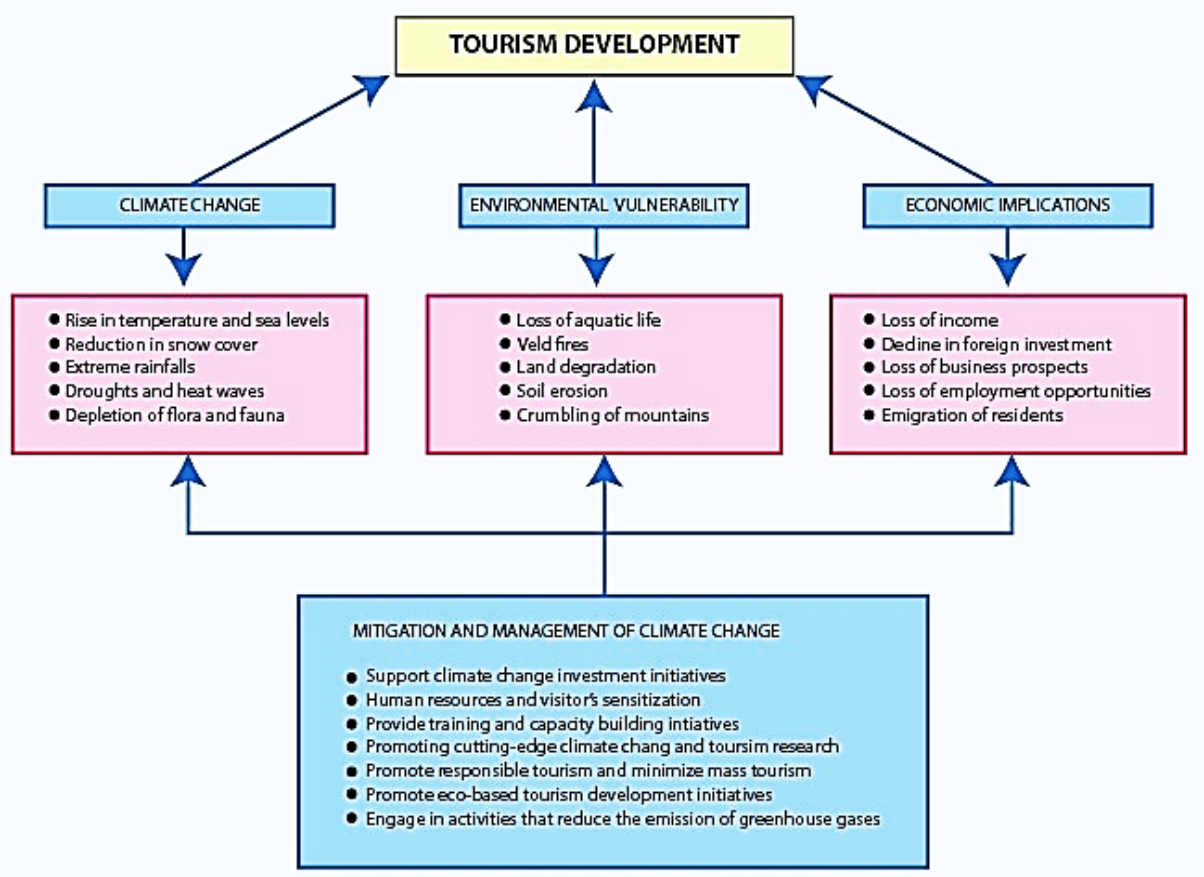
Hall (2008:347) submits that the existing gap with respect to understanding the relationship of climate change and tourism (as discussed above) are wide and thus needs to be filled. Hall (2008) notes that the gaps are necessary to be filled not only in terms of the sustainability of the tourism industry, but also with respect to destination communities and the physical environment. In this context, Sookram (2009: 221) and Rayamajhi (2012) argues that "it is necessary that further work in this area involves a thorough investigation of adaptation and mitigation strategies and the costs of implementing such strategies. With the formulation of mitigation and adaptation strategies and the appropriate policies in place, the tourism sector can play a key role in dealing with climate change and encouraging sustainable growth in the sector".

In Bigano, *et al*.'s (2006) study, they share similar sentiments that tourism as it relates to climate change has not been thoroughly explored through the production of literature. Hoogendoorn and Fitchett (2018: 742) also admit that there is "the need for an increase in research into the threats of climate change to tourism in African countries. Identifying future research trajectories as the development of such knowledge would assist in the development of adaptation and mitigation strategies for these most vulnerable tourism economies". Thus, this research hopes to contribute significantly to filling these vacuums identified by scholars.

3.9 Proposed Integrated Framework

Figure 3:1 below is the proposed integrated model related to climate change and tourism development variables. This proposed model is derived based on the reviewed literature in this chapter (Three). The proposed model will be empirically analysed, statistically tested, construed and modified in tandem with an analysis of the results in Chapter Six (6) and Seven (7) of this research.

Figure 3. 1: Proposed Integrated Framework



Source: Author

3.9.1 Correlation of Climate Change Impacts on Various Sectors

As earlier stated, a number of tourism activities are weather-dependent and by extension, climate dependent. It is therefore very likely that climate change will correlate and similarly affect the utmost key components of the tourism industry i.e. the environment and the economy. Climate change reduces snow cover, increases and prolong heat waves or changes the patterns of annual rainfall (Damm *et al.* 2016: 39). By nature, climate change is a relatively slow process. Hence in some regions the changes are not so obvious in the short-run, yet, in that case, the impacts may be strong in neighboring or competing regions and thereby still influence the business area.

According to Tervo-Kankare *et al.* (2017), the impacts of climate change on the sustainability of the industry and business output can be manifold and be both negative and positive. Next to climate change, climate variability (e.g. variably cold and tepid winters) is also important for many types of tourism, while climate change can make the variability more extreme. For many developing countries in Africa, studies have already been conducted and the current situation indicated the following impacts: increasing heat waves, reduction of snow cover, extreme rainfall, drought, etc (Hoogendoorn and Rogerson 2015: 105).

3.9.2 Environmental and Economic Impacts

According to the Department of Environmental Affairs (2011), although the economic impacts of climate change have been analysed in South Africa at the national level, impacts of climate change specifically to the tourism industry at local or regional levels have been overlooked. It is likely that the economic impact of changing climatic conditions is much more damaging than realised, particularly at the regional/destination level. Climate change is expected to affect the demand for tourism, not just because of changes in consumption and technology, but also because of changes to the physical environments commonly attractive to tourists. The tourism industry and its destinations are reported as being sensitive to climate variability and change (Mathivha *et al.* 2017). Climate directly impacts a wide range of environmental resources critical for tourism (water levels and quality, bio-diversity, wildlife and snow, amongst others), whilst also influencing deterrents to tourists, including extreme events such as tropical cyclones, as well as background conditions such as infectious disease vectors and fire risk. Amongst tourism destinations, mountains and island and coastal destinations are considered particularly sensitive to climate-induced environmental change as are a number of UNESCO-declared world heritage sites of which CDR is one (Duval and Smith 2013).

3.9.3 Managing Climate Change Risks and Impacts

Broadly speaking, risk management responses to climate change risks fall into two categories: adaptation to the largely physical consequences of climate change and mitigation. Whilst many solutions for the highly interconnected risks from climate change will need to be sought at a multi-stakeholder level, there are specific actions that tourism authorities and businesses can take and tools that they can use (Harry *et al*. 2013). A number of scholars recommend developing and acting upon a climate resilience adaptation strategy. Such strategies should: identify broad business and strategic risks; develop a granular view of the risks involved, including for example, developing a mitigation strategy involving resilience. Meanwhile, developing an effective and innovative mitigation strategy and framework, especially in carbon-intensive industries like the tourism sector, will help to actively manage the downside and capitalize on the upside of climate change (Shaw *et al.* 2012 and Ziervogel *et al.* 2014).

It should be noted by now that whether or not climate change is sufficiently addressed, the tourism industry faces a greater risk ahead. In order to help with the navigation of climate change phenomena, models, frameworks, strategies and policies must be implemented that are going to measure progress and commitment in critical areas, as well as to detect changes in direction around climate change. Shakeela *et al.* (2015) suggest that while some good progress has been made, the evidence shows us that the tourism industry is still falling short of what is needed to sustainably transition the global economy and societies to a friendlier climate. It is to be hoped that different breakthroughs in research, climate change education and investment can significantly alter the condition of climate change and the commensurate risks and opportunities that present themselves. If not, the longer it takes to adequately address the calamity of climate change, the greater the efforts and disruption needed in the decades ahead to counter the rise in extreme weather events.

3.10 Chapter Summary

This chapter has reviewed relevant, global, scholarly literature on the concept of climate change and tourism, with a specific focus on South Africa. Issues relating to the impact of climate change on tourism; the importance of tourism in South Africa and causes of climate change, amongst many others, have been reviewed and discussed within the relevance of this study.

Prominently, the chapter established the need for an increase in the attention given to the impact of climate change and tourism through several scholarly contributions. The next chapter discusses the conceptual framework underpinnings, exemplifying how this study intends to actualize the objectives of the research.

Chapter 4 of 8: Conceptual Framework

4.1 Introduction

This chapter reviews the theoretical inclinations of this study, with a view to creating the conceptual underpinning within the tenets of this study. The chapter begins with a discussion on the lack of a theoretical framework for the Tourism discipline and then proceeds to the actual exploration of the conceptual framework adapted – Tourism Climatology.

4.2 Lack of a Theoretical Framework for the Tourism Discipline

Tribe (2006: 371) and Leszek (2016) explain that the academic discipline of tourism rents theories from existing disciplines, such as: anthropology, geography, sociology, psychology, philosophy, economics, political Sciences and law. They mention further that elements of tourism achievements and theory are thus split amongst these academic disciplines. This is a point conceded by Thirumoorthi and Wong Kee Mun (2015) in support of Echtner and Jamal (1997: 874), that authors studying tourism do so in relation to their field of interest e.g. sociology. On a similar note, Mowforth and Munt (20029) posit that tourism research has been disapproved of being insufficiently concerned with theoretical ideas, and Pearce (2004: 59) also made such remarks on "the poverty of tourism studies in terms of conceptual and theoretical approaches''.

Jansen-Verbeke (2009: 27) admits that the tourism sector in the 1980s witnessed a "growth in the awareness of the economic potential of tourism, its positive and negative impact on different types of location and the need for local and national authorities to manage and monitor. Despite the development, tourism was not yet regarded as a scientific field of research in its own right, or as a stakeholder in policy-making". Cukier (2006) also argues that although the tourism industry has been growing significantly, it has only been relatively recently that tourism is being taken seriously as an academic discipline. This implies that tourism has only attained research status recently, which perhaps thus explains why the field of tourism lacks a grounded research theory. De Esteban *et al.* (2016: 2) also observe that tourism as a "scientific discipline still does not have its own and established academic body that distinguishes it from other scientific disciplines and therefore, tourism as a recent field of research is struggling without being understood in the correct way because its theory of knowledge is not delimited". They also note that tourism researchers have failed to agree whether tourism is indeed an academic discipline, which is a pointer to the fact that there is a significant epistemological analysis gap in one of the most dynamic fields of the world´s economy. The authors recognize a lack of academic interest in producing an extensive theoretical base for tourism as papers on tourism are still published in journals not directly related to tourism, thereby making peer reviewers evaluate the material based on their main disciplines, theories, terms, methodologies and norms (de Esteban *et al.* 2016: 3).

Taillon (2014) is of the view that "there exists a persistent challenge to establish tourism as an independent discipline in the crowded social science field". Esteban *et al.* (2015: 2) contest that scholars characterize tourism as under-theorized, eclectic and ambiguous. Although it has been found that some authors have widely accepted a paradigm referred to as 'sustainability tourism' in tourism research, it is however not found to be sufficient for this study as the topical study does not only focus on tourism, but also on climate change. Thus, a deficiency is found in "sustainable tourism" as it is not extensive enough to include the area of climate change. To Mauleon Mendez *et al.* (2018), sustainable tourism is ''tourism which is economically viable but does not destroy the resources on which the future of tourism will depend, notably the physical environment and the social fabric of the host community''. For Butler (1998:56), sustainable tourism is "tourism which is developed and maintained in an area in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well-being of other activities and processes". The World Tourism Organisation (1998; 2001a) and Ruhanen *et al.* (2019) describes sustainable tourism as meeting the needs of present tourists and host regions whilst protecting and enhancing opportunities for the future.

It is envisaged as leading to the management of all resources in such a way that economic, social and aesthetic needs can be fulfilled whilst maintaining cultural integrity, essential ecological processes, biological diversity and life support systems. In a much recent contribution, Liu *et al.* (2013: 101) contend that sustainable tourism deals with the "growth of tourism's contribution to the economy and society and the sustainable use of resources and the environment, which will be gained by a deep understanding and proper management of tourism demand". Although the above definitions are productive for studies on tourism, they concentrate mainly on the affairs of tourism in relation to the delivery of services between service providers and tourists, thus having little or no impact on the weather conditions associated with the delivery of adequate services. Xin (2015: 199) affirms that the definitions only concentrate on the sustainability of the tourism industry in terms of its needs (the consumption of resources) and requirements (the maintenance of the quality of the environment, economy, culture and society). McCool and Moisey (2001) criticize these definitions for being solely concerned with the economic contribution of the tourism industry to the sustainable development of the broader society, hence overlooking the positive impacts of tourism on the protection of the cultural and natural heritage and quality of life. Choi (2005) thus proposes that in the light of this, tourism development may be abandoned when it contradicts the overall sustainable development of the society as the production of scientific knowledge in tourism has been neglected because of its business focus (Darbellay and Stock 2012).

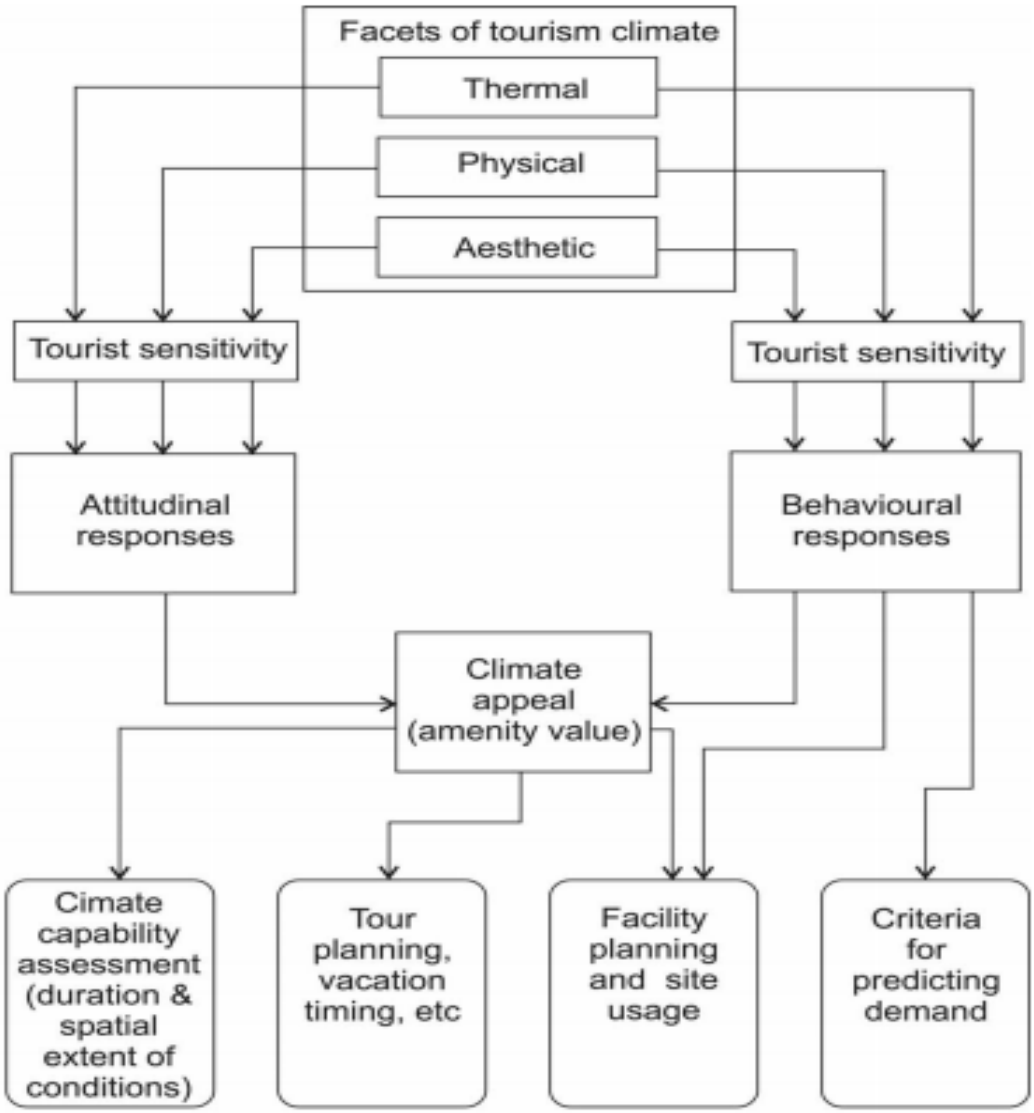
In actualising the objectives of this research, Stergiou and Airey (2018) holds the perspective that a "lack of scientific creation enables one to produce new theories, helps to implement improved techniques, but fundamentally generates new paradigms. For the creation of a new tourism model, we need paradigms which are related to tourism itself and broader society". This study takes a strong-hold in Stergiou and Airey's comment. Khan (2019) submits that "the construction of knowledge in tourism and hospitality does not mean that it accepts any theoretical and/or methodological proposal, but rather that the challenge lies in setting the objectives of the study which are recognised as touristy objectives and inter, multidisciplinary and/ or hybrid participation that gives new meaning to what is intended to address". As one of the objectives of this study, the researcher hopes to propose an efficient tourism-based model that could be employed for future tourism research. Having established the absence of a relevant theory for tourism research, this study employs the concept of "tourism climatology" as an exemplar for the study of tourism and climate change.

4.3 Tourism Climatology

The analysis of tourism climatology was based on climate indices, which is an attempt to calculate the thermal comfort range of tourists using basic information (Tzu-Ping Lin and Matzaraki 2008: 283). Knowledge on climate and weather developments facilitates the good planning of tourism activities and there is a need for climatic information in the field of tourism (Matzarakis 2006: 79). de Freitas (2003) reveals that tourism climatology deals with the concepts of "climate" and "tourism" in the broadest sense. As climate invokes the concept of "weather", "tourism" embraces the concept of "recreation" in that it is the practice of travelling for recreation. Thus, de Freitas (2003) finds a relationship between the elements of weather and climate on the one hand, and tourism and recreation on the other.

The author defines tourism climatology broadly as the study of interrelationships of tourism and recreation with climate and weather. He proposes that a fundamental "driver" of tourism climatology is the identification and evaluation of environmental information for business planning and decision making in the recreation and tourism industry. de Freitas (2003: 46) argues that tourists respond to the integrated effects of the atmospheric environment and it is generally accepted that standard weather data or even secondary climatic variables are not always reliable indicators of the significance of atmospheric conditions, hence the relevance of a study in tourism climatology. In investigating the impact of climate change on tourism, this study employs de Freitas' (2003) *Climate Index for Tourism (CIT):*

Figure 4. 1: Conceptual Framework for the Study on Tourism Climate



Source: de Freitas (2003)

de Freitas' (2003: 49) facet is instrumental in "showing the make-up of on-site climate conditions and two independent methods for assessing human response or reaction. Further, the model can be used for rating weather and climate in terms of participant sensitivity and satisfaction to conditions". De Freitas (2003: 51) proceeds to clarify his model:

Table 4. 1: Various facets of tourism climate and their significance and impact

Facet of climate	Significance	Impact
Aesthetic: ▪ Sunshine/cloudiness ▪ Visibility ▪ Day length	▪ Quality of experience ▪ Quality of experience ▪ Convenience	▪ Enjoyment, attractiveness of site ▪ Enjoyment, attractiveness of site ▪ Hours of daylight available
Physical: ▪ Wind ▪ Rain ▪ Snow ▪ Ice ▪ Severe weather ▪ Air quality ▪ Ultraviolet radiation	▪ Annoyance ▪ Annoyance, charm ▪ Winter sports/activities ▪ Danger ▪ Annoyance, danger ▪ Annoyance, danger ▪ Danger, attraction	▪ Blown belongings, sand, dust ▪ Wetting, reduced visibility, enjoyment ▪ Participation in sports/activities ▪ Personal injury, damage to property ▪ All of the above ▪ Health, physical wellbeing, allergies ▪ Health, suntan, sunburn
Thermal: ▪ Integrated effects of air temperature ▪ Wind ▪ Solar radiation ▪ Humidity ▪ Longwave radiation ▪ Metabolic rate	▪ Thermal comfort	▪ Environmental stress ▪ Physiological strain ▪ Hypothermia ▪ Hyperthermia
	▪ Therapeutic, restorative	▪ Potential for recuperation

Source: de Freitas (2003)

In order to clearly understand the impact of climate change on tourism, de Freitas (2003) proposes two separate forms of user response, as displayed in the diagrammatic figure. Firstly, there is a clear indication of the attitudinal responses of tourists to climate change which is mainly concerned with the perceptions of the immediate atmospheric surrounds, expressed verbally. Secondly, the behavioral responses modify and enhance the effects of the atmosphere. de Freitas' (2003: 50) model is divided into three facets, as explained below:

4.3.1 The thermal category:

de Freitas (2003: 50) notes that this category "integrates the physical factors influencing the body-atmosphere thermal state. For the atmospheric environment, these include air temperature, humidity, wind, solar and longwave radiation and the nature of the physical surroundings; and for the body, metabolic rate, posture and clothing". It further provides a rational index with sound physiological bases that adequately describe the net thermal effect on the human body. de Freitas (2003: 50) further argues that "it identifies relationships between the thermal state of the body and the condition of the mind that expresses the thermal sensation associated with this state. It further provides a rating of the perceived thermal sensation and corresponding calorific index according to the level of satisfaction experienced". This means identifying subjective reactions classified on a favorable-to-unfavorable spectrum as a measure of the desirability of conditions.

4.3.2 The physical category:

de Freitas (2003: 50) claims that this category deals with "the existence of specific meteorological elements such as rain and high wind that directly or indirectly affect participant satisfaction other than in a thermal sense. The occurrence of high wind, for example, can have either a direct mechanical effect on the vacationer, causing inconvenience (personal belongings having to be secured or weighted down) or an indirect effect such as blowing sand causing annoyance". Other things that fall into the physical category are rain (duration), rain days (frequency), ice, snow, severe weather, air quality and ultraviolet radiation.

4.3.3 The aesthetic aspects:

These relate to the climatically controlled resource attributes of the recreation environment i.e. the atmospheric component of the aesthetic natural environment. Examined in this "category are the weather factors such as visibility, sunshine or cloud associated with the prevailing synoptic condition (for example, `a nice, clear, sunny day'), day length and visibility" (de Freitas 2003: 50). Accordingly, de Freitas model suffices for this study. In fact, it creates a foundation for this study to examine the impact of climate change on tourism in KZN.

De Freitas *et al.* (2004: 22) note that "tourists and tour operators could use CIT to select the best time and place for a vacation travel or plan activities appropriate to the expected climate. They also explain that tourism planners could use the index to promote visitation outside the peak period and, if necessary, discourage it during the peak; or it could be used to assess potential visitor numbers to assist in planning resort development programmes".

Authors, researchers and academics have also employed the index to validate the current climate preferences of tourists, as well as to investigate the possible impacts of climate change on the climate resources of tourism destinations worldwide. This study will examine the facets discussed above in the Central Drakensberg Region of KZN in respect of the perceptions of tourists. Of importance to this study is to examine and analyse how tourists react to these various facets, which will thus form the basis for the results of this study. The approach should be commended as it allows for an accurate evaluation of the actual perceptions and responses of tourists to weather and climate (Hewer *et al.* 2015: 405).

4.4 Chapter Summary

In this chapter, the researcher examined the deficiencies of an academic theory specializing directly in tourism. Further, he has explained the concept of tourism climatology, which serves as the underpinning measurement for how this study intends to study the impact of climate change on tourism in KwaZulu-Natal. The next chapter discusses the research methodology employed in guiding the techniques used to identify, select, process and analyse information about the topic.

Chapter 5 of 8: Research Methodology

5.1 Introduction

Having discussed the literature and theoretical underpinnings for this research, the current chapter examines the methodological approach to this study. The chapter begins with the research design and approach, then proceeds to discuss issues related to sampling and the target population, followed by the ethical requirements and data collection instruments. The chapter ends by discussing validity, reliability, the pilot study and limitations.

5.2 Research Design and Approach

"A research design is the logic that links the data to be collected and the conclusions to be drawn to the initial questions of a study. It ensures coherence. Another way of viewing a research design is to see it as an action plan for getting from the questions to conclusions" (Rowley 2002: 16). The research design stage of a study is inevitable as this provides the researcher with a coherent and sequential analytical approach to the research work, thus giving the researcher a laid down strategy that serves as a guide. To Yin (2014: 13), "research design gives a logical sequence to a researcher which will in turn create a connection between the aims and objectives and questions of a research study to eventually lead to the conclusion". In his illustration, it is "a logical plan for getting from here to there" where 'here' imply the research questions that require solutions and 'there' accounts for the answers to the research questions.

In other work, Flick (2009) and Mishra and Alok (2017) stipulates that the research design refers to the set of methods and procedures for gathering and understanding information that will enable the researcher to satisfactorily answer specific questions. It entails the mode of data collection, the instruments to be used and the proposed means of analysing the collected data. Scholars have discussed different types of research designs in relation to their importance to a particular study (Grey 2014). The popular types include exploratory, descriptive and causal designs, with numerous other sub-categories such as action research, case study, cross-sectional or cross-cultural, descriptive, experimental, historical, longitudinal, observational, survey, philosophical and sequential studies (Apuke 2017). Therefore, having studied the different categories and sub-categories, the researcher selected the descriptive case-study design as a guide for this research, considering its strong alignment with the purpose of the study. The research examined the environmental and economic impacts of changing climatic conditions on the development of tourism in the Central Drakensberg Region (CDR) by ascertaining the implications of climate change for the local business community of CDR in relation to economic activities. As such, the CDR, in relation to climate change, was the case study.

Since the case study design focuses on a single context, it becomes important for a study of this nature focusing particularly on a region. Crowe *et al.* (2011) affirm that when it is requisite to acquire a thorough understanding of a particular subject, occurrence or an event of interest in its normal realistic setting, the case study approach is particularly useful to employ. In a similar vein, Harrison *et al.* (2017: 9) notes that case study-based research studies have been widely recognised as a novel method/approach to study and make sense of some multidimensional issues impacting the global order. Issues around Climate Change have permeated the world in recent times and has also been perceived as a complex phenomenon, given the possible impact it is likely to have on different sectors. As such, a case study design is essential in this research in order to gather an in-depth and real-life awareness of the impact of Climate Change on the tourism sector of CDR.

In terms of the approach, quantitative research was employed. Creswell and Guetterman (2018) describe a quantitative research approach as a category of experiential research into a societal problem, exploring various study variables which are analysed and presented as statistical information in order to ascertain if the theory clarifies the problem and/or challenge of interest. Yilmaz (2013: 321) explains it as a research study that deals with a societal challenge which is expressed and studied by means of scientifically-grounded techniques, particularly statistics. Creswell (2009: 17) describes the strengths of quantitative research in a succinct manner:

i. Tests or verifies theories or explanations;
ii. Identifies variables to study;
iii. Relates variables in questions or hypotheses;
iv. Uses standard of validity and reliability;
v. Observes and measures information numerically;
vi. Uses unbiased approaches; and
vii. Employs statistical procedures.

Given the nature of this study, it is believed that an approach exemplifying statistical and numerical basis would suffice. In so doing, a precise insight concerning to the influence of climate conditions on the tourism sector in CDR was to be gained. The degree to which this impact is likely to affect the sector was also ascertained.

5.2.1 Research Paradigm: Exploratory Research Design

The very essence of initiating a research study is ‘to know’. It is a methodical yet continuous process which clearly identifies and explains a particular problem (Antonius 2003). Research employs some well-thought-out techniques to collect, organise and analyse the information and/or data.

Ultimately, it simplifies and disseminates the findings to a wide audience for the purpose of either contributing to the body of knowledge, creating awareness regarding a certain occurrence or finding a working solution to a particular problem. Generally, there are three types of research that are common in academic settings, namely exploratory research, descriptive and explanatory research. For the purpose of this investigation, an exploratory research approach was employed in order to develop an integrated model that intended to ascertain the impact of climate change on the tourism industry in CDR. As was mentioned, the catastrophe of climate change in CDR has not been thoroughly and broadly studied, particularly in the context of tourism. Hence, it was appropriate for this study to apply this approach.

According to Denscombe (2010), in a scenario where a problem under study is not explicitly defined, it is common that most researchers will use an exploratory design as a first step of enquiry. More than that, exploratory studies are an important factor in understanding what exactly is happening in order to seek new perspectives and to probe problems that have not yet been comprehensively explored. Moreover, one key advantage of an exploratory research design is that it is generally used to develop hypotheses and can also be utilised as a ground work for future research projects (Gray 2014: 32). In relation to this particular investigation, exploratory research focuses on the information generated from the interviews, published reports, published academic papers, literature review and books related to climate change and tourism development.

5.3 Study Sample

Altinay and Paraskevas (2008) argue that sampling is a procedure through which a researcher selects representatives or participants from a total population in order to be studied for their topic. Creswell (2008) describes sampling as the system of selecting portions of individuals with some shared defining characteristics for study. Sparkes and Smith (2014) posits that it comprises creating informed and strategic decisions about which people are best for gaining data that need to be addressed to research questions. This will enable generalizing the conclusion as regards the whole population, with the hope that the conclusions drawn are a true reflection of the total population.

There are two essential forms of sampling methods, that is probability and non-probability. For probability sampling, Sa'id and Madugu (2015: 52) claim that this method involves sampling items or subjects chosen randomly, where each element in the population is given an equal and independent chance of being included in the sample. Techniques include: systematic, random, stratified and area/cluster sampling. In non-probability sampling, however, there is an absence of the privilege of having an equal probability of being chosen as it does not use random sampling. The possible techniques include convenient, snowball, purposive and quota sampling.

Effective sampling is considered an important factor in research as there are many critical impacts that sampling could have on a research work. Sampling in research is relevant for the following reasons:

i. Amongst the components that form the population of study, there are similarities and therefore a study of a few of these elements will give the researcher adequate information of the general consensus of the entire population of study;
ii. Every so often, it is just about impossible to take a broad and wide-ranging study of the population because of the configuration and dispersion of the elements of the population. Therefore, sampling becomes imperative because it remains the most effective method of estimating the population characteristic in such circumstances;
iii. Investigating a specific sample is usually inexpensive, rather than to study the whole population;
iv. Sampling enables researchers to be more thorough and affords him/her better supervision than with a complete coverage of the entire population; and
v. Sampling enables one to obtain quicker results than does a complete coverage of the population.

To achieve the above, this study fused two different sampling techniques under the auspices of the non-probability sample method, namely purposive and convenience sampling. Purposive sampling includes a situation whereby an investigator deliberately chooses only those who have relevant views on the issue at hand, whilst convenience sampling involves accidental techniques where a researcher possibly selects available respondents due to difficulties in gathering or accessing all possible respondents (Babbie and Mouton 2010).

To this end, the researcher employed purposive sampling to select experts in the field of tourism who could provide adequate and relevant information on the objectives of the study. In balancing the views, the researcher also sought information from stakeholders through the use of a convenience sampling method. The sample size of the study is n=350 respondents, broken down into different categories: n=320 of the respondents were guests who visited the aforementioned destinations: n=6 of the respondents were from the local municipality tourism department (the department only had 5 employees which means they all participated); and the last n=24 respondents were from EKZNW employees purposively selected either because of their direct and indirect involvement with tourism/climate change matters, each of the 6 selected destinations had 4 participants in the study.

5.4 Target Population

Asiamah (2017) describes the target population as the whole group of individuals to which a researcher is interested in applying his/her conclusions.

Banerjee and Chaudhury (2010) sees a target population as people made up of all feasible elements, subjects or observations concerning a certain occurrence of interest to the principal researcher. Elements and subjects refer to those singular items or variables that form the population (Sa'id and Madugu 2015). The target population of this study was N=450 respondents that consisted of two groups: stakeholders and experts. Stakeholders will include visitors/tourists, businesses and/or destinations and employees from Cathedral Peak Hotel. This segment of respondents was selected because they greatly influence the success or failure of any tourism destination and they are the most adaptive to the impacts of climate change.

The second group of respondents constitutes the population of experts (EKZNW employees and the local municipality). This segment of respondents was selected due to their expertise, experience and information on the economic impact of climate change and how these impacts are affecting tourism patterns in the area. This is to afford the researcher access to individuals who possess expert information and experience. "Expert" will be used in this research to define individuals with specific knowledge in the field of climate change and tourism. This group will involve tourism officials from UKhahlamba Municipality and authorities from Ezemvelo KwaZulu-Natal.

Participating study areas are: Didima Resort, Injisuthi Camp, Giants Castle, Cathedral Peak Hotel, Monks Cowl and the Queen Elizabeth Park. The target population was mainly tourists/guests who were visiting the aforementioned tourism destinations. Employees working in these tourism destinations were also the target population, as was the local municipality (UKhahlamba Municipality). The target population size is unknown, but the researcher tried to ensure that all the major attractions in the region were represented.

5.5 Ethical Requirements

A research study has ethical dimensions. Ethical issues have become a critical domain of research. As such, permission should be sought and granted before a study can be conducted, especially when it involves participants revealing their personal information. Neuman (2011) intimates that ethical considerations require the researcher to maintain ethical and professional responsibilities that are to be guided by integrity, even when the participants are uninformed of the moral code. This explains Flick's (2009) position that ethical considerations are concerned with how to protect the interests of those who showed interest in participating in the research. Additionally, it ensures that certainly no injury comes to the respondents as a result of what the research entails (Rubin and Rubin 2012). The authors maintain that a researcher needs to seek the consent and willingness of the respondents. In this regard, the researcher is responsible for ethical behaviors and makes sure that no deceit or pressure is involved with the participants.

Given the tenets of ethical considerations, institutions of higher learning have sought to monitor ethical issues by constituting a committee to guide this particular aspect of research. The committee is thus concerned with issues related to informed consent, privacy and confidentiality, anonymity, benefits and risks of the research, and the right to withdraw. Study permission from the Durban University of Technology was sought and acquired from the Faculty Research Committee and the Institutional Research Ethics Committee. The researcher was also required to get official permission from the study area, which was equally acquired. Issues relating to informed consent were dealt with.

Informed consent ensures that the required respondents understand the nature of the research (Rubin and Rubin 2012). Informed consent was ensured in this research as the sample of the letter of information and informed consent were examined and approved by the research committee. The letter of information and informed consent were subsequently acknowledged and signed by the respondents. They were aware of the risks and benefits involved and were not coerced to partake in the research, which implies that they have the right to voluntary participation and withdrawal. Regarding privacy, confidentiality and anonymity, the personal bio-data of respondents were not required. As such, Anonymity of the participants was ensured and all information retrieved were treated with confidentiality and kept safely.

5.6 Data Collection Instruments

Canals (2017: 390) posits that the data collection process involves the practice of preparing actions that engage study respondents to discuss a particular theme or to mobilize certain communication skills. Similarly, Paradis *et al.* (2016: 263) adds that the data collection process entails the following: deciding on who will do what, when, where and how it will be done at the different phases of the research process; recognizing the role of the principal investigator as an instrument of data collection; and cautiously understanding the study context and all the respondents involved in the research (Young 2015). It has thus become evident that the data collection stage is crucial and important for efficient research.

Authors have then cautioned that the techniques applied to gather data ought to be commonly informed by the research questions and objectives (Canals 2017: 395). Paradis *et al.* (2016) also note that data collection techniques are essential because the method by which the data collected is used and the enlightenments it can produce are determined by the selected methodology and questioning approach used/employed by the researcher. Generally, five data collection instruments are essential: namely questionnaires, interviews, observations, focus group and textual analysis (Paradis *et al.* 2016: 264 and Canals 2017: 396).

Sansoni (2011) defines a questionnaire as a document designed with the purpose of seeking specific information from the respondents. For Ponto (2015), questionnaires typically include a series of items reflecting the research aims, which may often include demographic questions in addition to valid and reliable research instruments. Since questionnaires have now been ascertained to be a relevant data collection instrument, this research employed questionnaires as the data collection instrument. They were tailor-designed for each segment group (Local municipality, visitors/tourists and Tourism authorities). The questionnaires were divided into 4 parts (Demographics, climate change impacts, environmental impacts and supplementary questions). Most of the questions were in a Likert-scale format.

5.7 Validity and Reliability Constructs

Evidence-based research studies include, to some extent, a detailed interpretation of the findings of well-investigated quality research studies. Therefore, being able to produce quality and trustworthy studies in the social sciences is in important factor that must always be adhered to. Accordingly, serious attention must be given not only to the study outcomes, but also the rigour of the study. In research, rigour can be explained as the trustworthiness or accuracy of a research study in terms of planning, data collection, analysis and reporting (Noble and Smith 2015). In quantitative research, this can be achieved through measurement of the validity and reliability. In addition, the significance of validity and reliability in research is essential, particularly when one is evaluating a measurement tool (Cooper *et al.* 2003). The consistency with which data collection techniques produces the same outcomes on repeated testing is generally associated with the term 'reliability', whereas the accuracy with which the study measure what is intended is normally associated with the term 'validity'. Golafshani (2003: 602) concludes by asserting that the value of these two vital research elements can under no circumstances be underrated as they are effective tools of the positivist epistemology.

5.7.1 Validity

Bonds-Raacke *et al.* (2012: 84) view validity as "the ability of your measurement to accurately measure what it is supposed to measure". For White and McBurney (2013: 141), "validity is an indication of accuracy in terms of the extent to which a research conclusion corresponds with reality". Similarly, Bearden *et al.* (2011) perceive validity as the process of adequately ensuring that data collected through interviews and observations are accurately conducted without the fear of fraud or bias. This implies that the collection of data should be free of any intervention, other than that of the respondents. In Flick's (2009: 387) words, validity is about the question of "whether the researchers see what they see".

Bolarinwa (2015: 199) notes that the researcher's conclusion has to be correct with the actual state of the world. Thus, he identifies some types of validity related to the use of questionnaires, namely face, content, criterion-related and construct validity. In an attempt to ensure validity in this research, a content validity method is employed, which was further validated by the use of data triangulation which will help in cross-checking the findings. Content validity refers to the extent to which the tool, or rather the instrument, completely assesses or measures the concept and phenomenon of interest (Bolarinwa 2015: 201). In warranting the validity of the research findings, the questionnaire was pre-tested or rather piloted in order to ensure that the questions were clearly understood and that respondent does not come across any redundant complications when answering the questions.

5.7.2 Reliability

The testing of reliability in the process of conducting a research study cannot be over-emphasized. This process indicates that the collected data are devoid of possible errors and mistakes, as these affect the findings. Reliability as described by Yin (2014) as conducting a research study as if the research is strictly being monitored so that if another researcher does the same thing, the same findings and conclusions will emerge. For Leedy *et al.* (2010: 93), reliability is the "reproductivity of consistent results of a measurement under circumstances where the characteristics being measured have not changed". Bonds-Raacke and Raacke (2012) describe validity as the uniformity of the same measure to present comparable assumptions on different instances. By implication, reliability is concerned with the ability to represent the same findings over and over again.

Bolarinwa (2015: 196) recognizes different forms of reliability, amongst which are test-re-test, internal consistency and short note on SPSS. In this research, reliability was established through internal consistency by computing Cronbach's Coefficient Alpha. For this questionnaire, the coefficients of Cronbach's of the constructs were all higher than 0.70, thereby indicating an acceptable internal consistency of the measurements. Internal consistency refers to the extent to which elements on the experiment or tool are assessing the same thing (Bolarinwa 2015: 196). In addition to ensuring equivalence of the study outcome, two professional research assistants were hired to assist with data collection. A totally transparent, systematic approach to data collection was ensured and ethical consideration were considered as prescribed by the Durban University of Technology before and during data collection as a means of guaranteeing trustworthiness of the results.

5.8 Pilot Study

A pilot study, otherwise a pilot experiment, can help in refining the data collection procedures with regards to the content of the data and the chronological procedure to follow (Yin 2014).

It creates an avenue to secure sensible knowledge of a research problem and a study is deemed to be lacking if the pilot study did not take place (Babbie and Mouton 2006), thus making it necessary that a small-scale investigation is carried out to ascertain feasibility (De Vos *et al.* 2005) in order to identify the likely risks pertaining to the research. The pilot study was carried out in three different capacities. The selection of respondents consisted of the following people: 10 respondents from Didima Resort (5 employees and 5 visitors), 15 research students from DUT, 15 research students from UKZN's and 1 lecturer from UKZN; Department of Environmental studies, Earth and Science.

No major flaws were identified during the trial run. The respondents were concerned about the high volume of questions in the questionnaires. There were some further concerns regarding the difficulty of the questions, especially with respect to the use of subject terminology. The second concern was addressed by simplifying some of the terminology used in the questionnaire. The first concern was dealt with through Likert-scale questions to make it easier and comprehensible for the study respondents. The instrument was able to provide responses that were in line with the study objectives hence no major changes were required. The questions in the instrument were deemed necessary for the study objectives and aims. Pilot testing helped the researcher to ascertain a viable approach to be used in tackling the research problem.

5.9 Limitations of the Study

This research study is restricted to one tourism region in KwaZulu-Natal: Central Drakensberg. This region makes up an enormous segment of the uKhahlamba Drakensberg Park. Participating protected areas/destinations in this region include Didima Resort, Cathedral Peak Hotel, Giants Castle Game Reserve, Monks Cowl and Injisuthi Camp. Therefore, just like other research studies and because one researcher cannot examine all possible variables, this study is also not devoid of deficiencies. Firstly, the outcomes of this investigation cannot be directly generalized to other tourism destinations or anywhere else as the spatial setting of this study presents a unique ecological component that includes winter snow. Amongst the remaining perceived limitations are:

i. Since the study was investigating the economic impact of climate change, access to financial statements of all the selected study areas was prohibited, which in turn was a major limitation to the study;

ii. The lack or non-existence of a tourism theoretical framework meant that the study had to opt for a conceptual framework in tourism climatology, which is of course not a full-blown framework. It is moreover essential to comprehend that the field of tourism climatology is yet to gain significant academic attention, thus resulting in limited academic literature;

iii. The study's spatial settings are only limited to the Central Drakensberg Region. Considering other regions may have contributed new and important information to the study; and

iv. Limited outcomes in quantitative research. The respondents had limited options of responses based on the selection made by the researcher. As such, generalization of results is limited. It should be noted that using a qualitative approach or a mixed-method approach could have contributed enormously to the findings.

5.10 Analysis of Data

According to Samuels (2020), data analysis is the process whereby a phenomenon is broken down into its constituent parts in order for it to be understood better. As a significant and crucial aspect of research, data analysis summarizes collected and interpreted data through the exploitation of systematic and rational reasoning in order to ascertain patterns, correlations or trends in the collected data. Data analysis refers to the process of transforming, cleaning, modeling and inspecting data with a view to recognising essential information, advising decision-making and suggesting conclusions (Brynard *et al.* 2015: 51). Editing relates to the scrutiny and thorough check of the completed questionnaires (Scheyvens 2014: 44). Hence, it is important for checking the accuracy and completeness of the data before it is captured. Every completed returned questionnaire has been scrutinised to make sure that the criterion for completeness is abided by. The responses per questionnaire have been captured to form the data set, which is subjected to statistical analysis.

In this study, measures of frequency were utilised as a type of descriptive statistics. The rationale for using this type of analysis was that descriptive statistics is mostly concern with the summary of statistics in the form of tables, pie-charts, tables, graphs and the calculation of descriptive measures (Scheyvens 2014: 31). Inferential statistics exploit meaningful statistical tests to achieve accurate values in relation to the tested hypothesis. The function of descriptive statistics is to summarise large amounts of data with the aim of drawing conclusions about the variables under study. DePoy and Gitlin (2015) underlined that descriptive statistics exploits two ways of data description, i.e. the numerical and graphical descriptions. Inferential statistics utilise the findings generated from the sample data to make a generalisation and draw a conclusion about the population. It is crucial to ascertain the causal effect, rather than just a mere association between variables. The study determines the causal impact of climate change on the development of tourism. The proposed integrated climate change model will be scrutinized. The correlation or connection between two variables is usually well understood when displayed in graphics.

There are manifold approaches to analysing quantitative data. However, this research utilises cross-tabulation as it is a fairly widely preferred method of analysing quantitative data. Its key advantage is that it exploits the simplest procedures to establish assumptions amongst various sets of data in the research study. It contains information that is jointly exclusive or has some correlation with each other (Ngxongo 2016: 79). Some advantages of quantitative data analysis are that it is more likely that the research study will be detailed and thorough. The possibility of biasness is to a greater extent reduced due to the numerical nature of quantitative data and the objective nature of outcomes. The results are extremely accurate (McDaniel and Gates 2010: 132).

The questionnaire data collected from the study participants (tourists, experts and stakeholders) was entered into a computer package called the Statistical Package for the Social Sciences (SPSS). SPSS is a recognized and prominent programme used in analysing data. The SPSS programme proves useful in data management and the formatting of tools for coding variables, computing new variables, filtering cases, data weighting, etc. In order to make sense of the results, a number of statistical tests were conducted for the purpose of formulating hypotheses to substantiate if there was any numerically significant correlation amongst the study variables. The main experiments conducted were the use of correlations, chi-square tests, regression analysis, and Fisher's Exact Test which are interpreted using the p-values.

Regression and correlation analyses are the two major techniques that assist in the deduction of the relationship between the real dimensions of two or more variables. Hence, the quantitative paradigm illustrates the key sub-variables for cross-tabulation. Correlation analysis will be carried out to check the connection between variables in the integrated model. Factor analysis will be carried out for validity testing of the measurement instruments. Pearson's Chi-Squared test will be carried out for hypotheses testing of variables in this study.

5.11 Hypotheses Formulation

A hypothesis is a tool that is used to enlighten a phenomenon or predict a relationship between different variables in research. It brings specificity, focus and clarity to the problem statement (Wrench *et al.* 2013: 21). Generally, there are four (4) assessment criteria that a hypothesis is required to meet. These principles are that;

i. It must indicate an expected relationship between variables;
ii. It must be testable to determine whether a hypothesis is truth or false.;
iii. It should be consistent with the existing body of knowledge; and
iv. Lastly, it should be stated as simply and concisely as possible.

Creswell (2014: 21) further emphasized that not only does a hypothesis enable scholars to discover a relationship between study variables, but also assists in predicting a correlation based on theoretical procedures and/or empirical results. For the purpose of this project, the independent variable is tourism development, whilst the dependent variables are: climate change, environmental vulnerability and economic implications. A thorough discussion of the below-mentioned hypotheses is presented in the following chapter of the study. The following hypotheses are established and statistically tested in this study;

Hypothesis 1:	There is a significant correlation between choosing an environmentally sustainable destination and increased climate change research investment.
Hypothesis 2:	There is a significant correlation between choosing an environmentally sustainable destination and vacation cancelation due to inclement climate conditions.
Hypothesis 3:	There is a significant correlation between choosing an environmentally sustainable destination and increased tourist expenditure.
Hypothesis 4:	There is a significant correlation between the quality of a destination's natural surroundings and its accessibility.
Hypothesis 5:	There is a significant correlation between climate change affecting visitor flow to tourism destinations and climate change reducing profitability and efficiency of tourism.
Hypothesis 6:	There is a significant correlation between sustainable development and weather and climatic conditions.
Hypothesis 7:	There is a significant correlation between the impact of climate change on tourist spending behavior and tourism's financial success.
Hypothesis 8:	There is a significant correlation between investment opportunities and the tourism's prospects.
Hypothesis 9:	There is a significant correlation between the quality of the natural surroundings and the cultural and historical attractions in the region.

5.12 Chapter Summary

This particular chapter has critically examined the methodological stance of this study. In the process, a discussion on the preferred research strategy, data collection and analysis procedures, sampling, target audience as well as the ethical requirements have been expatiated. The chapter also clarifies issues of validity, reliability, pilot study and limitations. The foregoing presents the analysis of collected data for this research. The following chapter of the study presents the analysis and the interpretation of the results.

Chapter 6 of 8: Results – Analysis and Interpretation of Data

6.1 Introduction

In the foregoing chapter, it was indicated that the methodology employed in the study was the use of a structured questionnaire. It was also indicated that the study is descriptive in nature and used a quantitative research method. A combination of a purposive sampling method for experts and convenience sampling method for stakeholders was used correspondingly to identify the most suitable and specific respondents of the study.

The definitive intention of any research study is to determine and suggest a solution for the existing problems in the chosen field and subject area. The results can be measured by the methodical examination of collected data. The required Information can be appropriately gathered either in the form of quantitative or qualitative data and/or the combination of the two research methods. Appropriate statistical techniques can be used to analyse the raw data collected from the study respondents. Data analysis and interpretation in research represents one of the most important elements of research as it qualifies the researcher to make sense of the information and interpret the findings in order to present a conclusion that addresses a particular problem.

Therefore, this section of the study presents the analysis of data, followed by a discussion of the research findings. The presented outcomes relate to the research variables, objectives and questions that guided the direction of the study. Moreover, the findings presented in this chapter were obtained from various stakeholders in the tourism industry. The collected data was analysed in order to ascertain, define and evaluate the correlation between tourism development and the impact of climate change, as well as to determine exactly how climate change is impacting the environment and tourism economic activities in CDR. There were two set of questionnaires in total: the first questionnaire (Appendix 4) was for visitors; the second questionnaire (Appendix 5) was for the local municipality, businesses and tourism authorities. Accordingly, the presentation and the interpretation of the analysis is presented in three separate sections, namely visitors/guests, local municipality and the tourism authorities.

This section presents the outcomes and discusses the findings attained from the data collection instruments. A researcher-administered questionnaire was the primary instrument exploited to collect data and was circulated to suitable respondents. The information gathered from the respondents was analysed with SPSS version 25.0. The study outcomes are presented in the form of descriptive information: graphs, cross-tabulations and other figures for the quantitative data that was collected. Inferential methods consist of the use of variable correlations and chi-square test values, which are all analysed using the p-values.

6.2 The Research Instrument and Sample

A total of **320** questionnaires were despatched and **317** were accordingly returned which gave a **99.0%** response rate. The data collection instrument consisted of 119 items, with a level of evaluation at a nominal or an ordinal level. The instrument was separated into 4 sub-divisions which were intended to assess different topics as indicated below:

I	Personal Information
II	Climate Change Impact
III	Environmental Impact
IV	Miscellaneous Questions

6.3 Descriptive Analysis

This section of the chapter presents a descriptive analysis of the data obtained through the data collection instruments. A descriptive statistical analysis is a summary statistic that quantitatively describes the features of a collection of information. The process entails the summary and presentation of quantitative data (Loeb et al. 2017). A descriptive analysis of data is necessary as it helps to determine the normality of the distribution. For the purpose of this study, the data collected from the field were analysed descriptively in terms of measures of variability and measures of central tendency. In addition, descriptive statistics are analysed and presented in the form of tables, bar graphs and pie charts. A summary of frequency tables that illustrate the total percentages of the Likert-scale answers with regard to each theme in the questionnaire were analysed using SPSS, version 25.0. As earlier indicated, because of the nature of study respondents and data, the descriptive analysis is presented in three separate sections: visitors/guests, tourism authorities and the local municipality.

6.3.1 Reliability Statistics

Cronbach's Alpha was exploited as a measurement instrument for internal consistencies and construct stability with regard to climate change, tourism development, environmental vulnerability and economic implications. The reliability test is calculated by taking various measurements on similar topics. Of interest, a reliability number of 0.70 or higher is perceived as "acceptable". In addition, Bryman and Bell (2015: 29), Garson (2011) and Malhotra (2004) posits that reliability values between 0.6 and 0.7 are satisfactory for explorative studies. Table 6.1 below reflects the Cronbach's alpha count for all the elements that made up the questionnaire.

The reliability counts for all units surpassed the suggested Cronbach's alpha value. Therefore, this confirms an extent of satisfactory, reliable scoring for all the units of the investigation. On the contrary, section B7 has a slightly lower value. This is due mainly to the minimum number of items that constituted the section.

Table 6. 1: Cronbach's Alpha

Section	Name	N of Items	Cronbach's Alpha
B5	Impact of Climate Change on the Tourism Sector	11	0.666
B6	Climate Change Awareness & Understanding	6	0.636
C6	Climate Change Adaptation & Mitigation / Management	9	0.820
D3	Tourism Vulnerability	7	0.792

The reliability scores for all sections exceed the recommended Cronbach's alpha value. This indicates a degree of acceptable, consistent scoring for these sections of the research, which therefore confirms the measurement scale's reliability.

6.4 Visitors' Descriptive Statistics

In this part of the data presentation, the biographical information of visitor participants is presented.

6.4.1 Gender and Age Distribution

Table 6.2 describes the gender distribution of visitors per age group. The Fisher exact tests failed to show significant differences in gender with respect to age distribution of the respondents ($p>0.05$). As shown in the table below, male (54.9%) were slightly higher than female (45.1%) respondents. Largely, the proportion of males to females is virtually 1:1 (54.9%: 45.1%) ($p = 0.082$). In terms of the age distribution, the proportion of males (32.5%) within the age category of 18-30 years old was higher than the females (24.0%). Similarly, males were more within the age distribution of 31-40 (18.6%) when compared against females (15.8%). However, the female respondents constitute the highest number within the age distribution of 41-50 years old (1.3%), 51-60 years (0.9%), as well as 61-70 years old (1.9%) respectively. Overall, more (56.5%) of the respondents are within the age distribution of 18-30 years old, with the lowest representative within the age distribution of 51-60years old (1.6%).

Table 6. 2: Gender Group Distribution of Visitors by Age

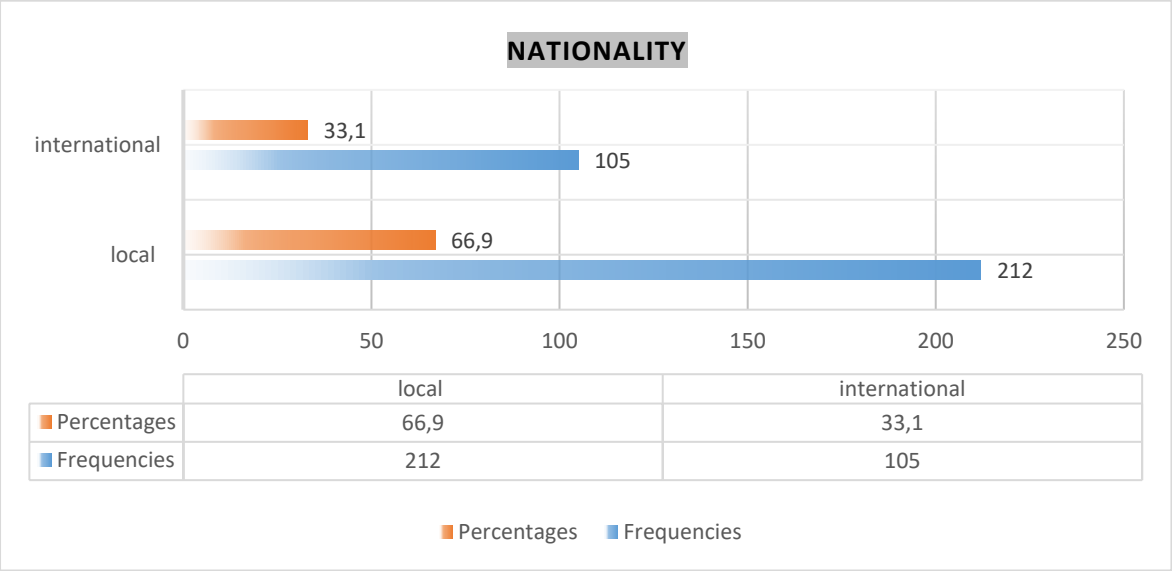
			Gender		Total
			Male	Female	
Age	18-30	Count	103	76	179
		% within Gender	59.2%	53.1%	56.5%
		% of Total	32.5%	24.0%	56.5%
	31-40	Count	59	50	109
		% within Gender	33.9%	35.0%	34.4%
		% of Total	18.6%	15.8%	34.4%
	41-50	Count	2	4	6
		% within Gender	1.1%	2.8%	1.9%
		% of Total	0.6%	1.3%	1.9%
	51-60	Count	2	3	5
		% within Gender	1.1%	2.1%	1.6%
		% of Total	0.6%	0.9%	1.6%
	61-70	Count	3	6	9
		% within Age	33.3%	66.7%	100.0%
		% within Gender	1.7%	4.2%	2.8%
		% of Total	0.9%	1.9%	2.8%
	Cannot disclose	Count	5	4	9
		% within Gender	2.9%	2.8%	2.8%
		% of Total	1.6%	1.3%	2.8%
Total		Count	174	143	317
		% within Gender	100.0%	100.0%	100.0%
		% of Total	54.9%	45.1%	100.0%

P=0.082

6.4.2 Nationality of Visitors

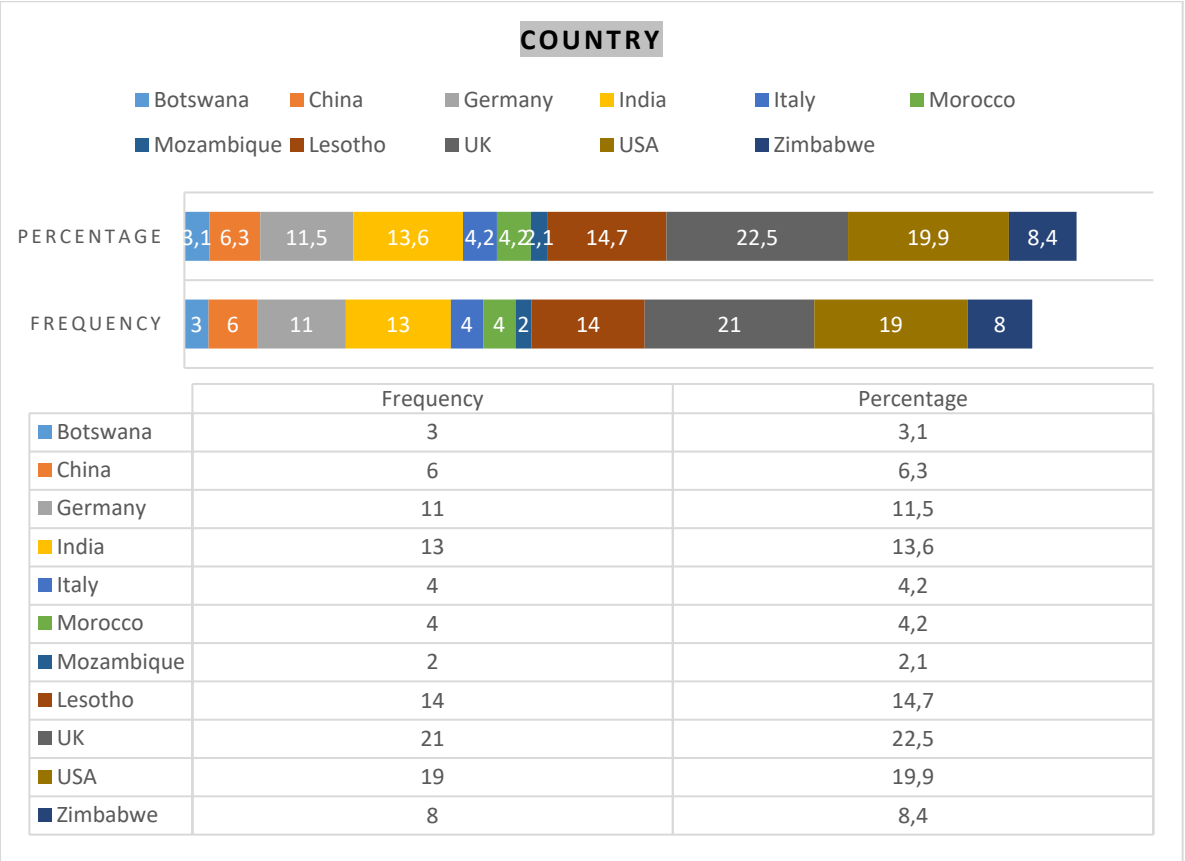
The nationality of the tourism visitors sampled are given in Figure 6.1. It can be seen that an overwhelming majority 212 (66.9%) of the respondents are locals (South Africans) with the other 105 (33.1%) respondents indicated to be international visitors.

Figure 6. 1: Nationality of Visitors



It was also interesting to note that amongst the international visitors were Zimbabwe, Botswana, Mozambique, Lesotho and Nigerian nationals (Figure 6.2).

Figure 6. 2: Countries of International Visitors

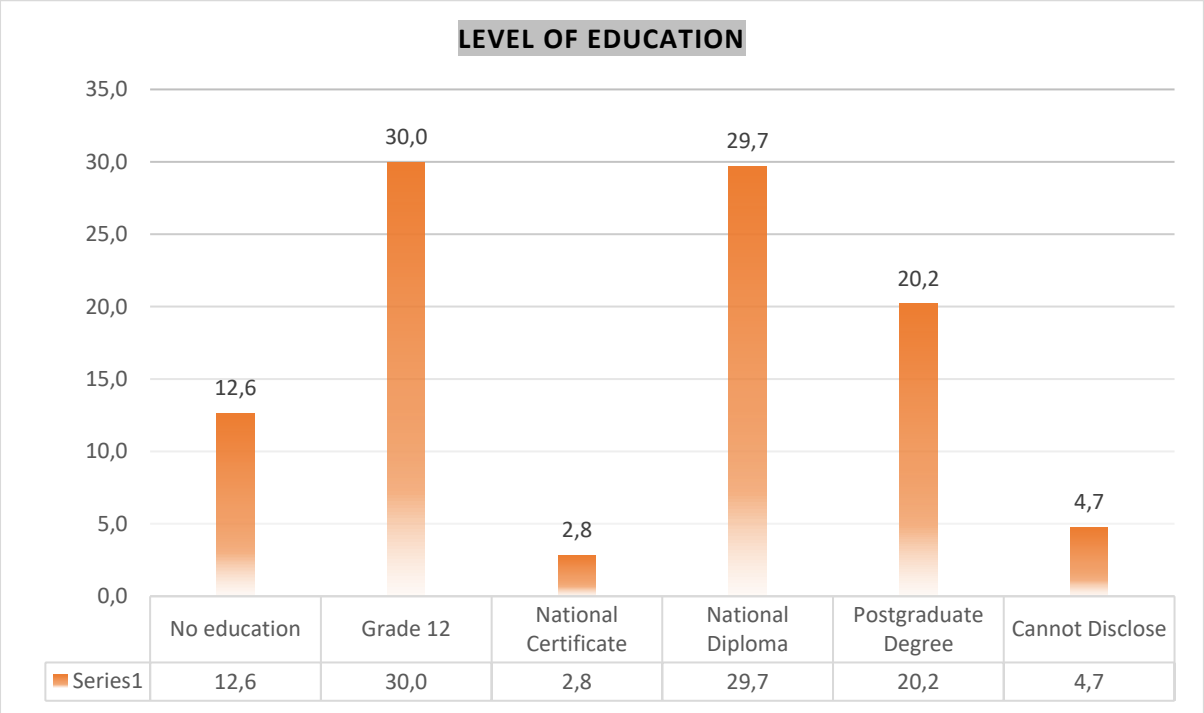


	Frequency	Percentage
Botswana	3	3,1
China	6	6,3
Germany	11	11,5
India	13	13,6
Italy	4	4,2
Morocco	4	4,2
Mozambique	2	2,1
Lesotho	14	14,7
UK	21	22,5
USA	19	19,9
Zimbabwe	8	8,4

6.4.3 Level of Education

The respondents' levels of education are given in Figure 6.3. The majority (> 50%) of respondents had a post-school qualification (national certificate =2.8% and national diploma=29.7%). A reasonable number of the respondents (20.2%) were in possession of a post-graduate degree. This is an advantageous indicator as it points out that a reasonable percentage of the study respondents have a tertiary qualification, thus suggesting that the data collected from them would likely be correct as it comes from a knowledgeable (learned) source.

Figure 6. 3: Visitors' levels of Education



6.4.4 Visitors' Occupations

Table 6.3 reflects the occupations of the visitors. It can be understood from the table that a majority (98.4%) of the respondents declined revealing their occupation.

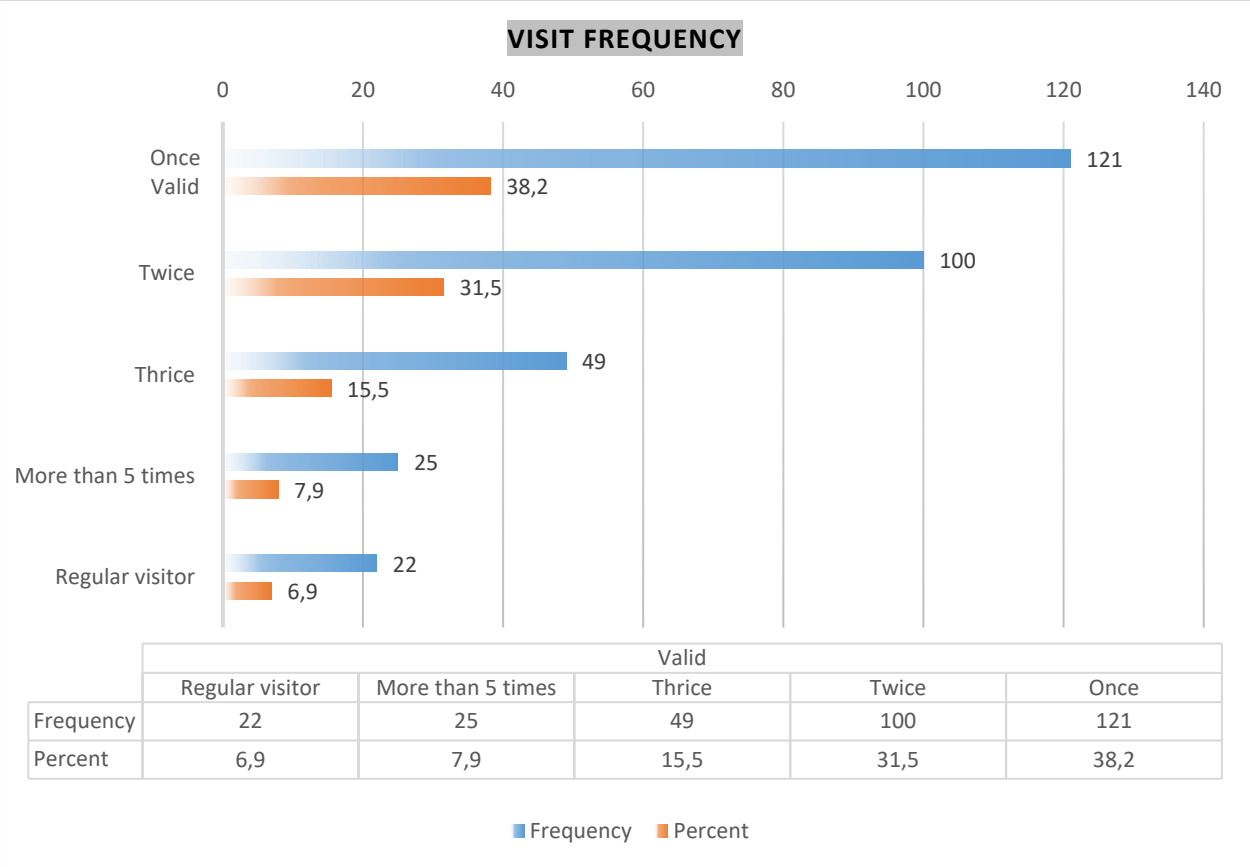
Table 6. 3: Visitors' Occupations

	Frequency	Percent	Valid Percent
No disclosure	312	98.4	98.4
Business man	1	0.3	0.3
Fashion designing	1	0.3	0.3
Student	2	0.6	0.6
Teacher	1	0.3	0.3
Total	317	100.0	100.0

6.4.5 Time of Visit

The visitors' time of tourism visits are shown in Figure 6.4. It was gathered that more of the respondents (121/38.2%) indicated visiting once, while 100 (31.5%) visited twice. A point deserving mention is that out of the 317 respondents, 22 (6.9) were regular visitors and 25(7.9%) indicated visiting more than 5 times.

Figure 6. 4: Visitors' Time of Visit

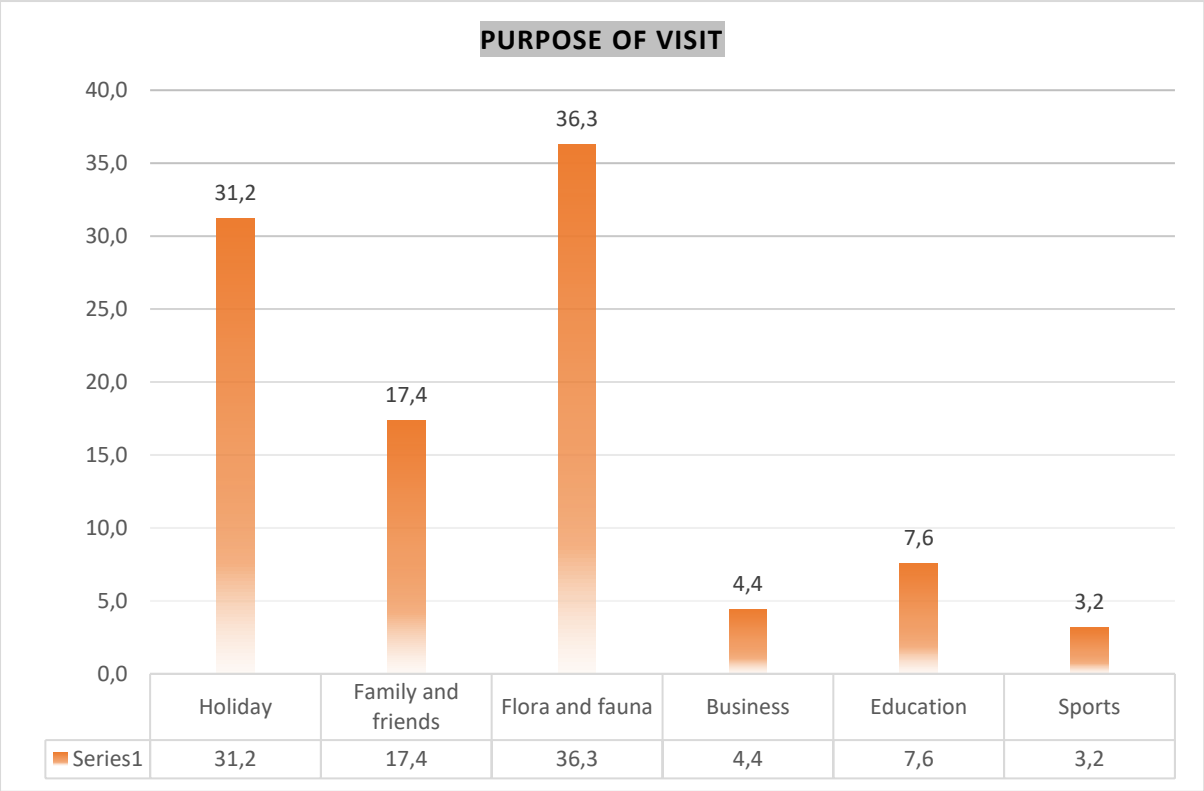


	Valid				
	Regular visitor	More than 5 times	Thrice	Twice	Once
Frequency	22	25	49	100	121
Percent	6,9	7,9	15,5	31,5	38,2

6.4.6 Purpose of Visit

The purpose of the visit is depicted in Figure 6.5. It was found that a good proportion (36.3%) visited because of the evergreen and breath-taking flora and fauna, followed by those who visited for a holiday (31.2%). Moreover, it can be gleaned from the figure that family and friends (17.4%), education (7.6%), business (4.4%) and sports (3.2%) were amongst the other reasons given for the purpose of visits.

Figure 6. 5: Visitors' Purpose of Visit



Given the high number of respondents who visited for the flora and fauna as well as holidaying, it was pertinent to know the number of times they have visited for the same purpose. A cross-tabulation (Table 6.4) was used to compare the relationship between the time and the purpose of visitors' visit. Amongst those who indicated visiting for holiday purpose, it was found that a majority 55 (55.6%) visited only once. Similarly, it was also observed that more (27/49.1%) of the respondents who indicated visiting friends and family did so only once.

In terms of the respondents who visited due to the flora and fauna, the majority 43 (37.4%) visited twice. Amongst those who indicated visiting for business, it emerged that a majority of 4 (26.8%) had done so more than 5 times. Amongst those whose purpose was for education, it was found that 8 (33.3%) are regular visitors. Hence it was understandable that similar number (33.3%) had also visited more than 5 times, etc. Drawing from the above narrative, it is sufficient to assume that the respondents who visited for business are most likely to return for another visit.

Table 6. 4: Cross-Tabulation Between Purpose of Visit and Time of Visit

			Time of visit					Total
			Once	Twice	Thrice	More than 5 times	Regular visitor	
Purpose of visit	Holiday	Count	55	30	9	2	3	99
		% within Purpose of visit	55.6%	30.3%	9.1%	2.0%	3.0%	100.0%
		% within Time of visit	45.5%	30.0%	18.4%	8.0%	13.6%	31.2%
		% of Total	17.4%	9.5%	2.8%	0.6%	0.9%	31.2%
	Family and friends	Count	27	18	6	3	1	55
		% within Purpose of visit	49.1%	32.7%	10.9%	5.5%	1.8%	100.0%
		% within Time of visit	22.3%	18.0%	12.2%	12.0%	4.5%	17.4%
		% of Total	8.5%	5.7%	1.9%	0.9%	0.3%	17.4%
	Flora and fauna	Count	36	43	26	5	5	115
		% within Purpose of visit	31.3%	37.4%	22.6%	4.3%	4.3%	100.0%
		% within Time of visit	29.8%	43.0%	53.1%	20.0%	22.7%	36.3%
		% of Total	11.4%	13.6%	8.2%	1.6%	1.6%	36.3%
	Business	Count	2	3	2	4	3	14
		% within Purpose of visit	14.3%	21.4%	14.3%	28.6%	21.4%	100.0%
		% within Time of visit	1.7%	3.0%	4.1%	16.0%	13.6%	4.4%
		% of Total	0.6%	0.9%	0.6%	1.3%	0.9%	4.4%
	Education	Count	1	3	4	8	8	24
		% within Purpose of visit	4.2%	12.5%	16.7%	33.3%	33.3%	100.0%
		% within Time of visit	0.8%	3.0%	8.2%	32.0%	36.4%	7.6%
		% of Total	0.3%	0.9%	1.3%	2.5%	2.5%	7.6%
	Sports	Count	0	3	2	3	2	10
		% within Purpose of visit	0.0%	30.0%	20.0%	30.0%	20.0%	100.0%
		% within Time of visit	0.0%	3.0%	4.1%	12.0%	9.1%	3.2%
		% of Total	0.0%	0.9%	0.6%	0.9%	0.6%	3.2%
Total		Count	121	100	49	25	22	317
		% of Total	38.2%	31.5%	15.5%	7.9%	6.9%	100.0%

6.5 Assessing Climate Change Impact

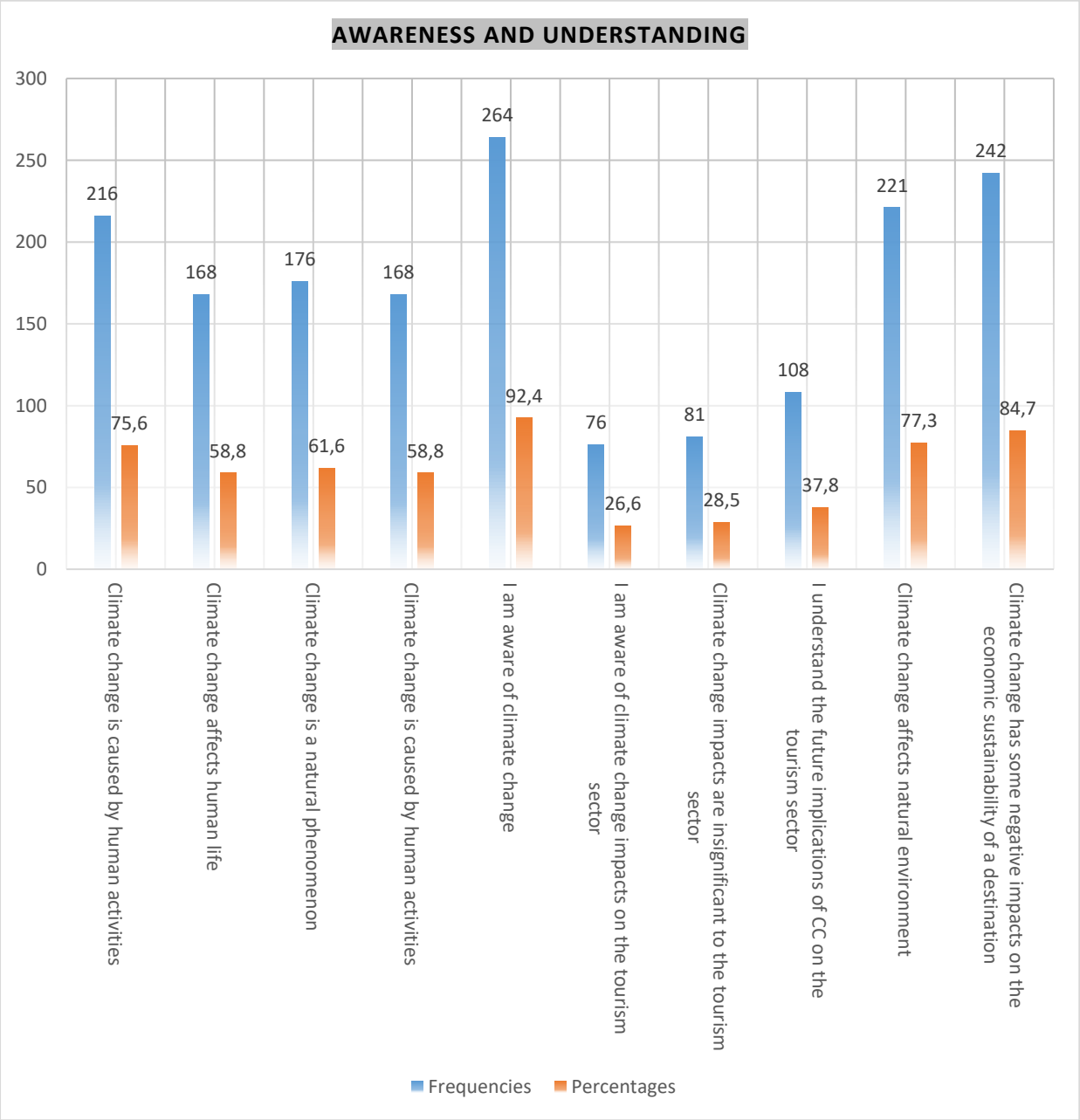
Since the turn of the 21st century, the debate and discourse about climate change have become intense. De Stefano *et al.* (2016) moot that climate change is a pressing challenge facing the global community, which requires the urgent adoption of timely and effective innovations in many sectors of the economy. Given that tourism contributes nearly 15% of the South African Gross Domestic Product (GDP), it becomes highly imperative to acknowledge the effects of climate change on this sector. Hence this section aims to assess, from the perspective of the visitors, the impact of climate change on tourism.

6.5.1 Awareness and Understanding of Climate Change Impacts

Figure 6.6 reflects respondents' awareness and understanding of climate change. It was found that a significant majority (264/92.4%) indicated being aware of climate change, whereas 242 (84.7%) of the respondents thinks that changing climate conditions has some major harmful impacts, particularly on the financial sustainability and prosperity of the region. Undesirably, a small number of respondents' 108 (37.8%) and 76 (26.6%) respectively indicated a poor understanding of climate change effects on the tourism industry. Moreover, the future implications thereof associated with climate change remains unknown. In order to better comprehend what is observed to be the major cause of climate change in the region, visitors were probed to rate the extent to which they acceded that climate change is caused by human activities and to what extent by natural processes.

The majority of respondents (216 /75.6%) agreed that climate change is certainly triggered and perpetuated by human activities, whereas 176 (61.6%) assented that the climate change issue is a natural occurrence. Moreover, just over half (168/ 58.8%) of the respondents think that climate change affects human life, while more than half (221 /77.3%) of the respondents think that climate change affects the natural environment. In essence, the outcomes of this study indicated that a great number of study respondents have some level of understanding and were familiar with the concept of climate change. The position of these findings is also consonant with other reported studies that greenhouse emissions are the foremost culprit of climate which leads to global warming, thus contributing to the incidence and severity of life-threatening weather conditions (Huisingh et al. 2015: 9; Jevrejeva *et al.* 2012: 17; Lenzen *et al.* 2018).

Figure 6. 6: Awareness and Understanding of Climate Change Impacts

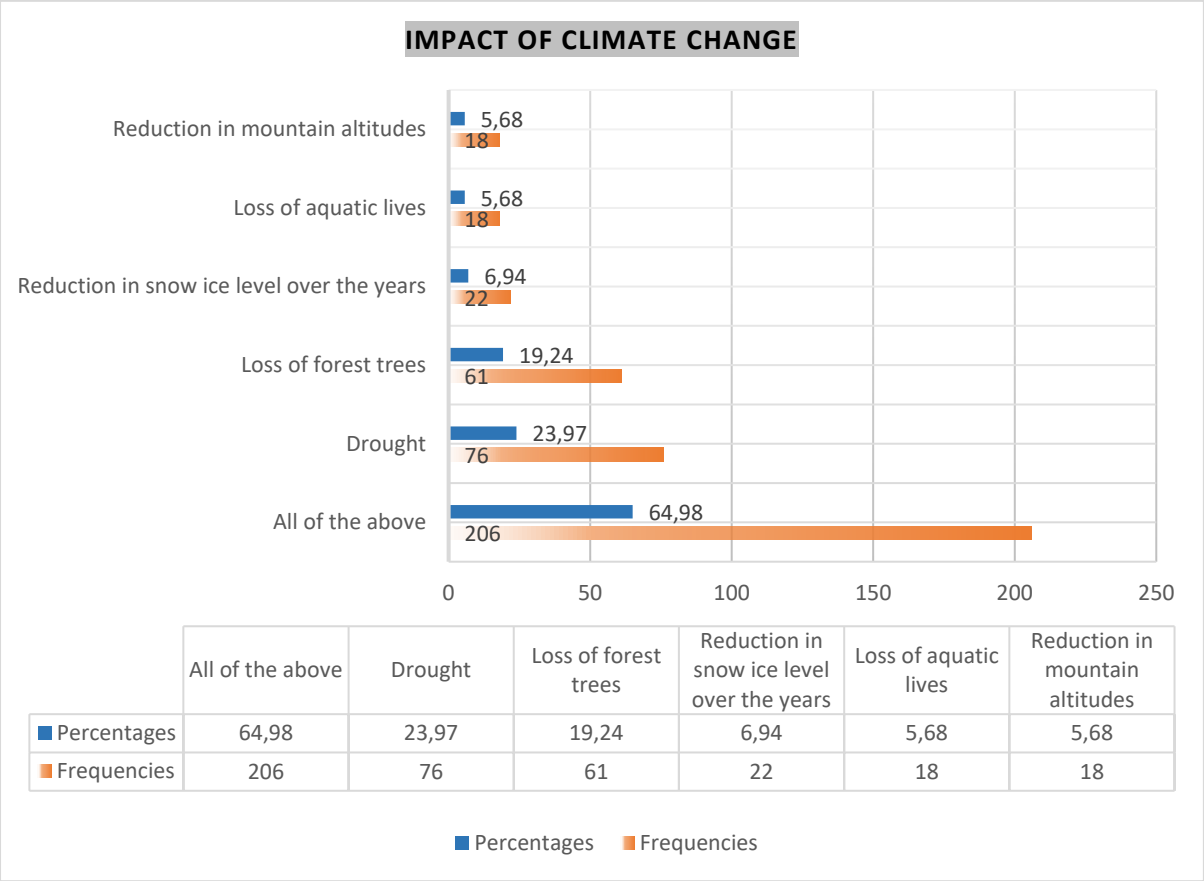


6.5.2 Impacts of Climate Change

Importantly, the economic costs attributed to climate change could undermine the economy potential of developing economy like South Africa. Bearing this in mind, the respondents were probed on what they assume would be the effects of climate change. Unsurprisingly, a large proportion (64.98%) of the respondents significantly indicated that climate change would typically have negative effects, such as drought, loss of forest tress, a reduction in snow ice levels over the years, loss of aquatic life and a reduction in mountain altitudes (Table 6.9 and Figure 6.7).

All of the above effects may have a consequential effect on the climate, particularly the survival of human existence on earth. This is also in agreement with the report by De Stefano *et al.* (2016) that quantified the impacts of climate change as market impacts (tourism, damaged to coastal areas, agriculture, forestry and fisheries) and non-market impacts (sports and leisure, ecosystem, human settlement and health).

Figure 6. 7: Impacts of Climate Change



	All of the above	Drought	Loss of forest trees	Reduction in snow ice level over the years	Loss of aquatic lives	Reduction in mountain altitudes
Percentages	64,98	23,97	19,24	6,94	5,68	5,68
Frequencies	206	76	61	22	18	18

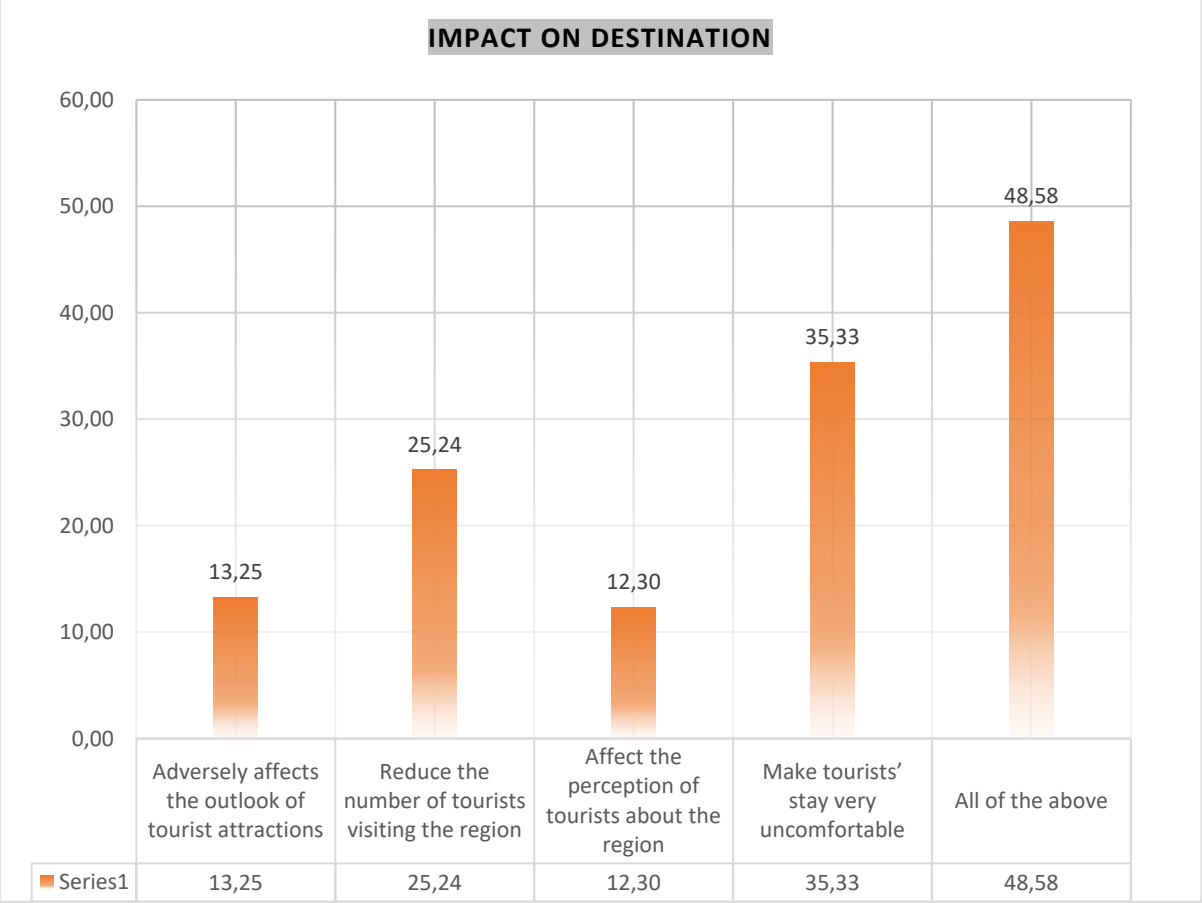
6.5.3 Impacts of Climate Change on Tourism Destinations

Drawing from the above quantification of the impact of climate change by De Stefano *et al.* (2016), it is sufficient to say that the tourism industry may be greatly impacted. This view is further reinforced by a significant majority of the visitors (155/ 48.58%) who indicated that climate change would adversely affect the outlook of tourist attractions; reduce the number of tourists visiting the region; affect the perception of tourists about the region; as well as make tourists' stay very uncomfortable (Table 6.5 and Figure 6.8). In addition, the number (112/ 35.33%) of respondents who emphasised that climate change would make tourists' stay very uncomfortable further highlighted the critical effect of climate change on the tourism sector.

Table 6. 5: Impacts of Climate Change on Tourism Destinations

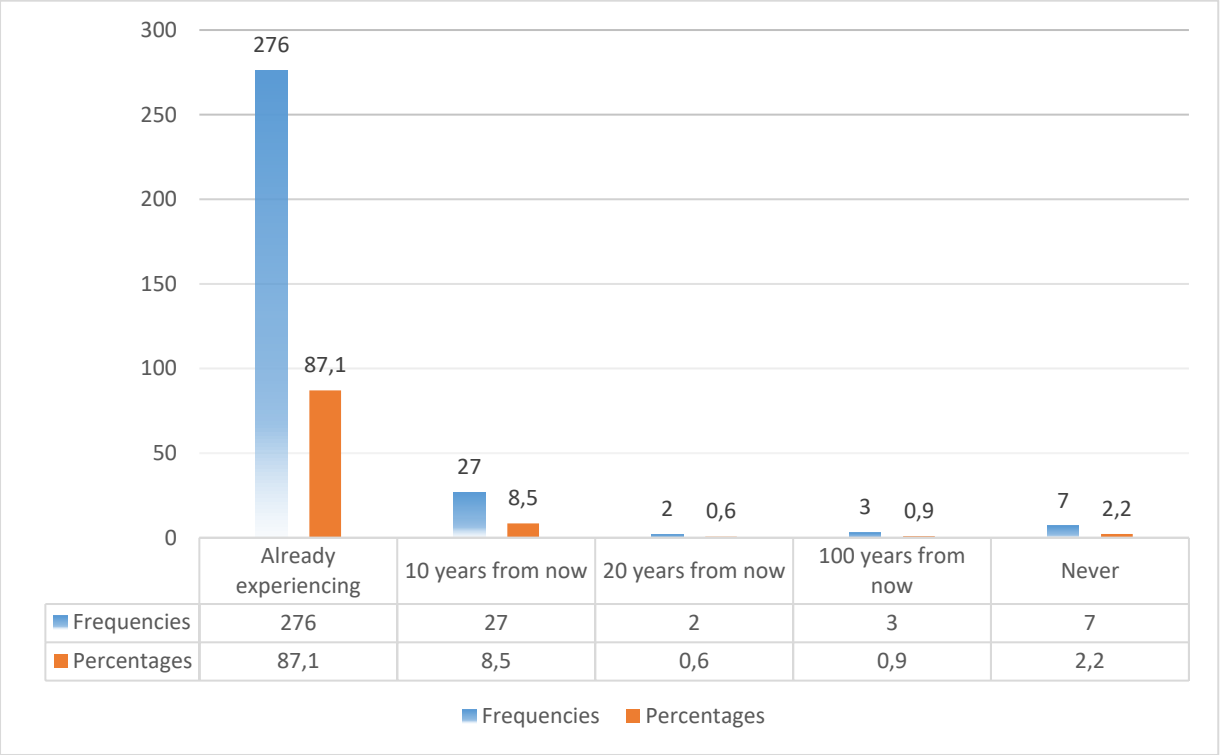
	Count	Percent
Adversely affects the outlook of tourist attractions	42	13.25
Reduce the number of tourists visiting the region	80	25.24
Affect the perception of tourists about the region	39	12.30
Make tourists' stay very uncomfortable	112	35.33
All of the above	154	48.58

Figure 6. 8: Impacts of Climate Change on Tourism Destinations



Moreover, environmental activists and scientists alike have all painted a gloomy picture of climate change effects on earth. According to a recent UN Flagship report, civilisation as we know it may cease to exist by the year 2050 if the negative trend of climate change is not revised. Given this dire situation, it was reasonable to know from the perspective of the participants when they think the region will start experiencing the impacts of climate change. Expectedly and given the number of catastrophic events happening worldwide, a majority (276/ 87.6%) believe that the effects of changing climate conditions are already being felt in the region (Figure 6.9).

Figure 6. 9: Climate Change Impacts Occurrence



6.6 Climate Change Impacts on Tourist Destination Choice

The previous section tried to gauge the understanding of climate change amongst tourism visitors. It was established that climate change would negatively impact on the tourism destination. More concerning, the section revealed that a significant majority of respondents are of the opinion that the region is at present suffering the negative influences of climate change. Given this concern, this section aimed to evaluate the impact of climate change on tourist destination choice. A Chi Square test was used to compare the scoring pattern of the respondents. The outcomes are first explained using shortened measurements for the variables that make up each unit. The outcomes are then further analysed according to the significance of the statements.

6.6.1 Factors Influencing Choosing a Holiday Destinations

This section deals with dynamics that influence the choice of a holiday destination. The respondents were asked to rate how significant each element highlighted in Table 6.6 are to them when choosing a holiday destination. As summarised in Table 6.6 below, it was found that a significant majority (85.1%) of respondents consider climate and weather to be very significant in their choice of a holiday destination ($P<0.05$). Similarly, a significant majority consider food quality and price (81.6%), quality and the price of accommodation (70.5%) to be very significant in their choice of a holiday destination ($P<0.05$).

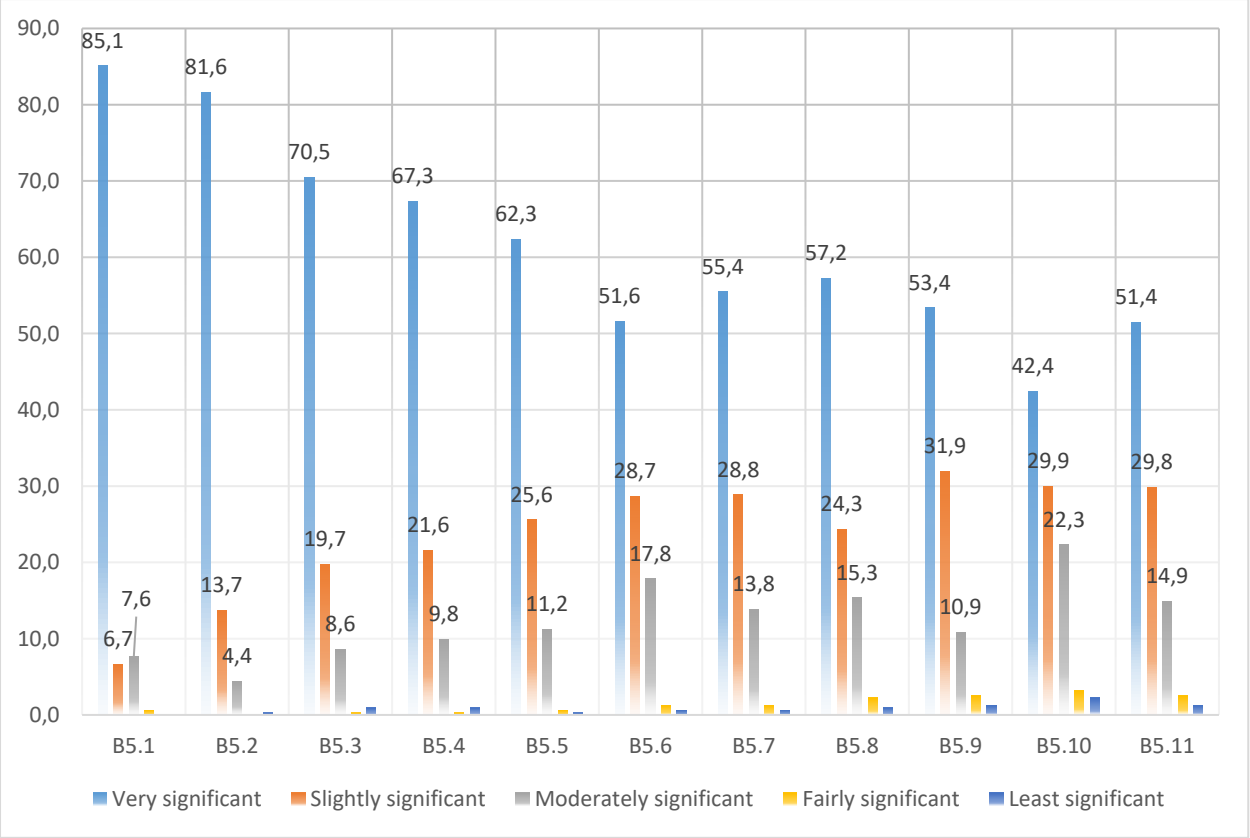
Furthermore, a large proportion of the respondents felt that the cleanliness of the destination (67.3%) and safety and security of the holiday destination to be very significant to their choice (P<0.05). Equally important, more than half indicated that easy accessibility of the destination (51.6%), beautiful scenery (55.4%), quality of the area's natural setting (57.2%), cultural and historical attractions (53.4%) and the physical images and presentation of the locale (51.4%) were very significant to their choice of a holiday destination (P<0.05). In addition, and although a lower percentage of the participants rated beach facilities/amenities to be very significant, it was however still significantly higher than those who consider low significance to their choice of a holiday destination (P<0.05).

Table 6. 6: Factors that Influences Visitor's Choice of Destination

		Very significant		Slightly significant		Moderately significant		Fairly significant		Least significant		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Climate and weather conditions	B5.1	268	85.1 %	21	6.7%	24	7.6%	2	0.6%	0	0.0%	0.000
Food quality and price	B5.2	257	81.6 %	43	13.7 %	14	4.4%	0	0.0%	1	0.3%	0.000
Quality and the price of accommodation	B5.3	222	70.5 %	62	19.7 %	27	8.6%	1	0.3%	3	1.0%	0.000
Cleanliness of destination	B5.4	212	67.3 %	68	21.6 %	31	9.8%	1	0.3%	3	1.0%	0.000
Safety and security	B5.5	195	62.3 %	80	25.6 %	35	11.2 %	2	0.6%	1	0.3%	0.000
Easy accessibility of a destination	B5.6	162	51.6 %	90	28.7 %	56	17.8 %	4	1.3%	2	0.6%	0.000
Beautiful scenery	B5.7	173	55.4 %	90	28.8 %	43	13.8 %	4	1.3%	2	0.6%	0.000
Quality of the area's natural setting	B5.8	179	57.2 %	76	24.3 %	48	15.3 %	7	2.2%	3	1.0%	0.000
Cultural and historical attractions	B5.9	167	53.4 %	100	31.9 %	34	10.9 %	8	2.6%	4	1.3%	0.000
Beach facilities/amenities	B5.10	133	42.4 %	94	29.9 %	70	22.3 %	10	3.2%	7	2.2%	0.000
The physical images and presentation of the location	B5.11	162	51.4 %	94	29.8 %	47	14.9 %	8	2.5%	4	1.3%	0.000

Figure 6.10 further depicts the scoring pattern with regard to the significance of the factors influencing the choice of a holiday destination. This figure clearly shows that the visitors perceived climate and weather conditions to be more significant when making a choice of a holiday destination. This further strengthens the earlier assertion that climate change may undoubtedly impact on the tourism destination.

Figure 6. 10: Factors that Influences Visitors' Choice of Destination



6.6.2 Critical Concern of Climate Change for Tourism

One of the critical points that emerged from the previous section was that a high number of the tourist visitors viewed climate and weather conditions as the most significant influencer of their choice of a holiday destination. As such, it is pertinent to know from the perspective of the participants whether climate change could invariably harm their tourism destination. A Chi-Square test was used to conclude whether the scoring configurations of the respondents were expressively different.

This is the way that the respondents scored (agreed, strongly agree, neutral, disagree and strongly disagree). As illustrated by the level of significance, the Chi-Square test highlighted in Table 6.7 revealed that the scoring pattern of the respondents in all the statements per option were statistically different ($P<0.05$). It can be observed that a significant majority (62.7%) of respondents were in agreement (strongly agree=26.1%; agree=36.7%) with the statement "climate change is certainly a cause for concern". Given the high number of respondents who consider climate change a cause for concern, it was not surprising that an overwhelming majority (97.8%) believed (strongly agree=62.2%; agree=35.6%) that climate change is distressing tourism development. This is highly concerning when one considers the economic impacts of tourism's contribution to South Africa's GDP.

Furthermore, and regarding the statement "the global climate conditions are changing", an overwhelming majority (98.1%) were in support of this view (strongly agree=62.3%; agree=35.8%). Equally concerning, an overwhelming majority (95.6%) believed (strongly agree=65.1%; agree=30.5%) that climate changing is reducing visitor flow in tourism destinations. More worrisome is that a majority (89.5%) of the respondents are of the belief (strongly agree=58.1%; agree=31.4%) that climate change is regularly instigated by human activity. On the contrary, less than 63.0% of those who believed that humans are responsible for climate change were in agreement (strongly agree=35.0%; agree=28.0%) that climate change is often triggered by natural processes. This is also in agreement with the popular notion that human activity is behind the global climate change.

Notwithstanding the above, a majority (88.2%) of the respondents generally agreed (strongly agree=55.1%; agree=33.1%) that climate change is reducing tourism's financial performance. This reflects the market impacts of climate change on the world economy. Moreover, the non-market impact is echoed by a majority (93.0%) of the respondents who agreed (strongly agree=65.8%; agree=27.2%) that climate change is damaging the environment. Hence, it was expected that the majority (89.7%) of the respondents have heard of climate change and its impact (strongly agree=59.3%; agree=30.4%).

Moreover, and given that a large proportion of the respondents believed that the region is already feeling the effects of climate change, it was surprising to note that more than half (59.5%) of the respondents believed that the climatic conditions of CDR are very decent and friendly. Regardless of this belief, more of the respondents (71.4%) affirmed that climate change is harmfully impacting the ecosystem.

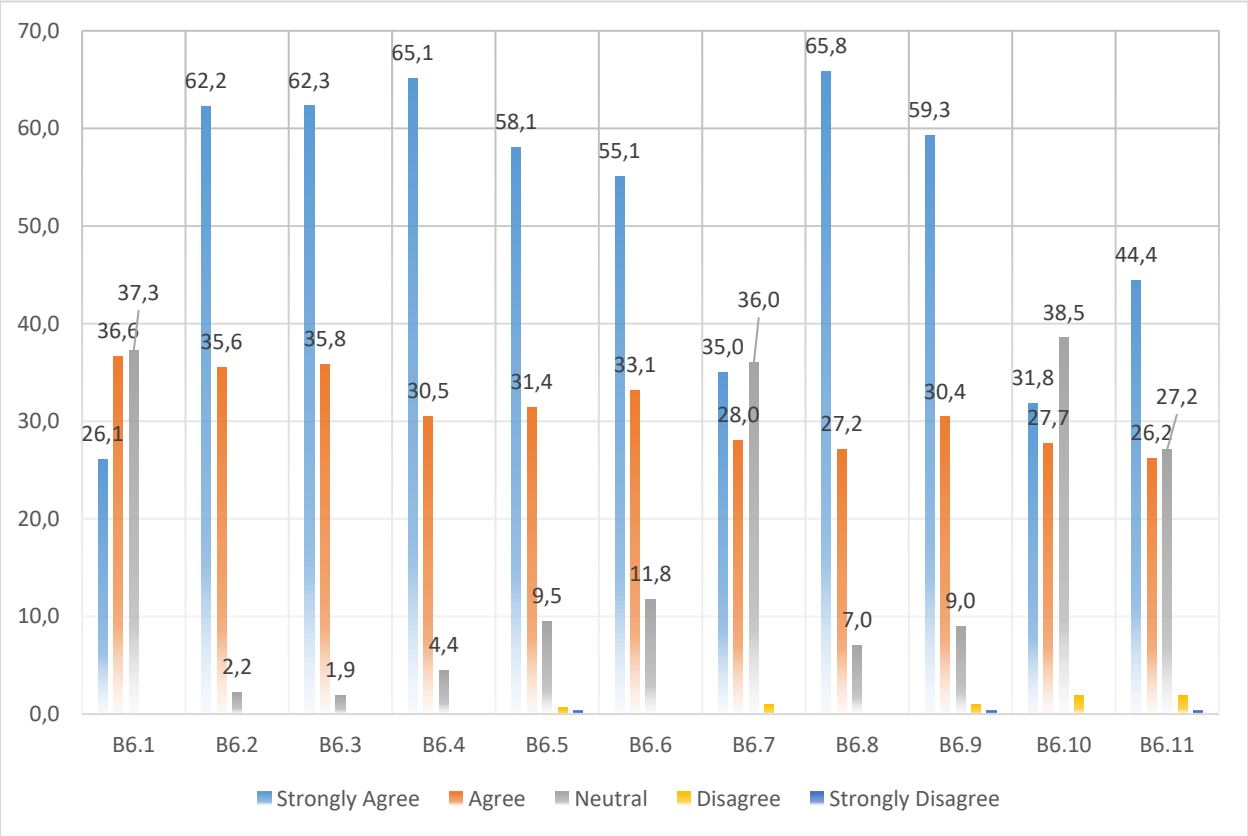
Table 6. 7: Concerns Associated with Climate Change Impacts

CONCERNS		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Climate change is certainly a cause for concern	B6.1	82	26.1 %	115	36.6 %	117	37.3 %	0	0.0%	0	0.0%	0.025
Climate change is distressing tourism development	B6.2	196	62.2 %	112	35.6 %	7	2.2%	0	0.0%	0	0.0%	0.000
The global climatic conditions are changing	B6.3	195	62.3 %	112	35.8 %	6	1.9%	0	0.0%	0	0.0%	0.000
Climate change is reducing visitor flow in tourism destinations	B6.4	205	65.1 %	96	30.5 %	14	4.4%	0	0.0%	0	0.0%	0.000
Climate change is regularly instigated by human activity	B6.5	183	58.1 %	99	31.4 %	30	9.5%	2	0.6%	1	0.3%	0.000
Climate change is reducing tourism financial performance	B6.6	173	55.1 %	104	33.1 %	37	11.8 %	0	0.0%	0	0.0%	0.000
Climate change is often triggered by natural processes	B6.7	110	35.0 %	88	28.0 %	113	36.0 %	3	1.0%	0	0.0%	0.000

Climate change is damaging the environment	B6.8	206	65.8 %	85	27.2 %	22	7.0%	0	0.0%	0	0.0%	0.000
I have before heard of climate change and it impacts	B6.9	185	59.3 %	95	30.4 %	28	9.0%	3	1.0%	1	0.3%	0.000
The climate conditions of CDR are very decent and friendly	B6.10	100	31.8 %	87	27.7 %	121	38.5 %	6	1.9%	0	0.0%	0.000
Climate change is harmfully impacting the ecosystem	B6.11	139	44.4 %	82	26.2 %	85	27.2 %	6	1.9%	1	0.3%	0.000

Figure 6.11 further depicts the scoring pattern of the respondents. The figure visibly confirmed that a high percentage of respondents were in agreement that climate change negatively impacts on the tourism destination.

Figure 6. 11: Concerns that are Associated with Climate Change Impacts



6.6.3 Tourism Destination Choice Vs Climate Change Adaptation

One of the critical take-aways that emerged from the previous section was that climate change has both market and non-market impacts. Hence, it was found that it is peculiarly distressing for the tourist destination. This section aimed to evaluate whether the respondents consider destinations that are proactive in addressing climate change. As shown by the level of significance, the Chi-Square test highlighted in Table 6.8 indicated that the scoring pattern of the respondents were significantly different ($P<0.05$).

It emerged that a majority of the respondents positively agreed to all the statements highlighted in Table 6.14. For instance, 72.2% agreed that they would choose a destination for the reason that they are actively involved in climate change initiatives. Furthermore, an overwhelming majority (93.4%) were in agreement with the statement "I am pleased to spend my money in a destination that is environmentally friendly". This suggest that the majority of respondents visit destinations that are environmentally safe.

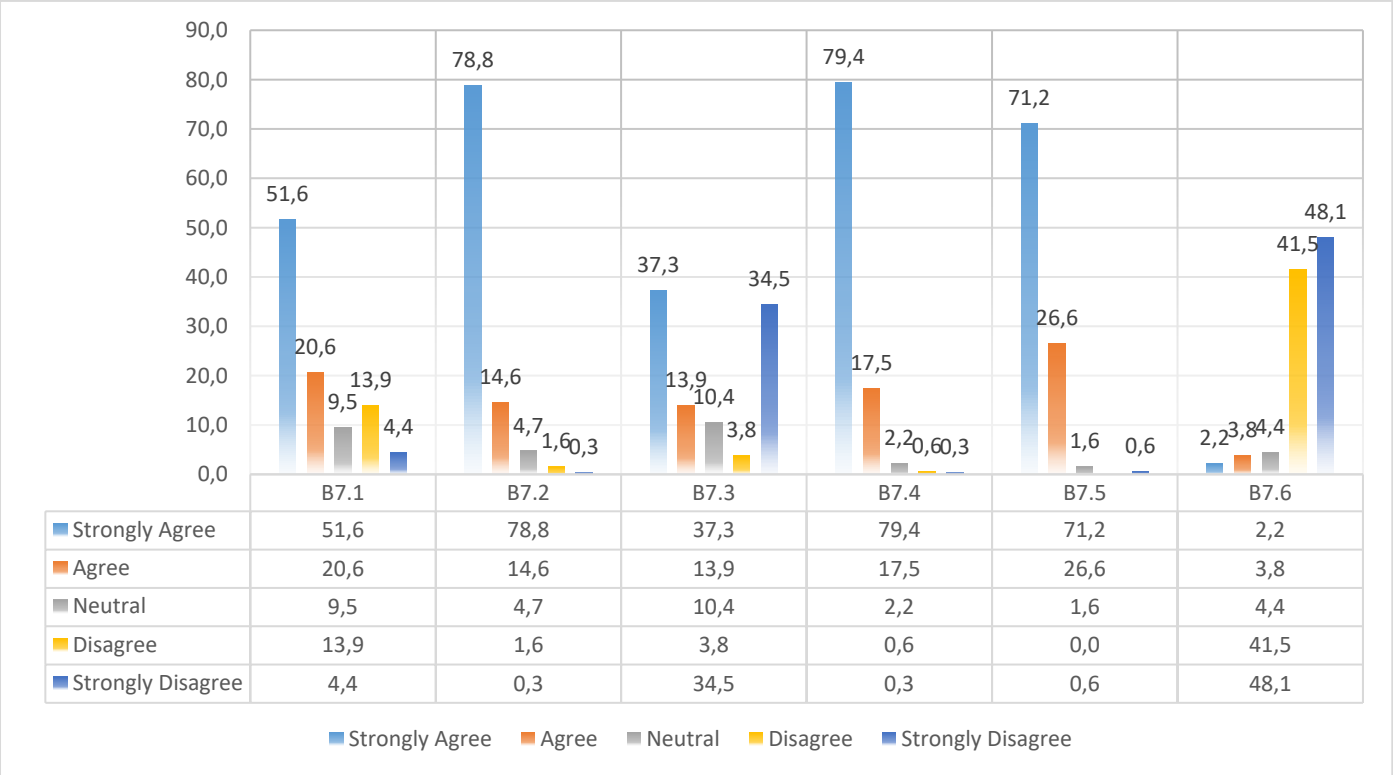
Despite this, only 51.2% indicated that they would be willing to pay higher accommodation prices to assist with the costs associated with adapting to climate change, while 38.3% were in disagreement. This strongly suggests that not all visitors would be willing to bear additional costs to mitigate against climate change. However, it was found that a majority (96.9%) of the respondents believed that climate change does impact visitors' spending patterns and behaviour. Furthermore, it emerged that the majority (97.8%) would rather cancel their vacation should the weather conditions be unstable due to unfavourable climate in the region. This view strongly re-affirms the notion that climate change would impact on the tourism destination. This assertion is further supported by those (89.6%) who are in disagreement that they would still visit the destination even if the weather conditions are unfavourable.

Table 6. 8: Influence of Climate Change Adaptation on Visitor Choice

		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
I would choose a destination for the reason that they are actively involved in climate change combat initiatives	B7.1	163	51.6 %	65	20.6 %	30	9.5 %	44	13. 9%	14	4.4 %	0.000
I am pleased to spend my money in a destination that is environmentally friendly	B7.2	249	78.8 %	46	14.6 %	15	4.7 %	5	1.6 %	1	0.3 %	0.000
I would be willing to pay higher accommodation prices to assist with the costs associated with adapting to climate change	B7.3	118	37.3 %	44	13.9 %	33	10.4 %	12	3.8 %	10 9	34.5 %	0.000
Climate change does impact the visitor's spending pattern and behaviour	B7.4	250	79.4 %	55	17.5 %	7	2.2 %	2	0.6 %	1	0.3 %	0.000
I would cancel my vacation if the conditions are unstable due to climatic conditions	B7.5	225	71.2 %	84	26.6 %	5	1.6 %	0	0.0 %	2	0.6 %	0.000
I would still visit the destination even if the weather conditions are unfavourable	B7.6	7	2.2%	12	3.8 %	14	4.4 %	13 1	41. 5%	15 2	48.1 %	0.000

Figure 6.12 further depicts the scoring pattern of the participants. The figure visibly confirmed that a high percentage of respondents were in agreement that a proactive environment would attract tourists.

Figure 6. 12: Influence of Climate Change Adaptation on Visitor Choice



	B7.1	B7.2	B7.3	B7.4	B7.5	B7.6
Strongly Agree	51,6	78,8	37,3	79,4	71,2	2,2
Agree	20,6	14,6	13,9	17,5	26,6	3,8
Neutral	9,5	4,7	10,4	2,2	1,6	4,4
Disagree	13,9	1,6	3,8	0,6	0,0	41,5
Strongly Disagree	4,4	0,3	34,5	0,3	0,6	48,1

Overall, and drawing from the above section, it is sufficient to assume that climate change would impact on tourism by way of visitors cancelling a holiday trip should the environment be unsafe. However, it was established that some of the visitors would not be ready to pay more to help support the drive towards a safe environment. With this in mind, the respondents were asked if they are willing to do anything to fight or/and reduce the repercussions of climate change impacts, particularly on the tourism industry. As shown in Table 6.9, a significant majority (64.3%) are willing to do anything to reduce the implications of climate change for the tourism industry.

Table 6. 9: Visitor Attitude Towards Climate Change

	Frequency	Percent
I am willing to do everything	198	64.3
I do not know what I can do	16	5.2
If everyone does, I will	72	23.4
I am not willing to do anything	3	1.0
I have already made efforts	19	6.2
Total	**308**	**100.0**

6.7 Environmental Impacts of Climate Change

This part of the chapter deals with the environmental impacts of climate change on the tourism destination. The following question was used to elicit responses from the respondents "Do you consider the climatic conditions of a holiday destination before choosing to go?" As shown in Table 6.10, a significant majority (90.7%) indicated that they did look at climatic conditions at prospective holiday destinations.

Table 6. 10: Climate Conditions at Prospective Holiday Destinations

	Frequency	Percent
Yes	283	90.7
No	9	2.9
Sometimes	20	6.4
Total	**312**	**100.0**

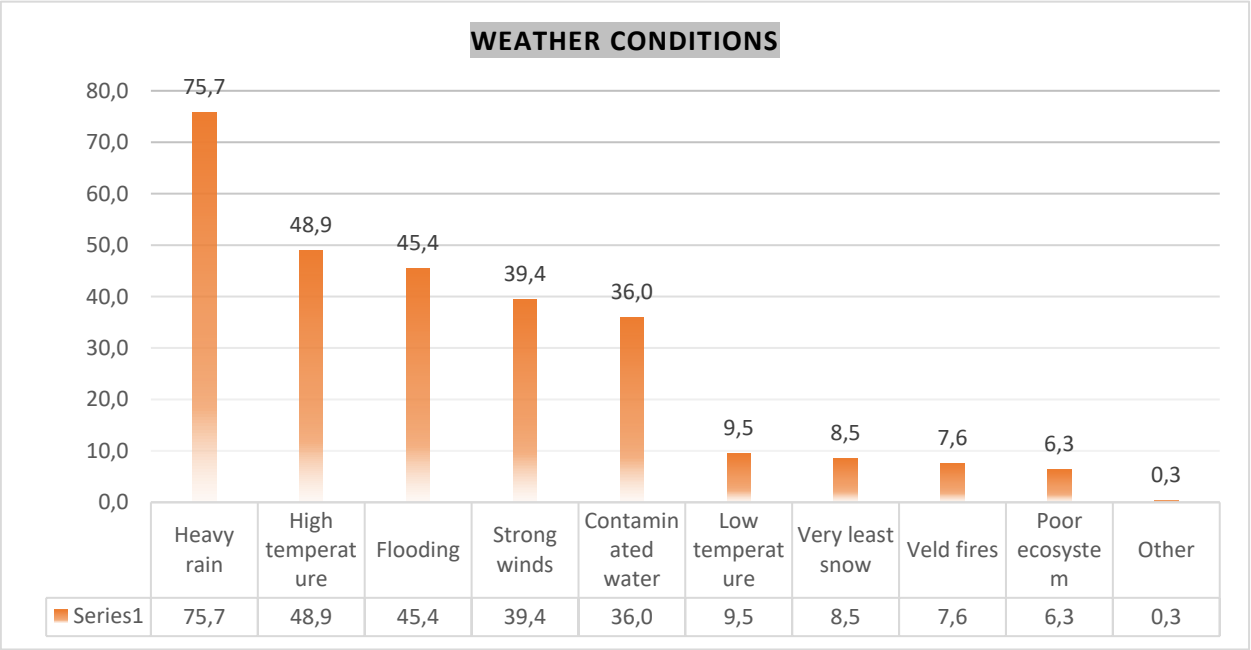
Similarly, when asked whether they would select a particular tourism destination based upon whether they are actively involved in adjusting to climate change, a significant majority (84.5%) indicated that they did decide on prospective holiday destinations depending on the level of involvement in adjusting to climate change (Table 6.11).

Table 6. 11: Visitor Choice vs the Level of Involvement in Acclimatising

	Frequency	Percent
Yes	262	84.5
No	11	3.5
Sometimes	37	11.9
Total	310	100.0

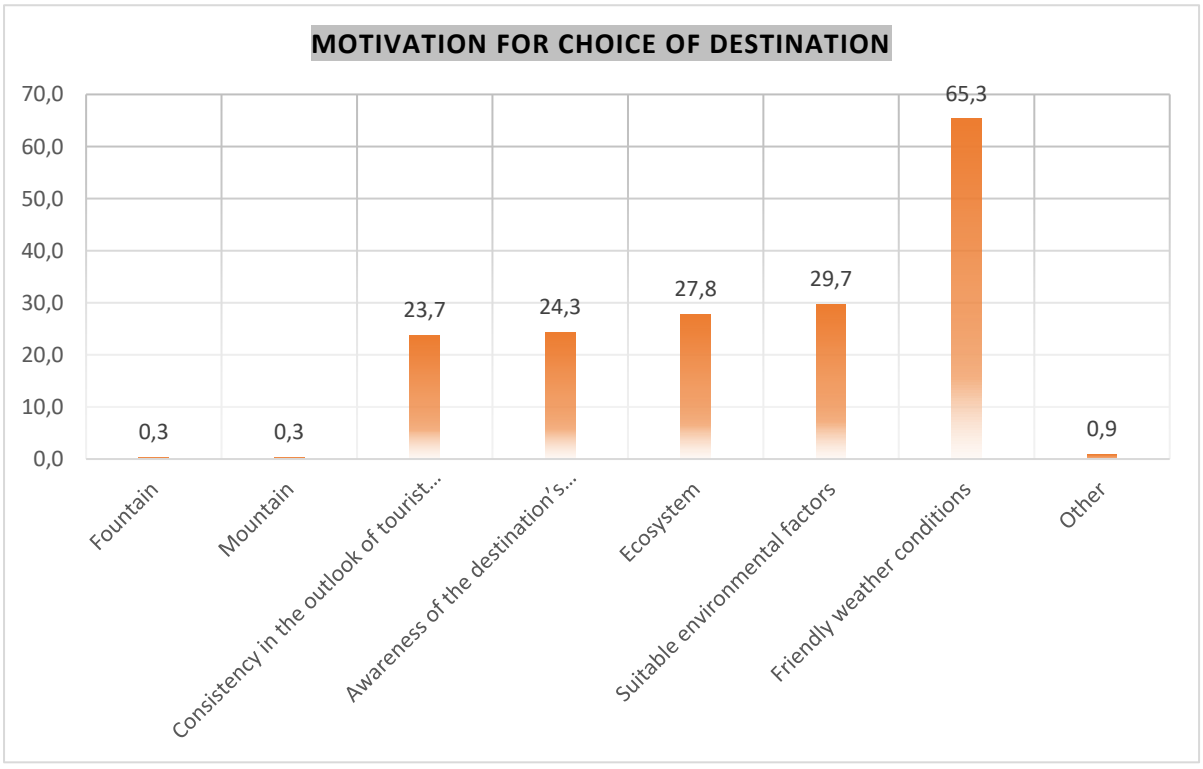
Further to the above, and as shown in Figure 6.13, the majority (75.7%) ranked heavy rain followed by high temperature (48.9%) as the climate conditions under which they would cancel their visit to the Drakensberg region. On the other hand, a poor ecosystem (6.3%) was ranked the least climatic condition reason to cancel visit.

Figure 6. 13: Influence of Weather Conditions



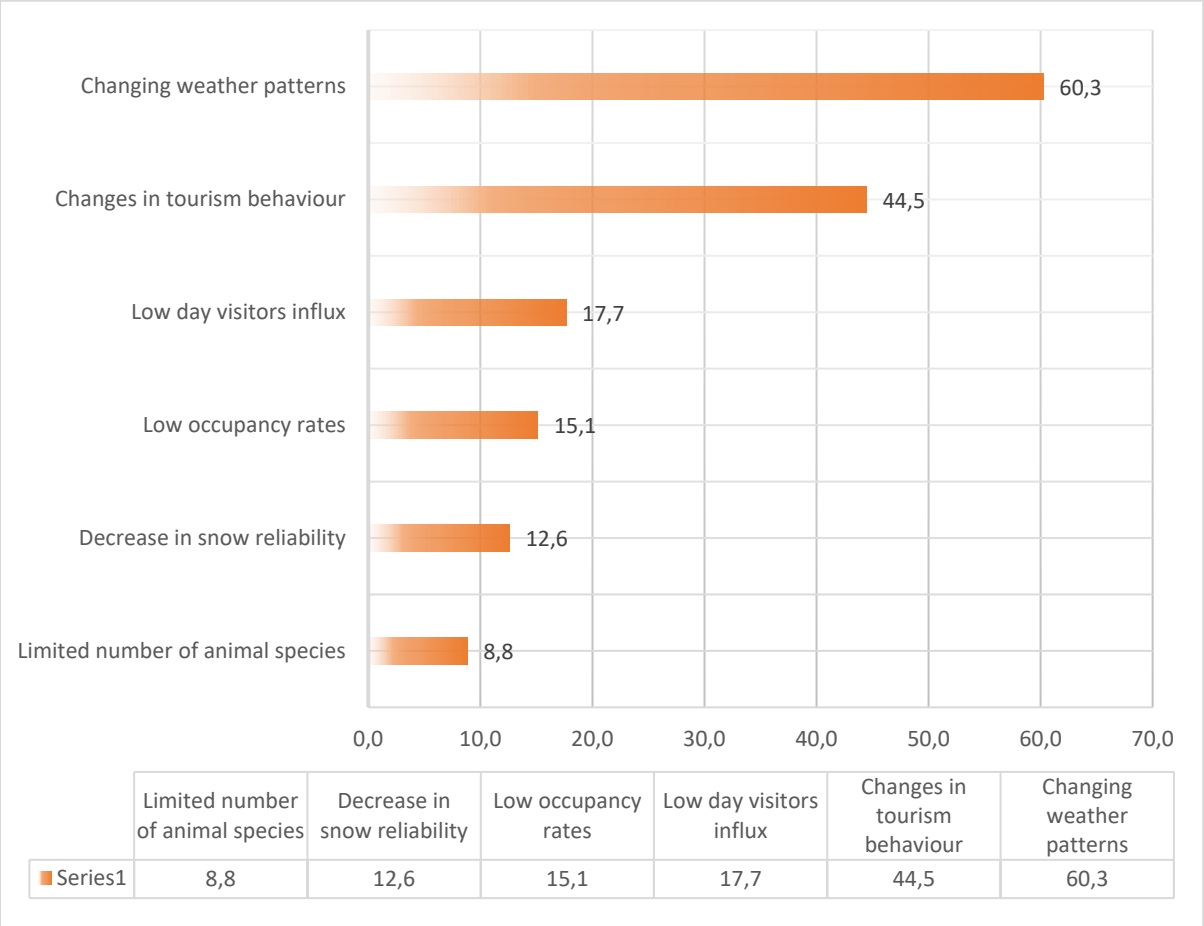
Examining why the respondents choose the Drakensberg region as a tourist destination, the majority (65.3%) indicated the friendly weather conditions (Figure 6.14). This also aligns with previous sections that the climate condition determines the tourist destination.

Figure 6. 14: Motivation for Choosing CDR as a Tourist Destination



Given that weather conditions were noted by a majority of the respondents as the reason they chose the Drakensberg region for their tourist destination, it was expedient to know whether respondents consider climate change to impact on the weather condition. The following question was used to elicit responses from respondents: "If this is your first visit, what are some of the impact that you have noticed which might be due to climatic changes in the area?" As shown in Figure 6.15, more (60.3%) indicated that changing weather patterns were noticed during their visits at the region that could be blamed for climate change in the area.

Figure 6. 15: Impact of Climate Change on CDR Weather Conditions



	Limited number of animal species	Decrease in snow reliability	Low occupancy rates	Low day visitors influx	Changes in tourism behaviour	Changing weather patterns
Series1	8,8	12,6	15,1	17,7	44,5	60,3

Given the large proportion of respondents who attributed climate change to the changing weather conditions in the region, it was no surprise that an overwhelming majority (93.0%) indicated that they would change destination had it been that the climate conditions were unfavourable in the Central Drakensberg Region. This finding revealed that although climate change creates weather patterns in the region, a majority of the tourists still consider this pattern favourable to their stay in the region.

Table 6. 12: Visitor Choice vs Unfavourable Climate Condition

	Frequency	Percent
Yes	291	93.0
No	7	2.2
Maybe	15	4.8
Total	**313**	**100.0**

Given the importance of weather conditions to the tourist, it was reasonable to know whether respondents check the climate conditions of their destination prior to making a booking. Expectedly, a significant majority (93.0%) indicated that they do check the weather conditions of their selected holiday destinations (Table 6.13).

Table 6. 13: Checking Weather Conditions of Selected Holiday Destination

	Frequency	Percent
Yes	268	85.6
No	28	8.9
Maybe	17	5.4
Total	**313**	**100.0**

6.7.1 Influence of Climate Change on Drakensberg Tourism

While the previous section explicitly documented that environmental conditions influence tourist destination, this section hopes to gain further understanding on the level of influence that climate change has on tourists to the Drakensberg region. The following question was used to elicit a response from the respondents: "What level of influence would the changing climatic conditions have on your decision to travel to the Central Drakensberg Region?"

As shown by the level of significance, the Chi-Square test revealed that the scoring pattern of the respondents regarding the statements highlighted in Table 6.14 were statistically different ($P<0.05$). It emerged that a significant majority (73.2%) indicated that climatic conditions such as minimum snow cover in the region has the least influence on their decision to visit the Drakensberg region. However, significantly more (51.3%) consider a degraded landscape to have a major influence on their choice to travel to the region. Similarly, a majority (85.3%) significantly claimed that increased rainwater would have a major influence on their decision.

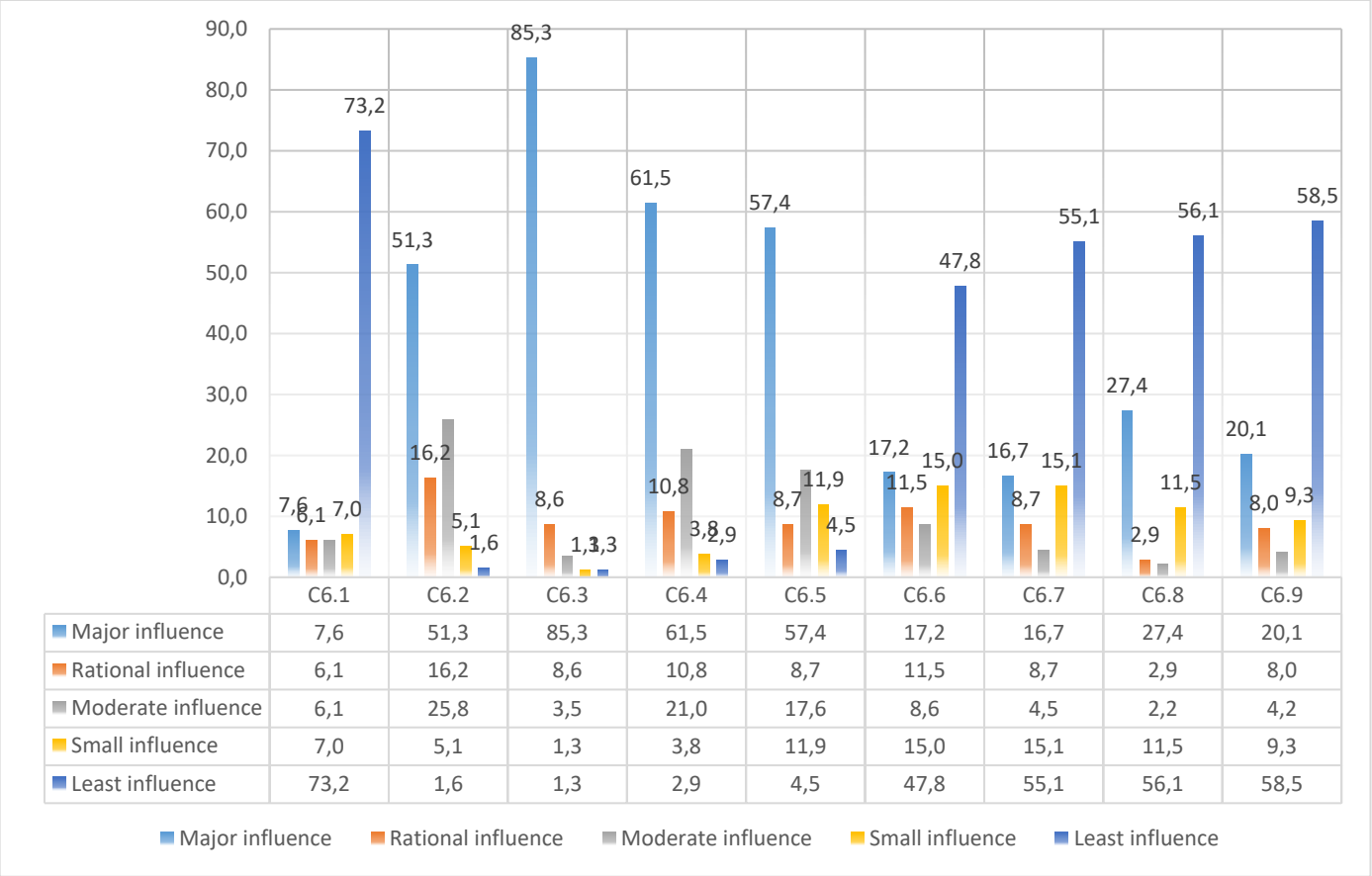
Further to the above, 61.5% of the respondents significantly consider climatic conditions like having more storms and lightning to be a major influence on their decision to travel. Equally, high and strong winds were indicated by 57.4% to have a significant major influence. On the contrary, poor air quality and visibility was viewed by a significant majority (62.8%) to have a minimal influence (small influence=15.0%; least influence 47.8%). Similarly, Veld fires (70.2%), poor water quality (67.6%) and flooding (67.8%) were also indicated by a significant majority to have a minimal influence on their decision to travel to the Drakensberg region.

Table 6. 14: Influence of Climate Conditions on Tourist Visits to CDR

Climate condition		Major influence		Rational influence		Moderate influence		Small influence		Least influence		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Minimum snow cover in the region	C6.1	24	7.6%	19	6.1%	19	6.1%	22	7.0%	230	73.2%	0.000
Degraded landscapes	C6.2	161	51.3%	51	16.2%	81	25.8%	16	5.1%	5	1.6%	0.000
Increased rainwater	C6.3	267	85.3%	27	8.6%	11	3.5%	4	1.3%	4	1.3%	0.000
More storms and lightning	C6.4	193	61.5%	34	10.8%	66	21.0%	12	3.8%	9	2.9%	0.000
High & strong winds	C6.5	179	57.4%	27	8.7%	55	17.6%	37	11.9%	14	4.5%	0.000
Poor air quality & visibility	C6.6	54	17.2%	36	11.5%	27	8.6%	47	15.0%	150	47.8%	0.000
Veld fires	C6.7	52	16.7%	27	8.7%	14	4.5%	47	15.1%	172	55.1%	0.000
Poor water quality	C6.8	86	27.4%	9	2.9%	7	2.2%	36	11.5%	176	56.1%	0.000
Flooding	C6.9	63	20.1%	25	8.0%	13	4.2%	29	9.3%	183	58.5%	0.000

Figure 6.16 further depicts respondents' scoring on the level of influence in their decision to travel to the Drakensberg region. Taken together, the figure clearly showed that climate conditions such as degraded landscape, increased rainwater, more storms and lightning and high and strong winds had an immense influence on tourists' decision to travel to the Drakensberg region. On the other hand, conditions such as minimum snow cover in the region, poor air quality and visibility, Veld fires, poor quality water as well as flooding had a minimal influence on the tourists' decision.

Figure 6. 16: Climate Condition Impacts' Influence on Visitors



6.8: The Role of Climate Change in Tourist Flow

As accentuated in the previous section, climatic conditions play a role in the decisions of tourists to visit the region. This section deals with the role of climate change in the inflow of tourists in the Drakensberg region. The following question was used to elicit responses from the respondents "Do you think the impact of climate change plays a specific role in tourist inflow to the destination?" As shown in Table 6.15, an overwhelming majority of the respondents (96.1%) significantly indicated that they did believe that the impact of climate change influences tourist inflow to the region.

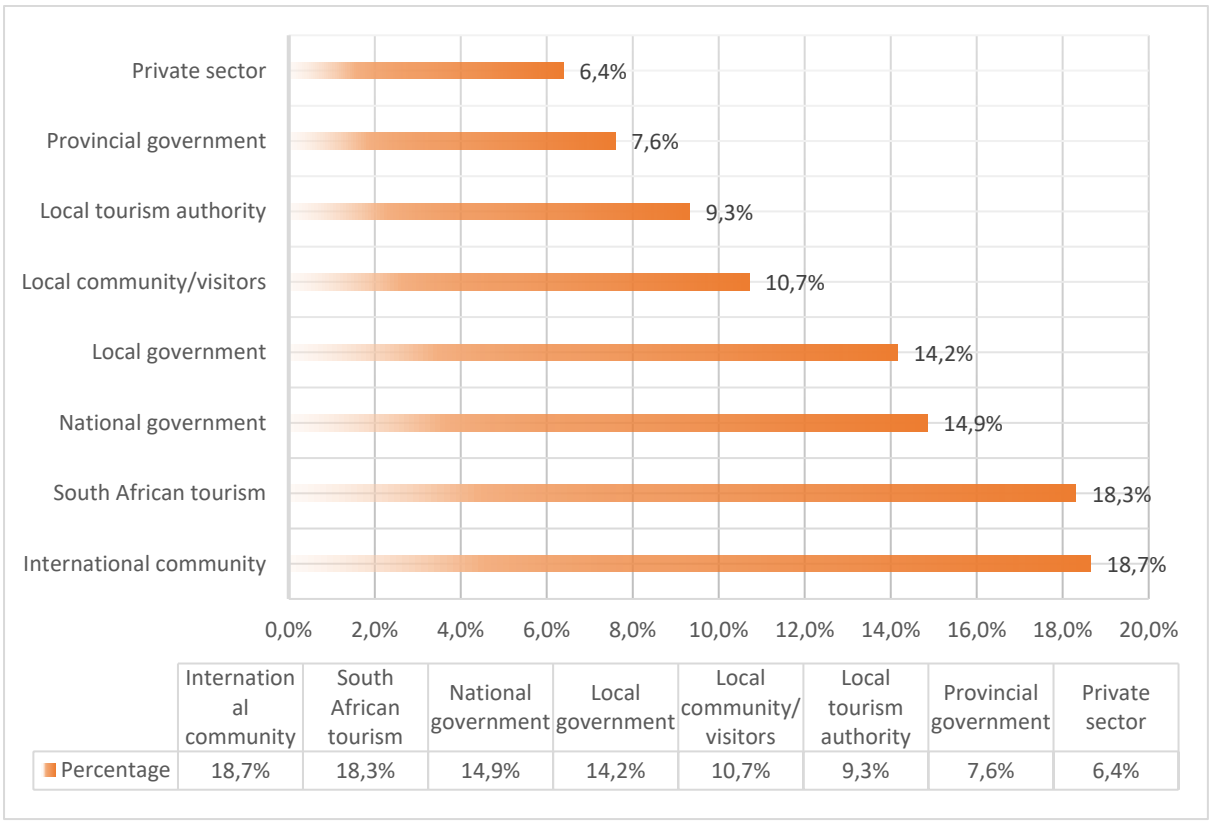
Table 6. 15: Impact of Climate Change on Tourist Inflow to CDR

	Frequency	Percent
Yes	299	96.1
No	2	0.6
Maybe	10	3.2
Total	**311**	**100.0**

Given the above perceived prominence of climate change on the inflow of tourists to the region, the participants were further asked the following: “Which role player/tourism authority do you think is best suited to deal with the economic and environmental impacts of climate change on tourism?” From Figure 6.17, it can be gleaned that 18.7% of the respondents think that the international community is better suited to deal with the impacts of climate change, whereas 18.3% of the respondents think that the South African Tourism is best suited to deal with both the economic and environmental impacts climate change. Perhaps, and not surprising, is that very few (6.4%) believed that the private sector is best suited for the job. infect

The above finding is highly expected, given that most countries align their environmental policies to international best practice. For instance, the Climate Change Accord signed in Paris in December 2015 under the patronage of the UNFCCC was the first global agreement to alleviate the effects of climate change. This notwithstanding, Harris and his co-workers reported that climate action is also taken by national government, hundreds of cities, regions and private corporations to reduce the environmental impacts of climate change (Harris *et al.* 2017: 111).

Figure 6. 17: Climate Change Risks Management



Taken together, a salient point that could be gathered from Figure 6.17 above is that another 14.2% of the respondents believed that the local government area (local government=14.2%; local community/visitors=10.7%; local tourism authority=9.3%) is best suited to deal with either the financial or the environmental impacts of climate change on the tourism industry. Hence, it was reasonable to know from the perspective of the visitors some of the fundamental conducts that visitors and local communities can undertake to minimise the impacts of climate change on tourism.

6.8.1 Strategies to Minimise Climate Change Impacts

As revealed in Table 6.16, the Chi Square test indicates that a significant majority of respondents believed that visitors and the local government community are of importance in minimising the impacts of climate change on tourism ($P<0.05$). This suggests that the local government area has a fundamental role to play in reducing the menace of climate change for the tourism industry. In examining some of fundamental roles that visitors and local communities can play, it was found that an overwhelming majority (94.1%) hinted at the importance of educating the local community about climate change (strongly important=55.7%; very important=38.9%). Similarly, 90.5% indicated that investing more resources in climate change research is important (strongly important=51.3%; very important=39.2%). In terms of turning off lights/electrical appliances when not used in order to minimise the impact of climate change, the majority (91.7%) viewed this as important (strongly important=46.3%; very important=45.4%). Understandably, 93.9% viewed the use of energy wisely as an essential conduct to minimise the impact of climate change (strongly important=38.7%; very important=55.2%).

Accordingly, the majority (95.2%) noted that minimising pollution is key to managing the impact of climate change (strongly important=44.1%; very important=51.1%). Moreover, the majority sees recycling as much as possible to be of importance in minimising the impacts of climate change (strongly important=45.5%; very important=43.3%). As another way of reducing pollution, the majority (86.0%) consider investing in renewable resources to be of importance to minimise the impacts of climate change (strongly important=31.4%; very important=54.6%).

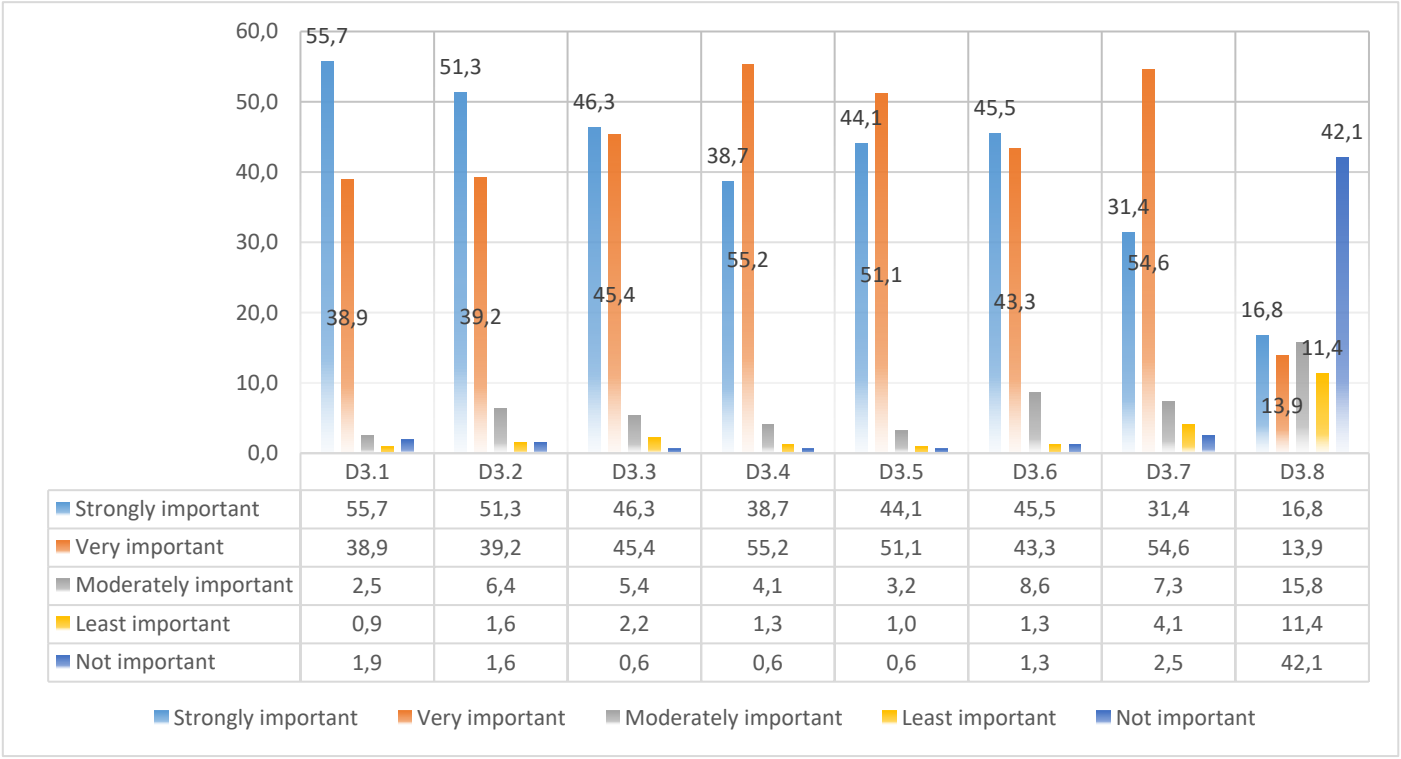
On the contrary, eating less meat was viewed by more (53.5%) of the respondents to be of minimal importance (least important=11.4%; not important=42.1%), while some (30.7%) see this to be of importance (strongly important=16.8%; very important=13.9%) to minimise the impacts of climate change. This mixed view reflects the current debate surrounding the contribution of cattle to climate change. Some environmental activists have suggested that cattle contribute to the high amount of methane gas in the atmosphere, thus calling for the lessening of meat consumption as a way of minimising the impacts of climate change.

Table 6. 16: Strategies to Minimise Climate Change Impacts

Conducts		Strongly important		Very important		Moderately important		Least important		Not important		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Educate local community about cc	D3.1	176	55.7 %	123	38.9 %	8	2.5%	3	0.9%	6	1.9%	0.000
Invest more resources in cc research	D3.2	161	51.3 %	123	39.2 %	20	6.4%	5	1.6%	5	1.6%	0.000
Turn off lights/electrical appliances when not used	D3.3	146	46.3 %	143	45.4 %	17	5.4%	7	2.2%	2	0.6%	0.000
Use energy wisely	D3.4	122	38.7 %	174	55.2 %	13	4.1%	4	1.3%	2	0.6%	0.000
Minimise pollution	D3.5	139	44.1 %	161	51.1 %	10	3.2%	3	1.0%	2	0.6%	0.000
Recycle as much as possible	D3.6	143	45.5 %	136	43.3 %	27	8.6%	4	1.3%	4	1.3%	0.000
Invest in renewable resources	D3.7	99	31.4 %	172	54.6 %	23	7.3%	13	4.1%	8	2.5%	0.000
Eat less meat	D3.8	53	16.8 %	44	13.9 %	50	15.8 %	36	11.4 %	133	42.1 %	0.000

Figure 6.18 further depicts the respondents' scoring on the importance of some conducts by visitors and local government communities to minimise the effects of climate change. Apart from eating less meat, the figure clearly showed that a majority of respondents viewed other conducts like educating the community, using energy wisely, etc. to be of importance.

Figure 6. 18: Significance of Climate Change Counter-active Strategies



	D3.1	D3.2	D3.3	D3.4	D3.5	D3.6	D3.7	D3.8
Strongly important	55,7	51,3	46,3	38,7	44,1	45,5	31,4	16,8
Very important	38,9	39,2	45,4	55,2	51,1	43,3	54,6	13,9
Moderately important	2,5	6,4	5,4	4,1	3,2	8,6	7,3	15,8
Least important	0,9	1,6	2,2	1,3	1,0	1,3	4,1	11,4
Not important	1,9	1,6	0,6	0,6	0,6	1,3	2,5	42,1

6.8.2 Vulnerability of Different Sectors to Climate Change Impacts

This section summarises the perceptions of respondents on the sectors that are more vulnerable to the impact of climate change. The following question was used to initiate their response: "Please rate how vulnerable you feel each of the following sectors would be to climate change in the region?" As shown by the level of significance, the Chi-Square test in Table 6.17 revealed that all the sectors highlighted are significantly susceptible to the impacts of climate change ($P<0.05$). It can be seen that a majority (87.6%) significantly believed that the tourism industry is vulnerable to climate change (strongly vulnerable= 51.0%; very vulnerable=36.6%).

In terms of the vulnerability of the landscape, a majority (89.5%) significantly believed it is vulnerable to climate change (strongly agree=56.8%; very agree=32.7%). Additionally, the local community was seen by a significant majority to be vulnerable to climate change (strongly vulnerable =55.6%; very vulnerable=34.9%). Further to this, the majority (65.7%) believed that snow is vulnerable to climate change (strongly vulnerable=14.3%; very vulnerable=51.4%). With regard to the vulnerability of the economy, 93.0% consider it to be vulnerable to climate change (strongly vulnerable=39.8%; very vulnerable=53.2%). Equally, plants and animals are viewed by a significant majority (92.3%) to be vulnerable to climate change (strongly vulnerable=62.6%; very vulnerable=29.7%).

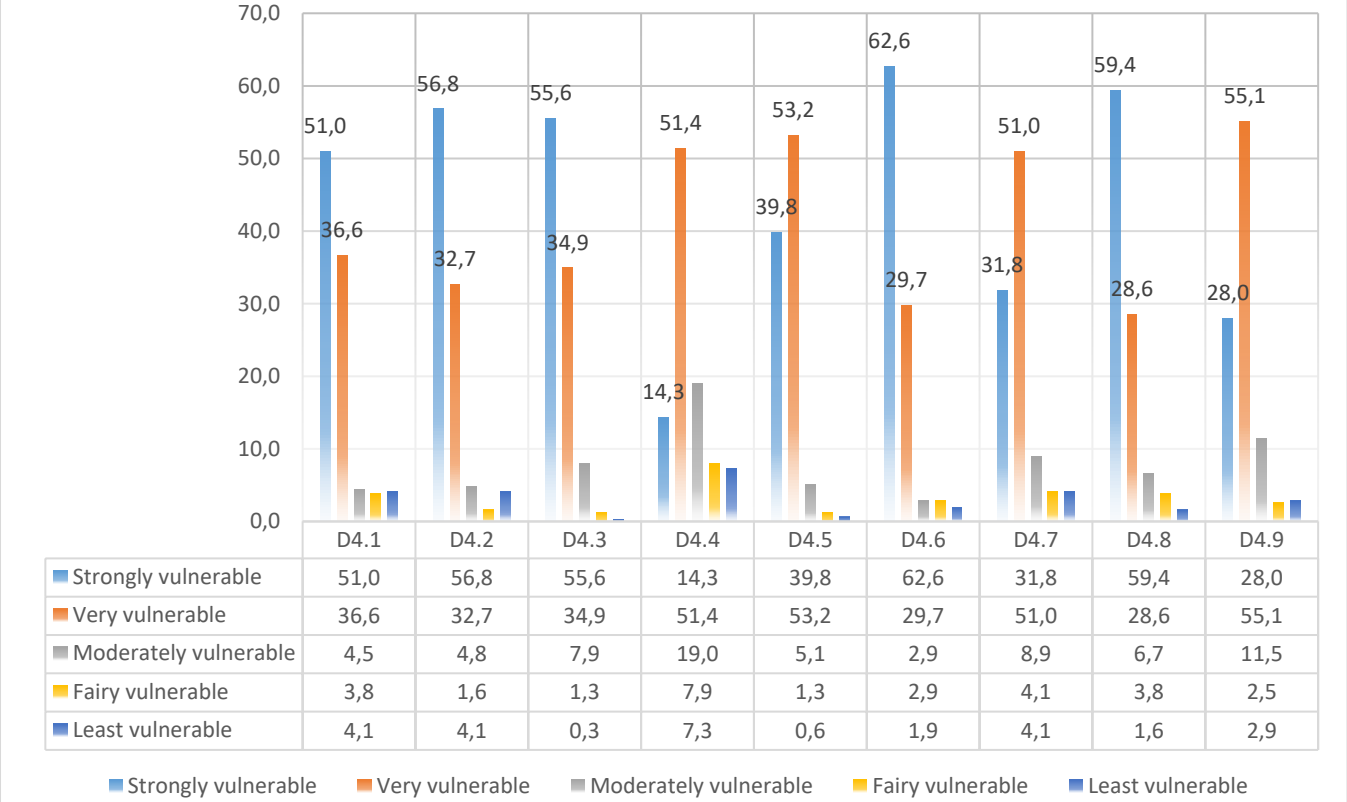
Furthermore, infrastructure was viewed by a significant majority (82.8%) to be vulnerable to climate change (strongly vulnerable=31.8%; very vulnerable=51.0%). Water and sea levels were also viewed by a significant majority (88.0%) to be vulnerable to climate change (strongly vulnerable=59.4%; very vulnerable=28.6%). In addition, sustainable development is indicated by a significant majority (83.1%) to be vulnerable to climate change (strongly vulnerable=28.0%; very vulnerable=83.1%).

Table 6. 17: Degree of Sectors' Vulnerability to Climate Change Impacts

Sectors		Strongly vulnerable		Very vulnerable		Moderately vulnerable		Fairy vulnerable		Least vulnerable		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Tourism	D4.1	160	51.0%	115	36.6%	14	4.5%	12	3.8%	13	4.1%	0.000
Landscape	D4.2	179	56.8%	103	32.7%	15	4.8%	5	1.6%	13	4.1%	0.000
Local community	D4.3	175	55.6%	110	34.9%	25	7.9%	4	1.3%	1	0.3%	0.000
Snow	D4.4	45	14.3%	162	51.4%	60	19.0%	25	7.9%	23	7.3%	0.000
Economy	D4.5	125	39.8%	167	53.2%	16	5.1%	4	1.3%	2	0.6%	0.000
Plants and animals	D4.6	196	62.6%	93	29.7%	9	2.9%	9	2.9%	6	1.9%	0.000
Infrastructure	D4.7	100	31.8%	160	51.0%	28	8.9%	13	4.1%	13	4.1%	0.000
Water and sea level	D4.8	187	59.4%	90	28.6%	21	6.7%	12	3.8%	5	1.6%	0.000
Sustainable development	D4.9	88	28.0%	173	55.1%	36	11.5%	8	2.5%	9	2.9%	0.000

Figure 6.19 further depicts the vulnerability of the various segments to climate change. At a glance, it can be seen that the economy (93.0%), followed by plants and animals (92.3%), and the local community (90.5%) are ranked as the most vulnerable sectors to climate change, while infrastructure was ranked as the lowest vulnerable sector.

Figure 6. 19: Degree of Sectors' Vulnerability to Climate Change Impacts



	D4.1	D4.2	D4.3	D4.4	D4.5	D4.6	D4.7	D4.8	D4.9
Strongly vulnerable	51,0	56,8	55,6	14,3	39,8	62,6	31,8	59,4	28,0
Very vulnerable	36,6	32,7	34,9	51,4	53,2	29,7	51,0	28,6	55,1
Moderately vulnerable	4,5	4,8	7,9	19,0	5,1	2,9	8,9	6,7	11,5
Fairy vulnerable	3,8	1,6	1,3	7,9	1,3	2,9	4,1	3,8	2,5
Least vulnerable	4,1	4,1	0,3	7,3	0,6	1,9	4,1	1,6	2,9

6.9 The Research Instrument and Sample

A total of **24** questionnaires were despatched and **24** were accordingly returned, which gave a **100%** response rate. The data collection instrument consisted of 119 items, with a level of evaluation at a nominal or an ordinal level. The instrument was separated into 4 sub-divisions which were intended to assess different topics as indicated below:

I	Personal Information
II	Climate Change Impact
III	Environmental Impact
IV	Miscellaneous Questions

6.10 Tourism Authorities Descriptive Statistics

In this section of the data presentation, the biographical data of the tourism authorities' respondents are presented.

6.10.1 Tourism Organisation

The name of the tourism organisations are given in Table 6.18. An equal percentage (16.7%) of the participants are from Cathedral peak, Didima, Giants Castle, Monks Cowl and Queen Elizabeth Park. Another notable organisation includes Injusuthi (16.6%).

Table 6. 18: Name of Tourism Organisation

	Frequency	Percent
Cathedral Peak	4	16.7
Didima	4	16.7
Injusuthi	4	16.6
Giant Castle	4	16.7
Monks Cowl	4	16.7
Queen Elizabeth Park	4	16.7
Total	24	100.0

6.10.2 Gender and Age Distribution

Table 6.19 describes the gender distribution of the tourism authorities by their age group. As shown in the table below, the respondents constitute equal numbers of males (50.0%) and females (50.0%). In terms of the age distribution, equal numbers of males and females are within the age category of 18-30 years (25.0%), as well as 61-70 years (4.2%). However, the female (20.8%) respondents dominated the males (16.7%) within the age category of 41-50 years. Overall, more (50.0%) of the respondents are within the age distribution of 31-40 years old, with the lowest representatives within the age distribution of 61-70years old (8.3%). A few (4.2%) of the respondents declined disclosing their age group.

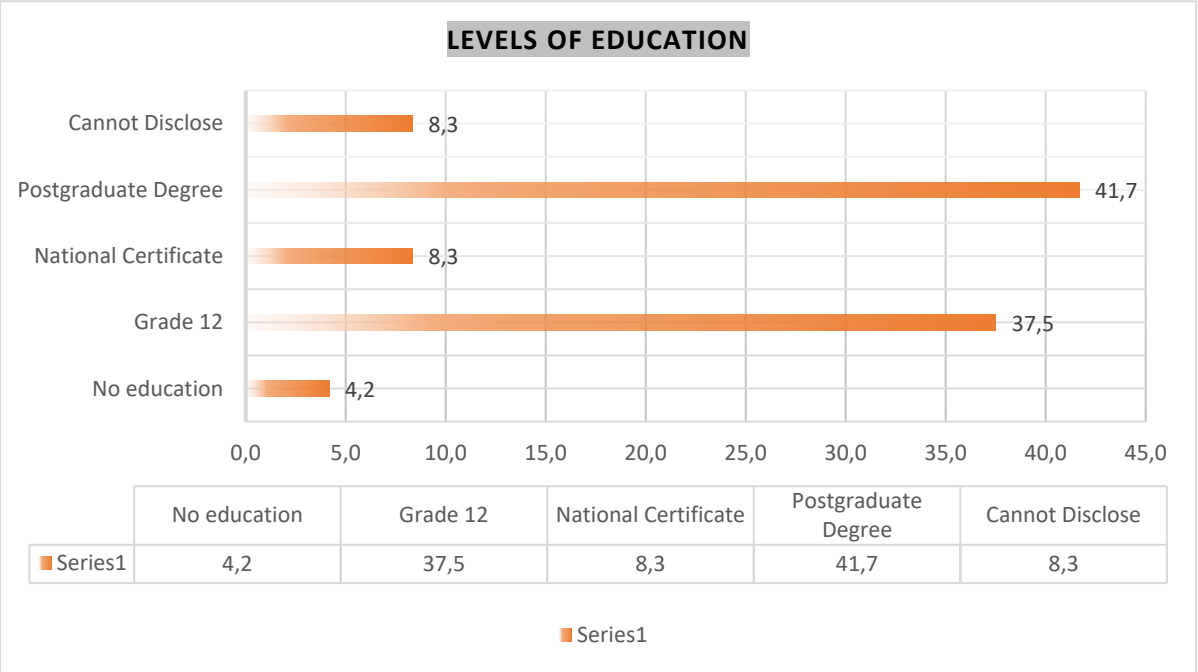
Table 6. 19: Gender Distribution of the Tourism Authorities Respondents by Age Group

			Gender		Total
			Male	Female	
Age	31-40	Count	6	6	12
		% of Total	25.0%	25.0%	50.0%
	41-50	Count	4	5	9
		% of Total	16.7%	20.8%	37.5%
	61-70	Count	1	1	2
		% of Total	4.2%	4.2%	8.3%
	Cannot disclose	Count	1	0	1
		% of Total	4.2%	0.0%	4.2%
Total		Count	12	12	24
		% of Total	50.0%	50.0%	100.0%

6.10.3 Highest Level of Education

The pie chart in Figure 6.20 reflects the highest level of education of the tourism authority respondents. A majority of them (41.7%) hold a post-graduate degree, followed by those with grade 12 (37.2%).

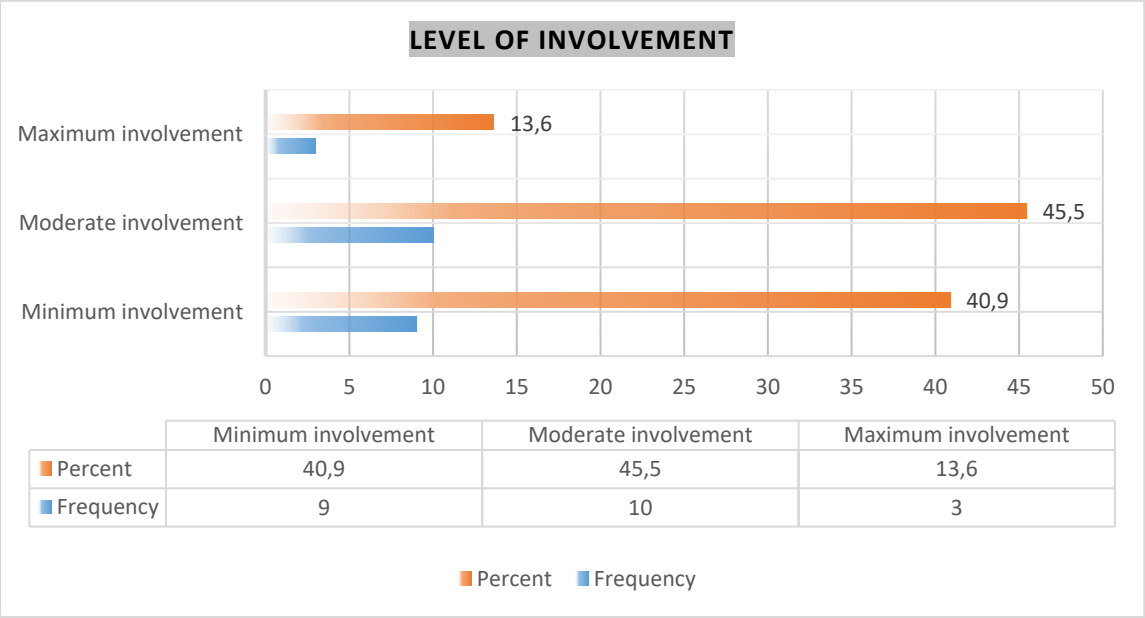
Figure 6. 20: Tourism Authorities Respondents' Highest Level of Education



6.10.4 Involvement in Tourism and Climate Change

Figure 6.21 highlights the level of involvement in projects dealing with tourism and climate change in the region. It was observed that more of the respondents claim to be moderately involved in climate change and tourism-related subjects in the region.

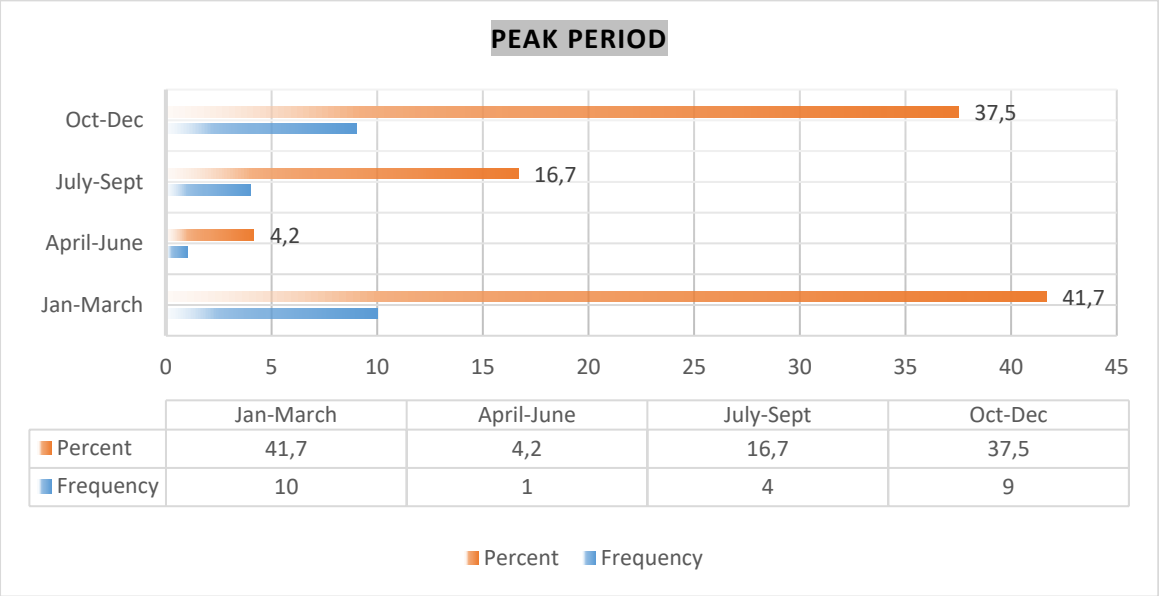
Figure 6. 21: Tourism Authorities' Involvement in Tourism and Climate Change



6.10.5 Peak Period of Occupancy

Figure 6.22 describes the peak period of occupancy in the tourism organisation. It can be seen that January-March had the highest (41.7%) peak period, followed by October to December (37.5%), whilst the lowest peak period was measured between April and June (4.2%).

Figure 6. 22: Peak Period of Occupancy in the Tourism Organisations



6.11 Impacts of Climate Change

This section deals with the perception of the tourism authorities' respondents regarding the impacts of climate change on the industry.

6.11.1 Awareness and Understanding of Climate Change Impacts

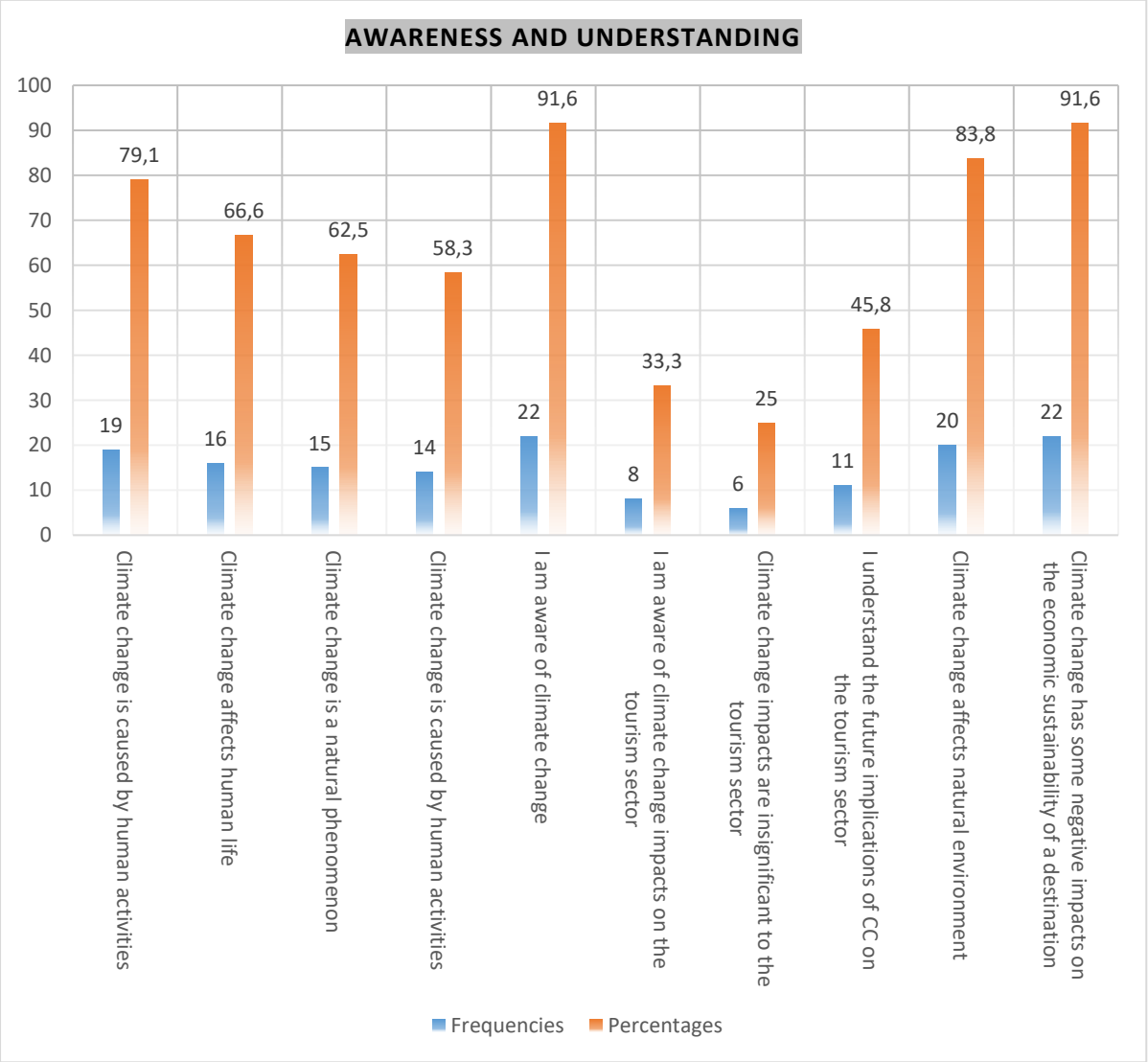
A noteworthy point emerging from this study was that the majority of the visitors consider that the local tourism authority is best suited to address the impacts of climate change on the tourism industry. Given this perceived confidence, it was critical to know the understanding of the tourism authorities of climate change. Figure 6.23 reveals the tourism authorities' awareness and understanding levels of climate change. It was found that a significant majority (91.6%) indicated being aware of climate change, where 91.6% of the respondents think that climate change has some major undesirable effects, particularly on the financial sustainability and prosperity of the region.

Regrettably, a small number of respondents (25%, 33.3% and 45.8% respectively) indicated a poor understanding of climate change impacts on the tourism sector, and that the future implications that are thereof associated with climate change remains unknown as well. In order to better comprehend what is observed to be the major cause of climate change in the region, the visitors were probed to rate the extent to which they assented with climate change being caused by human activities and to what extent by natural processes.

Furthermore, just over half of the respondents (58,3%) agreed that climate change is certainly caused and perpetuated by human activities, whereas 62.5% consented that climate change is a natural occurrence. Moreover, just over half (66.6%) of the respondents think that climate change affects human life, while more than a half (83.3%) of the respondents think that climate change affects the natural environment. In essence, the findings of this study indicated that the majority of study respondents has some level of understanding and were familiar with the concept of climate change.

The finding is also in agreement with the views expressed by a majority of the visitor respondents. From the results shown in the figure below, it is surmised that some of the respondents have a poor understanding of climate change. This may be attributed to their lack of involvement or assistance in dealing with the negative impacts of climate change in the region.

Figure 6. 23: Awareness and Understanding of Climate Change Impacts



Drawing from the above, it is apparent that there is a reasonable level of understanding of climate change amongst the tourism authorities. Furthermore, when asked what they think are the impacts of climate change, it emerged that all the respondents consider climate change effects to include drought; a reduction in snow/ice levels over the years; a loss of forest/trees and aquatic life; and a reduction in mountain altitudes (Table 6.20).

Table 6. 20: Tourism Authorities' Perception of Climate Change Impacts

	Frequency	Percent
All of them	24	100.0

In terms of the respondents' perceptions on how climate change is affecting tourism in their region, a majority of them (70.8%) believed that climate change adversely affects the tourism destination, reduces the number of tourists, affects perceptions of the visitors, as well as makes their stay uncomfortable (6.21).

Table 6. 21: Impacts of Climate Change on Tourism Destinations

	Frequency	Percent
Adversely affects	4	16.7
Reduces the number of tourists	7	29.2
Affects perceptions	4	16.7
Makes stay uncomfortable	4	16.7
All of the above	17	70.8

Given the above economic effects of climate change, it was not surprising to note that all the tourism authorities' respondents indicated that the region is at present facing the effects of climate change (Table 6.24). This also further supports the mainstream perceptions of the visitors on climate change in the region.

Table 6. 22: Climate Change Impacts

	Frequency	Percent
Already experiencing	24	100.0

6.12 Critical Concerns About Climate Change

One of the notable points that emerged from the previous section was that the overwhelming majority of the tourism authorities claimed that the region is already suffering the negative effects of climate change. As such, it was pertinent to know from the perspective of the respondents whether they consider climate change as a cause for concern to the tourism industry in the region. A Chi-Square test was used to ascertain whether the scoring configurations of the respondents were expressly different in the way that that the respondents scored (agreed, strongly agree, neutral, disagree and strongly disagree). It can be observed all of the respondents (100%) were significantly in agreement (strongly agree=16.7%; agree=83.3%) with the statement: "climate change is certainly a cause for concern".

Given the high number of respondents who consider climate change a cause of concern, it was not surprising that an overwhelming majority (100.0%) believed (strongly agree=33.3%; agree=66.7%) that climate change is distressing for tourism development. This is highly concerning when one considers the economic impacts of tourism's contribution to South Africa's GDP.

Furthermore, and regarding the statement: "the global climate conditions are changing, an overwhelming majority (100.0%) were in support of this view (strongly agree=16.7%; agree=83.3%). Equally concerning, an overwhelming majority (100.0%) believed (strongly agree=45.8%; agree=54.2%) that climate conditions in the region are changing. More worrisome is that the majority (95.9%) of respondents are of the belief (strongly agree=29.2%; agree=66.7%) that climate change is regularly instigated by human activity. Nevertheless, all of the respondents (100.0%) also believed (strongly agree=30.4%; agree=69.6%) that climate change is often triggered by natural processes.

On the economic side, an overwhelming majority (95.8%) believed (strongly agree=50.0%; agree=45.8%) that climate change is reducing tourism's financial performance. This is further reinforced by the number (95.9%) of those who believed (strongly agree=29.2%; agree=66.7%) that climate change is damaging the environment. Hence, it was not surprising that the majority (95.9%) of respondents have heard of climate change and its impact (strongly agree=4.2%; agree=91.7%).

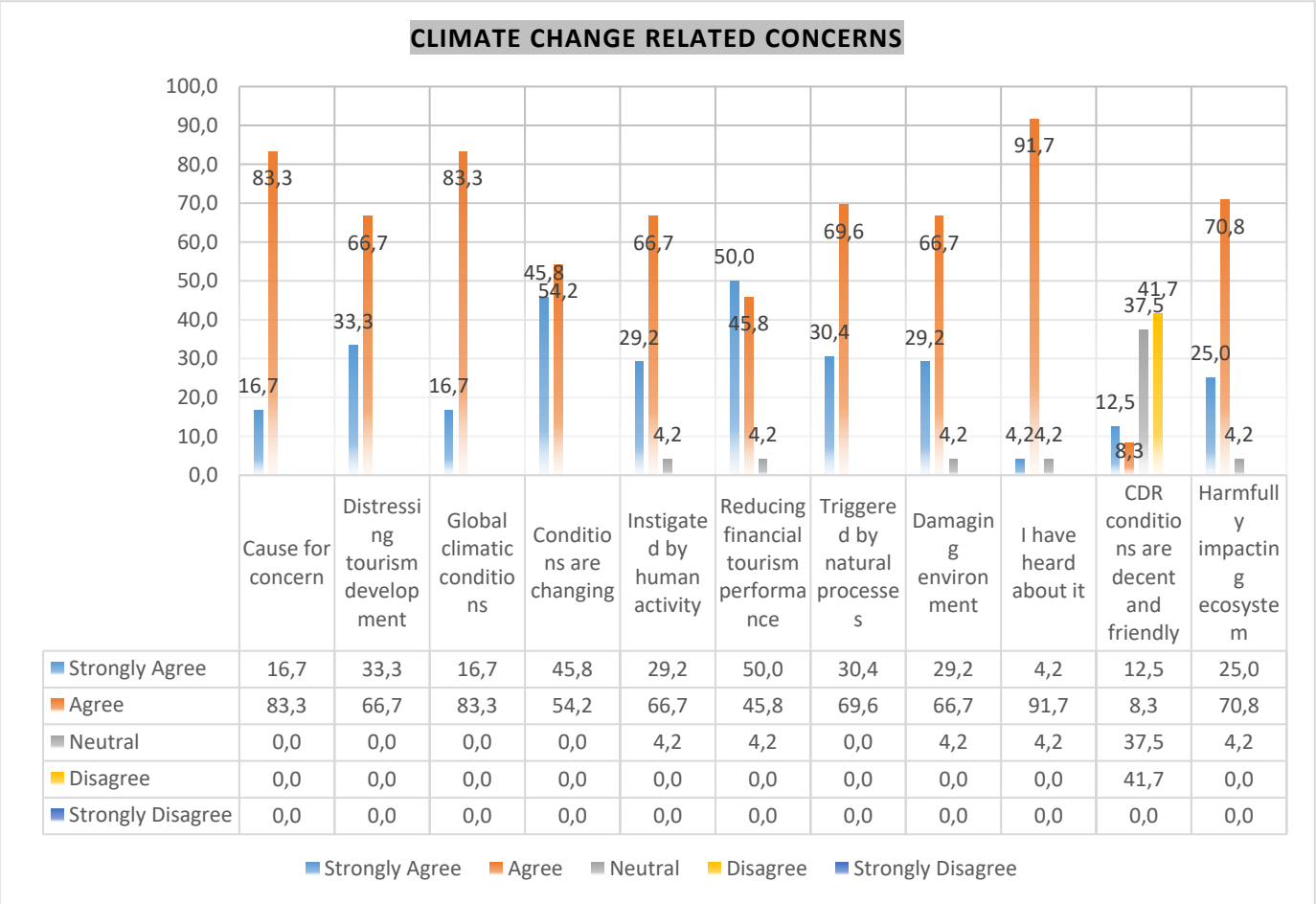
Moreover, and when compared against 59.5% of the visitors who believed that the climate conditions of CDR are very decent and friendly, 41.7% of the tourism authorities disagreed with this view, while 37.5% were neutral. Regardless of this belief, more of the respondents (95.8%) affirmed that climate change is harmfully impacting the ecosystem (strongly agree=25.0%; agree=70.8%).

Table 6. 23: Climate Change Concerns, Awareness and Understanding

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	p-value
Cause for concern	16.7	83.3	0.0	0.0	0.0	0.001
Distressing tourism development	33.3	66.7	0.0	0.0	0.0	0.102
Global climatic conditions	16.7	83.3	0.0	0.0	0.0	0.001
Conditions are changing	45.8	54.2	0.0	0.0	0.0	0.683
Instigated by human activity	29.2	66.7	4.2	0.0	0.0	0.001
Reducing financial tourism performance	50.0	45.8	4.2	0.0	0.0	0.010
Triggered by natural processes	30.4	69.6	0.0	0.0	0.0	0.061
Damaging environment	29.2	66.7	4.2	0.0	0.0	0.001
I have heard about it	4.2	91.7	4.2	0.0	0.0	0.000
CDR conditions are decent and friendly	12.5	8.3	37.5	41.7	0.0	0.040
Harmfully impacting ecosystem	25.0	70.8	4.2	0.0	0.0	0.000

Figure 6.24 further depicts the tourism authorities' views on the concerns of climate change. At a glance, it can be observed that the majority of the respondents assented that climate change is a cause for concern both globally and nationally.

Figure 6. 24: Tourism Authorities' Concerns Relating to Climate Change



	Cause for concern	Distressing tourism development	Global climatic conditions	Conditions are changing	Instigated by human activity	Reducing financial tourism performance	Triggered by natural processes	Damaging environment	I have heard about it	CDR conditions are decent and friendly	Harmfully impacting ecosystem
Strongly Agree	16,7	33,3	16,7	45,8	29,2	50,0	30,4	29,2	4,2	12,5	25,0
Agree	83,3	66,7	83,3	54,2	66,7	45,8	69,6	66,7	91,7	8,3	70,8
Neutral	0,0	0,0	0,0	0,0	4,2	4,2	0,0	4,2	4,2	37,5	4,2
Disagree	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	41,7	0,0
Strongly Disagree	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

6.13 Climate Change Impacts on CDR

This section scrutinizes the concerns of climate change in the Central Drakensberg Region. The Chi-Square was used to compare the scoring patterns of the respondents. The outcomes are first demonstrated using summarised measurements for the variables that made up each section.

The study outcomes are then further analysed according to the significance of each statement. In terms of the scoring patterns of respondents regarding the impacts of climatic condition on tourism destinations in the region, all (100.0%) of the respondents significantly agreed that climate change impacts tourism destinations in the region ($P<0.05$). Regarding the tourism flow in the region, there was a significant agreement (100.0%) amongst the respondents (strongly agree=16.7%; agree=83.3%) that climate change impacts tourism flow in the region ($P<0.05$).

With reference to the effects of climate change on financial performance, an overwhelming majority (100.0%) were in agreement (strongly agree=54.2%; agree=45.8%) that climate change affects the financial performance of tourism in the region. As such, it was no surprise that an overwhelming majority (100.0%) consider that climate change impacts on tourism sector employment in the region (strongly agree=29.2%; agree=70.8%).

Regarding the impacts of climate change on the ecosystem in the region, the majority (100.0%) were in agreement (strongly agree=41.7%; agree=58.3%) that climate change impacts on the ecosystem. This is also further supported by a majority (100.0%) who believed that climate change impacts on the natural landscapes of the region (strongly agree=58.3%; agree=41.7%). Moreover, a significant majority (100.0%) consider (strongly agree=20.8%; strongly agree=79.2%) that the climate conditions in the region will adversely impact community participation in tourism ($P<0.05$). Given the major role of the community in advancing tourism, it was no surprise that the majority (100.0%) believed that the major tourism role-players will be adversely impacted by climate change (strongly agree=62.5%; agree=37.5%).

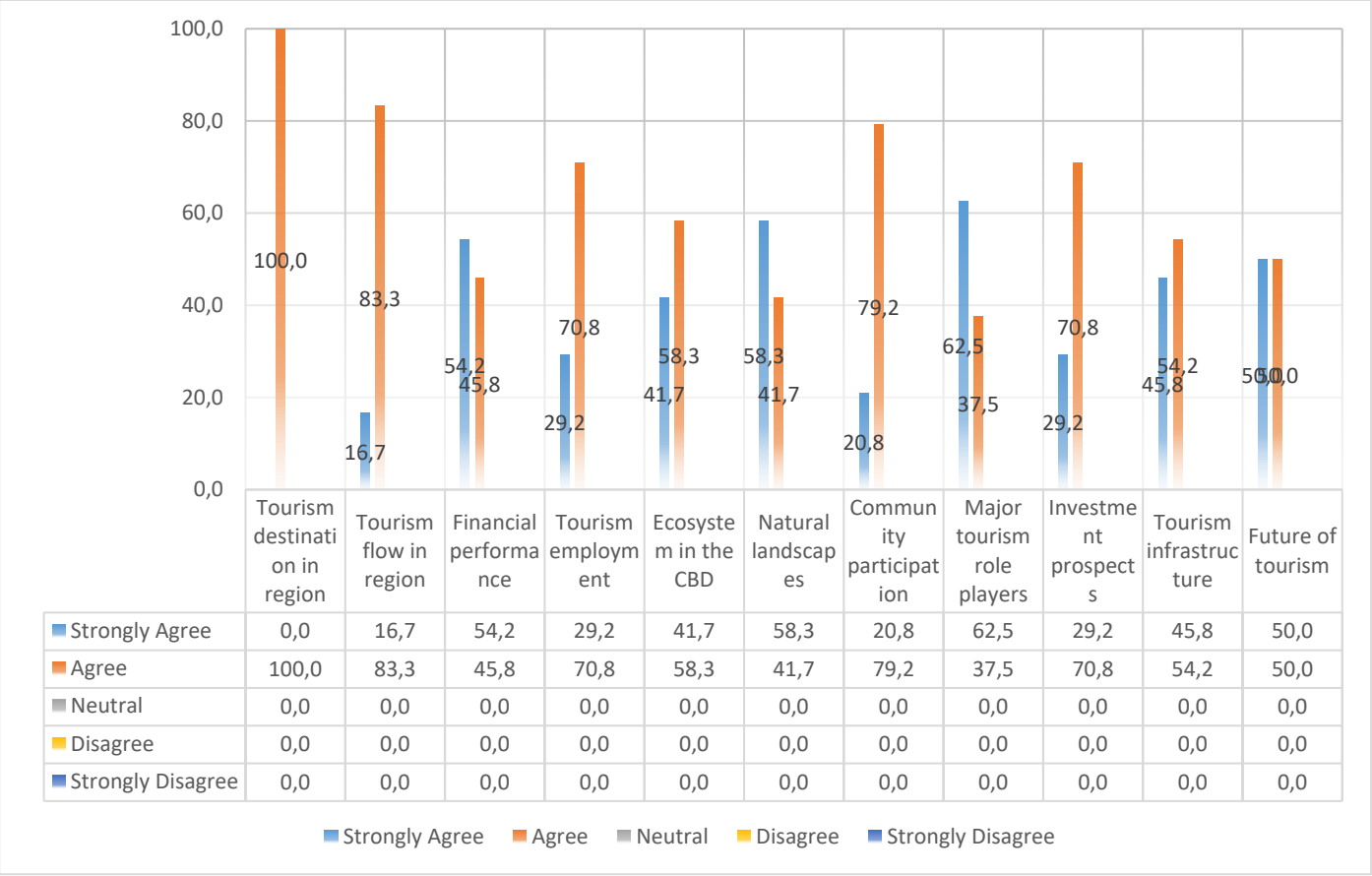
From the economic point of view, an overwhelming majority (100.0%) significantly believe (strongly agree=29.2%; agree=70.8%) that climate change will adversely impact investment prospects in the region ($P<0.05$). Essentially, the majority (100.0%) consider that climatic conditions in the region will adversely impact tourism infrastructure (strongly agree=45.8%; agree=54.2%). The absence of investment and infrastructure would ultimately impact on the future of tourism in the region. This assertion is reinforced by the majority (100.0%) who believed that climate change will have an adverse influence on the future of tourism in the region (strongly agree=50.0%; agree=50.0%).

Table 6. 24: Impacts of Climate Change in the CDR

IMPACTS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	p-value
Tourism destination in region	0.0	100.0	0.0	0.0	0.0	0.000
Tourism flow in region	16.7	83.3	0.0	0.0	0.0	0.001
Financial performance	54.2	45.8	0.0	0.0	0.0	0.683
Tourism employment	29.2	70.8	0.0	0.0	0.0	0.041
Ecosystem in the CBD	41.7	58.3	0.0	0.0	0.0	0.414
Natural landscapes	58.3	41.7	0.0	0.0	0.0	0.414
Community participation	20.8	79.2	0.0	0.0	0.0	0.004
Major tourism role players	62.5	37.5	0.0	0.0	0.0	0.221
Investment prospects	29.2	70.8	0.0	0.0	0.0	0.041
Tourism infrastructure	45.8	54.2	0.0	0.0	0.0	0.683
Future of tourism	50.0	50.0	0.0	0.0	0.0	1.000

Figure 6.25 further depicts the impacts of climate change in the Drakensberg region. At a glance, the most visible impact of climate change in the region was on tourism destinations in the region.

Figure 6. 25: Negative Impacts of Climatic Condition in the CDR



6.13.1 Climatic Condition Damages in the CDR

From the previous section, it was gathered that climate change adversely impacts the infrastructure in the region, which in turn puts the future of tourism in the region in grave danger. As highlighted in Table 6.25, all the respondents (100.0%) accentuated that the weather has caused damage to buildings, landscape degradation, vehicle damage, veld forest fires, a decline in animal plant species, as well as a decline in water quality in the last 5 years.

Table 6. 25: Climate Change Related Damages in the CDR

	Frequency	Percent
Weather damages building damages	24	100.0
Landscape degradation	24	100.0
Vehicle damages	24	100.0
Veld forest fires	24	100.0
Decline animal plant species	24	100.0
Decline in water quality	24	100.0

Bearing in mind the above enumerated infrastructure and wildlife damage of climate change, it was understandable that the majority (83.3%) believed that climate change is having a damaging impact on the long-term success of the protected area and the tourism business.

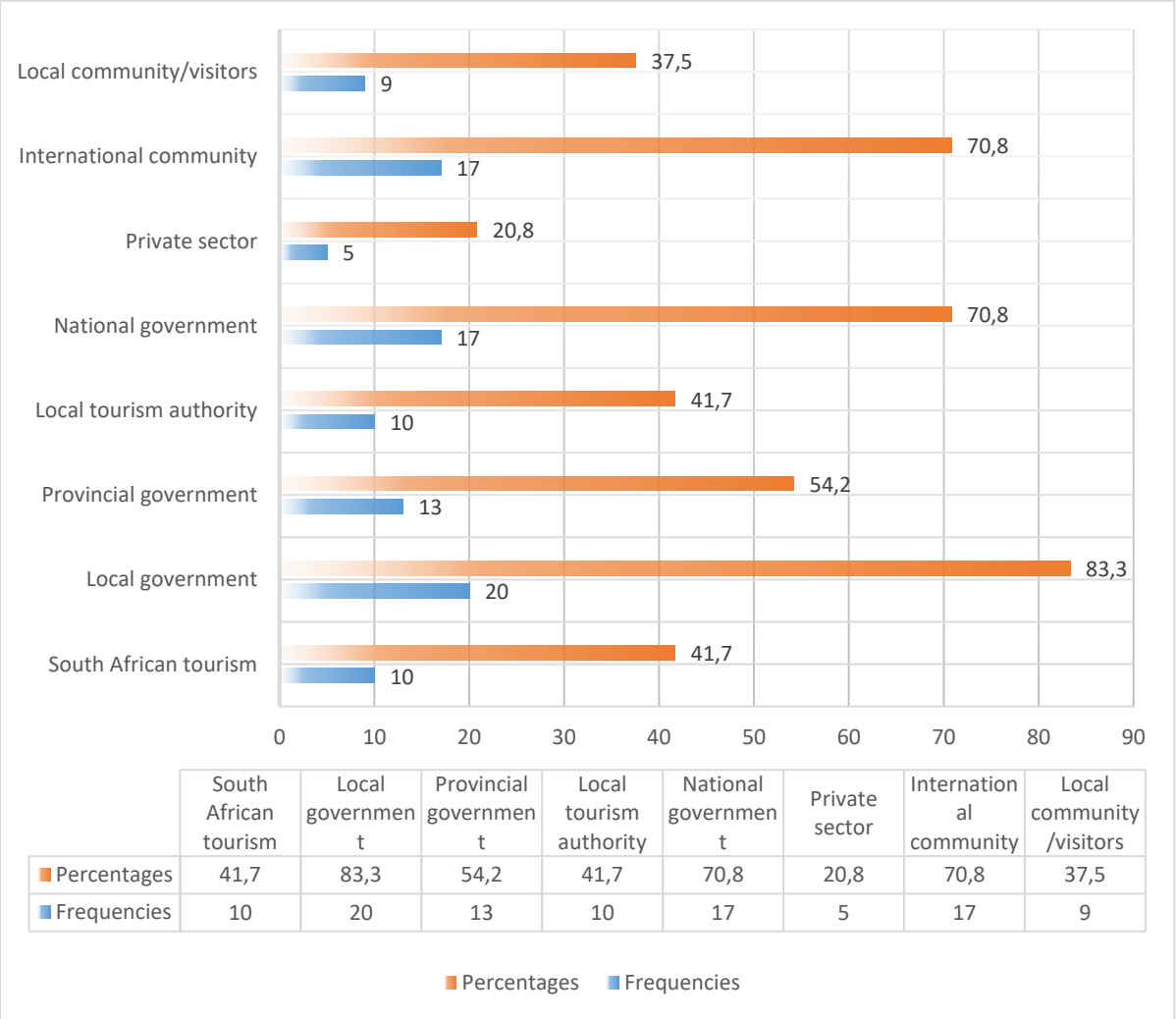
Table 6. 26: Long-term Sustainable Impacts of climate Change

	Frequency	Percent
Negative	20	83.3
I don't know	4	16.7
Total	**24**	**100.0**

Given the above perceived significance of climate change on the inflow of tourists to the region, the respondents were further asked the following: “Which role player/tourism authority do you think is best suited to deal with the economic and environmental impacts of climate change on tourism?”

Contrary to the views of the visitors, the majority (83.3%) of the respondents believed that the local government is best suited to deal with both the economic and environmental impacts of climate change on the tourism industry (Table 6.26). Equally, a high percentage (70.8%) thinks that the national government and the international community is in a better position to deal with the economic and environmental impacts of climate change on tourism.

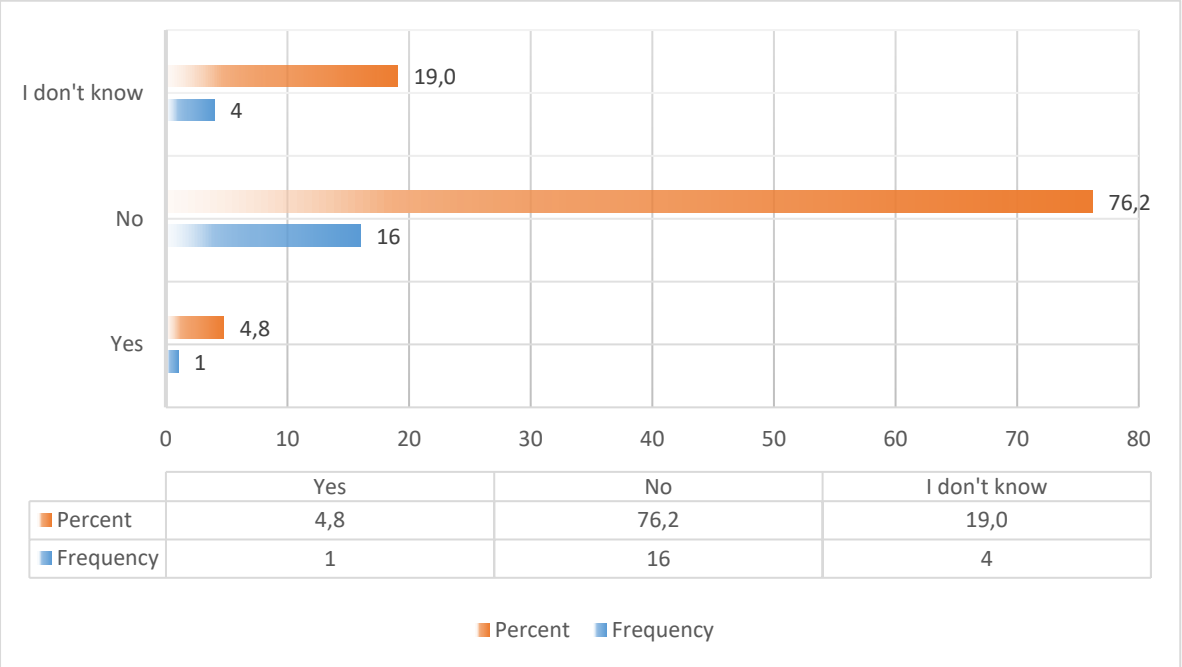
Figure 6. 26: Climate Change Risks Management



	South African tourism	Local government	Provincial government	Local tourism authority	National government	Private sector	International community	Local community /visitors
Percentages	41,7	83,3	54,2	41,7	70,8	20,8	70,8	37,5
Frequencies	10	20	13	10	17	5	17	9

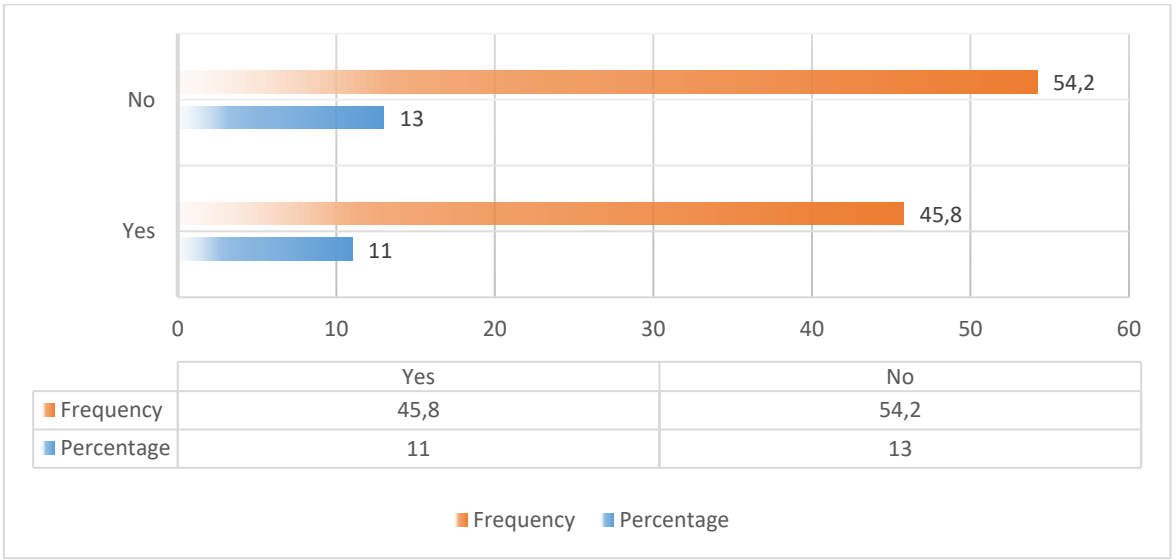
From the above table, it could also be gathered that the local government (83.3%), international community (70.8%) and national government (70.8%) were commonly considered to the most relevant and appropriate constituencies to deal with the issue of climate change. Furthermore, it was noted that 41.7% of the respondents consider the local tourism authority to be best suited to deal with the both the financial and environmental impacts of climate change in their region. With this in mind, it was sensible to know whether the participants have provided any form of support to local business in the area as an effort to lessen the negative effects of climate change on tourism. It was found that the majority (76.2%) had not provided any form of support to businesses in the area to address the impacts of climate change, while a few (4.8%) claimed to have provided support (Figure 6:27).

Figure 6. 27: Government Assistance in Climate Change Adaptation



It has been established from the foregoing that climate change poses a real threat to the tourism industry. As such, it was reasonable to know the measures that are in place to deal with all possible threats of climate change. As shown in Figure 6.28, while more (54.2%) of the respondents indicate no measure, 45.8% indicated that there are strategies in place to deal with the threat of climate change.

Figure 6. 28: Measures that Deal with Climate Change Threats



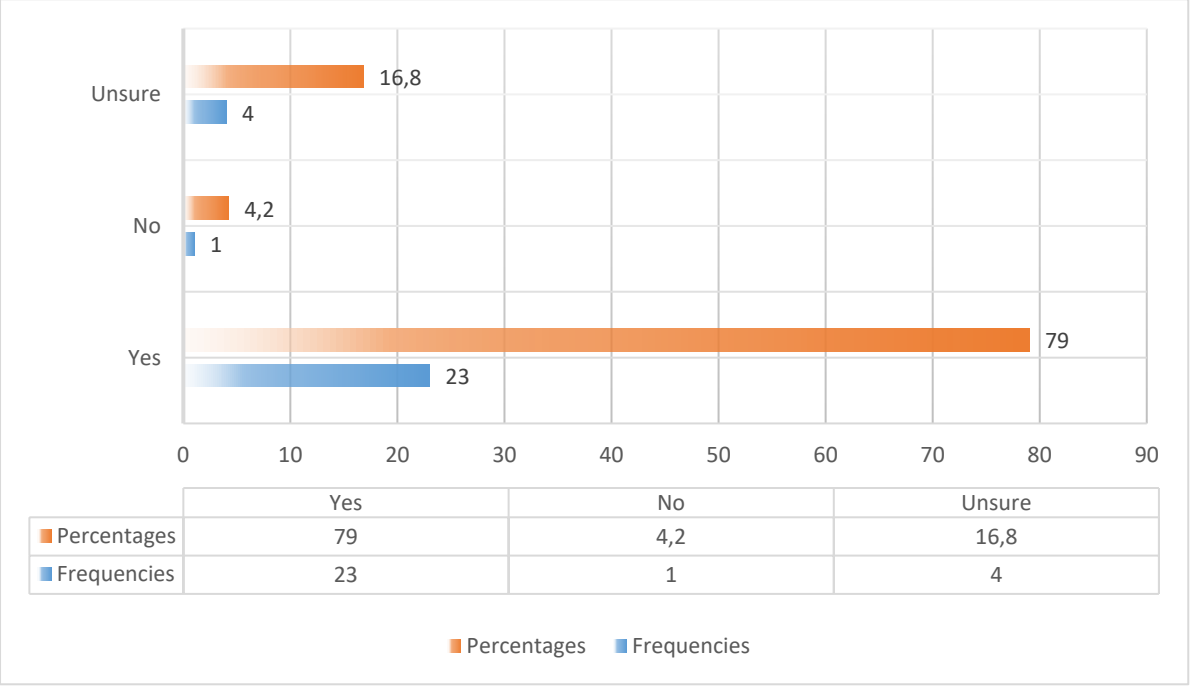
Drawing from the above, it is sufficient to assume that there are few measures in place to deal with the threat of climate change in the region. Given this concern and the negative impacts of climate change, it was critical to know, from the perspective of the respondents, some of the major weather-related damages that have ensued in the region because of climate change.

6.14 Management of Climate Change Impacts

From the above sections, it has been established that climate change has a negative impact on tourism in the region. Given the said impacts, the effective management of climate change will serve as an effective buffer to mitigate against both the environmental and the economic impacts of climate change in the region. This section therefore deals with the administration and mitigation of climate change impacts in the region. The following question was used to elicit a response from the respondents: "Has there been any policies/strategies introduced to address climate change impacts?"

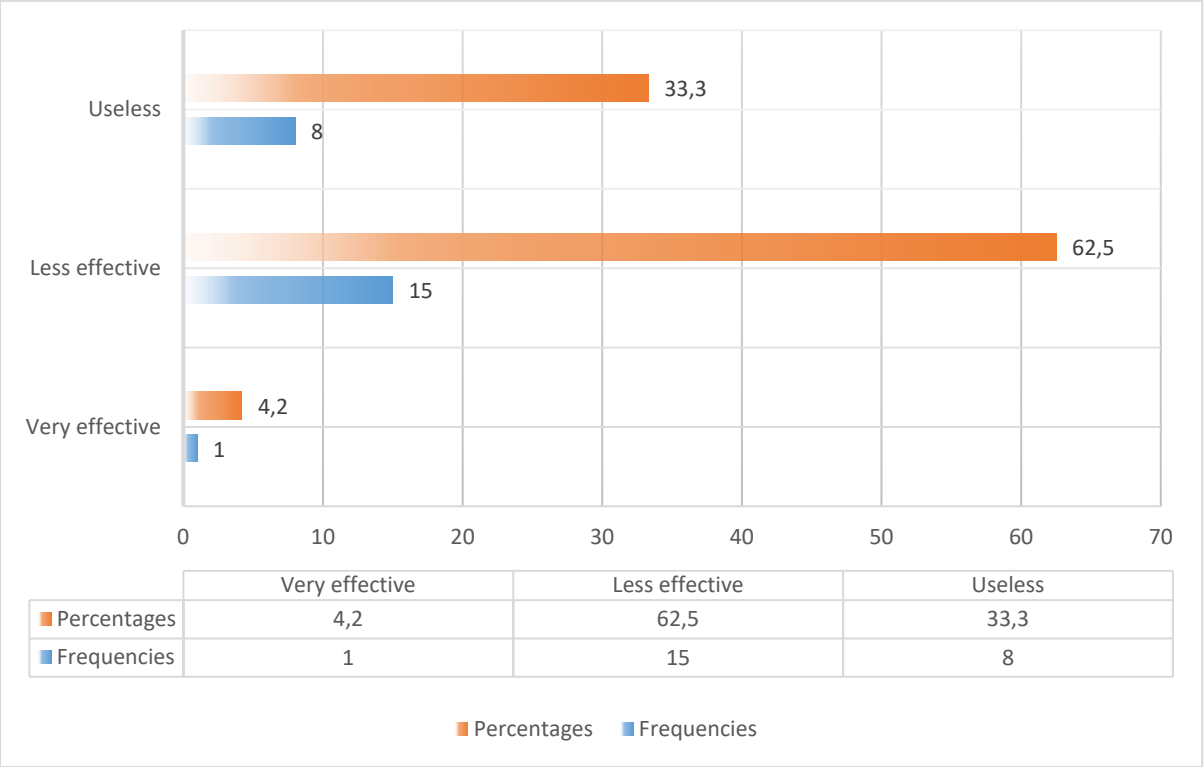
As shown in Figure 6.29, an overwhelming majority (95.8%) of the respondents were affirmative that there are strategies introduced to address climate change impacts. These views can also be reinforced with international strategy, such as the Paris Accord, to which South Africa is a signatory, designed to mitigate against climate change.

Figure 6. 29: Strategies Introduced to Address Climate Change Impacts



While both international, national and regional climate change management policies and strategies have been proposed, their effectiveness to effectively mitigate against climate change still remains debatable. For example, it can be seen that a majority (62.5%) consider the climate change strategies to be less effective (Figure 6.30). Equally concerning is that 33.3% viewed the climate change strategies to be useless, while a few (4.2%) see it to be very effective.

Figure 6. 30: Effectiveness of Climate Change Strategies



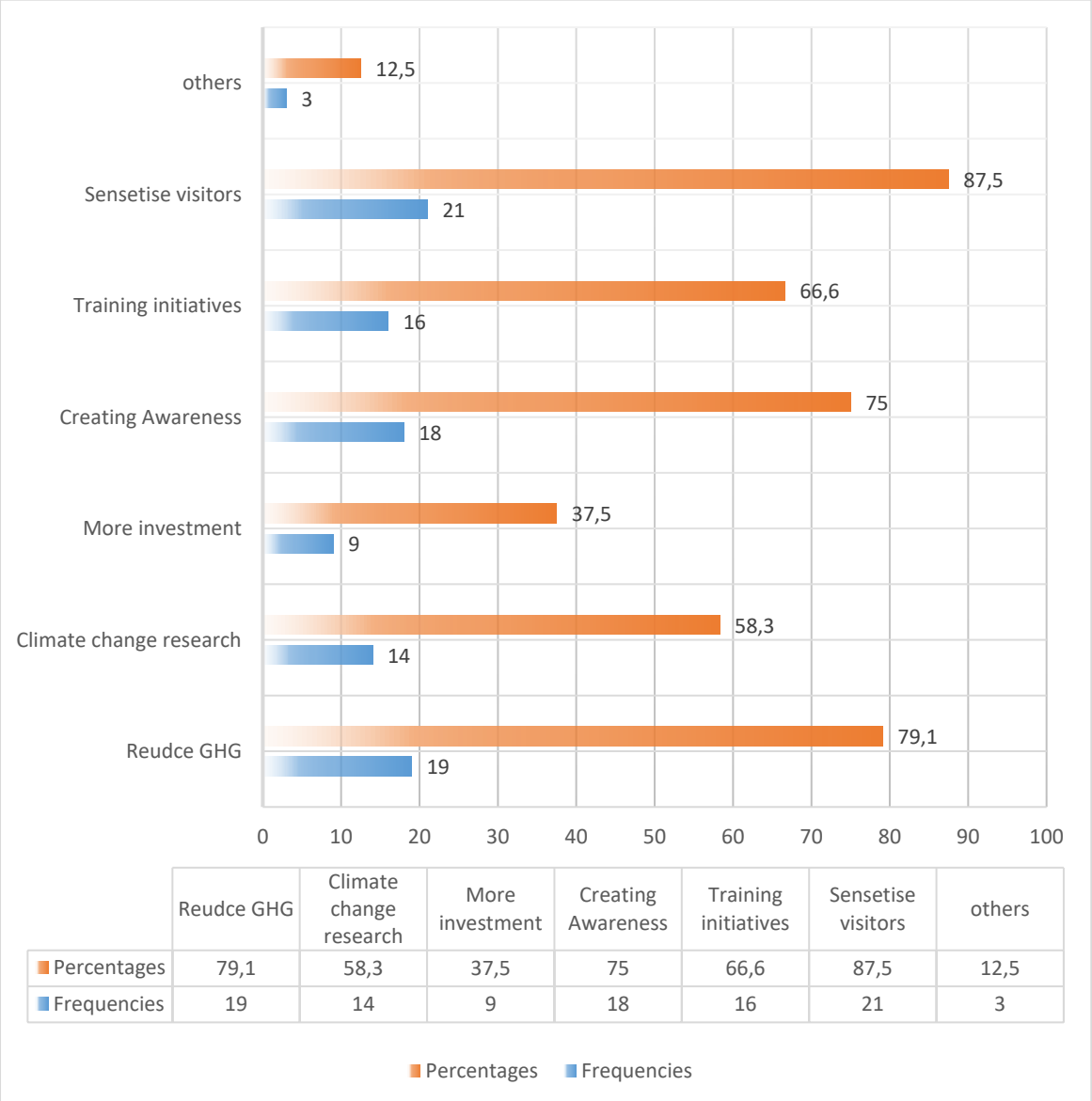
From the above table, it can be seen that a high number (95.8%) of respondents viewed the climate change strategies to be less effective or useless. Hence, it was worth knowing whether the region required any form of model/theoretical framework that can assist in assessing and management of the negative impact of climate change on tourism. Expectedly, a majority (83.3%) were affirmative that the climate change strategies in the region are guided by a framework (Table 6.27).

Table 6. 27: Model to Minimise the Negative Impacts of Climate Change

		Frequency	Percent
	Yes	20	83.3
	No	3	12.5
	Total	23	95.8
	No response	1	4.2
Total		24	100.0

Despite the claim by a majority of the respondents that climate change strategies are guided by a framework, it is also established that the aforesaid strategies are less effective or useless to manage the negative impacts of climate change. Bearing this in mind, the respondents were asked the following question: "What do you think the industry authorities should do to deal with the impacts that climate change may have on tourism in the region?" As shown in Figure 6.31, all the respondents noted that the authorities should engage in the prevention of green-house gas accumulation. This view also resonates with international frameworks that aim to reduce the carbon footprint in the earth's atmosphere as a measure to mitigate against climate change.

Figure 6. 31: Strategies to Minimise Climate Change in the CDR



	Reudce GHG	Climate change research	More investment	Creating Awareness	Training initiatives	Sensetise visitors	others
Percentages	79,1	58,3	37,5	75	66,6	87,5	12,5
Frequencies	19	14	9	18	16	21	3

6.15 Impacts of Climate Change on Tourism Influx

This section deals with the impacts of climate change in the region. As indicated in Table 6.28, a majority (91.7%) of the respondents believed that the impacts of climate change have played a particular role in tourist influx into the region.

Table 6. 28: Impacts of Climate Change on Tourist Influx into the Region

	Frequency	Percent
Yes	22	91.7
Maybe	2	8.3
Total	**24**	**100.0**

The latest trends of tourist inflow into the region are given in Table 6.29. The majority (62.5%) consider tourist flow to be poor, while 37.5% claimed that the inflow was declining.

Table 6. 29: Trends in Tourism Influx

	Frequency	Percent
Declining	9	37.5
Poor	15	62.5
Total	**24**	**100.0**

The previous sections have explicitly identified that changing climatic conditions destructively impact on the tourism destination. Given the above latest trends of tourism influx into the region, it was sensible to know whether climate change could be responsible for these trends. Expectedly, a majority (75.0%) believed climate change was responsible, whilst 25.0% disagreed (Table 6.30).

Table 6. 30: Impacts of Climate Change on Tourism Influx

	Frequency	Percent
Yes	18	75.0
No	6	25.0
Total	24	100.0

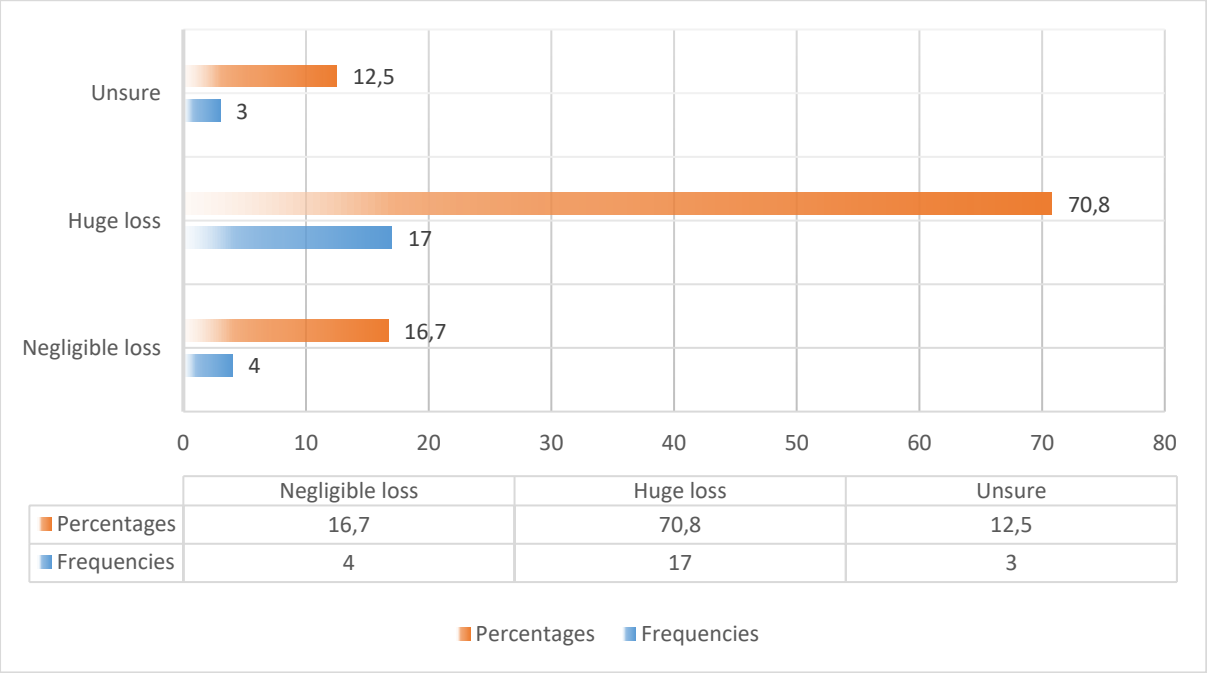
Moreover, and as shown in Table 6.31, all the respondents believed that climate change has some undesirable influence on the environmental characteristics of the area. This factor may have contributed to the observed declining or poor influx of tourism into the region.

Table 6. 31: Impacts of Climate Change on the Environment

	Frequency	Percent
Negative	24	100.0

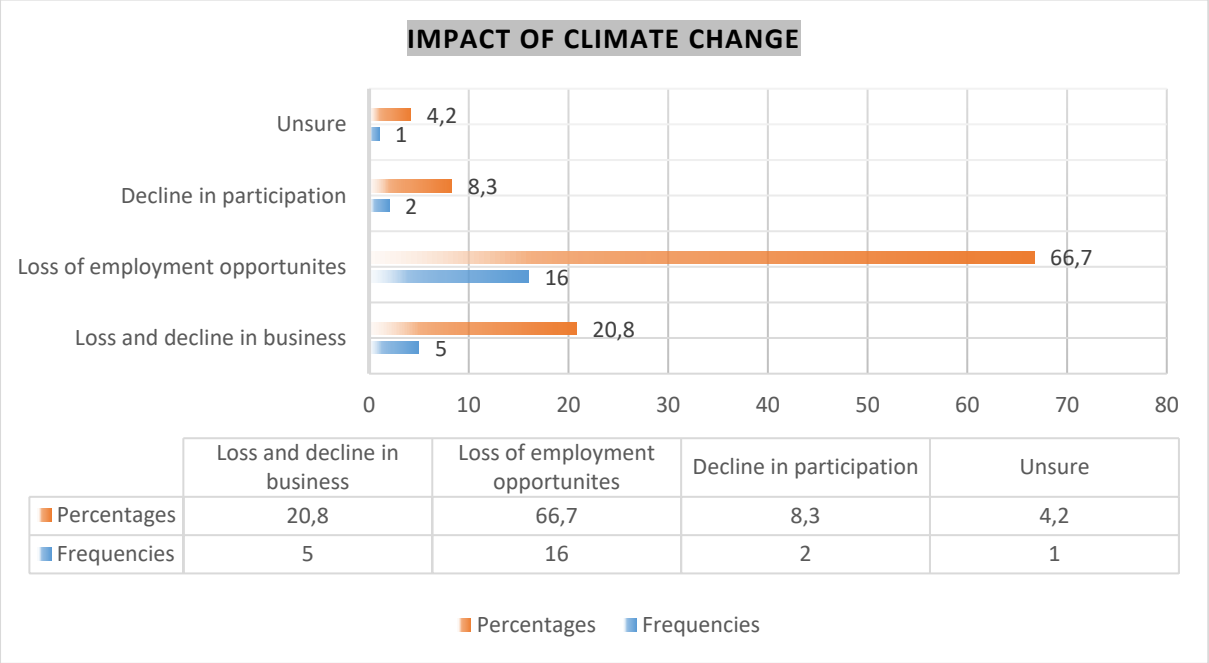
In terms of the economic assessment of climate change, the majority (70.8%) of respondents indicated that their businesses have experienced a huge loss in the past five years in the region due to climate change (Figure 6.32).

Figure 6. 32: Economic Impacts of Climate Change in the CDR



Additionally, when asked what impact climate change inflicts on the local community of the region in relation to tourism development, a majority (66.7%) of respondents indicated the loss of employment opportunities for the locals, followed by those (20.8%) who noted a loss and decline in business (Figure 6.33).

Figure 6. 33: Impacts of Climate Change on the Local Community



The above section illustrates that climate change negatively effects the environment, businesses and the growth of tourism in the region. Noting this concern, a Chi-Square experiment was used to compare the scoring configuration in the rating of the susceptibility of the critical divisions that climate change has in the region. As highlighted in Table 6.32, more than half (58.3%) of the respondents rated tourism to be moderately vulnerable in the region. Equally, a significant majority (66.7%) respondents believed that landscape is moderately vulnerable ($P<0.05$).

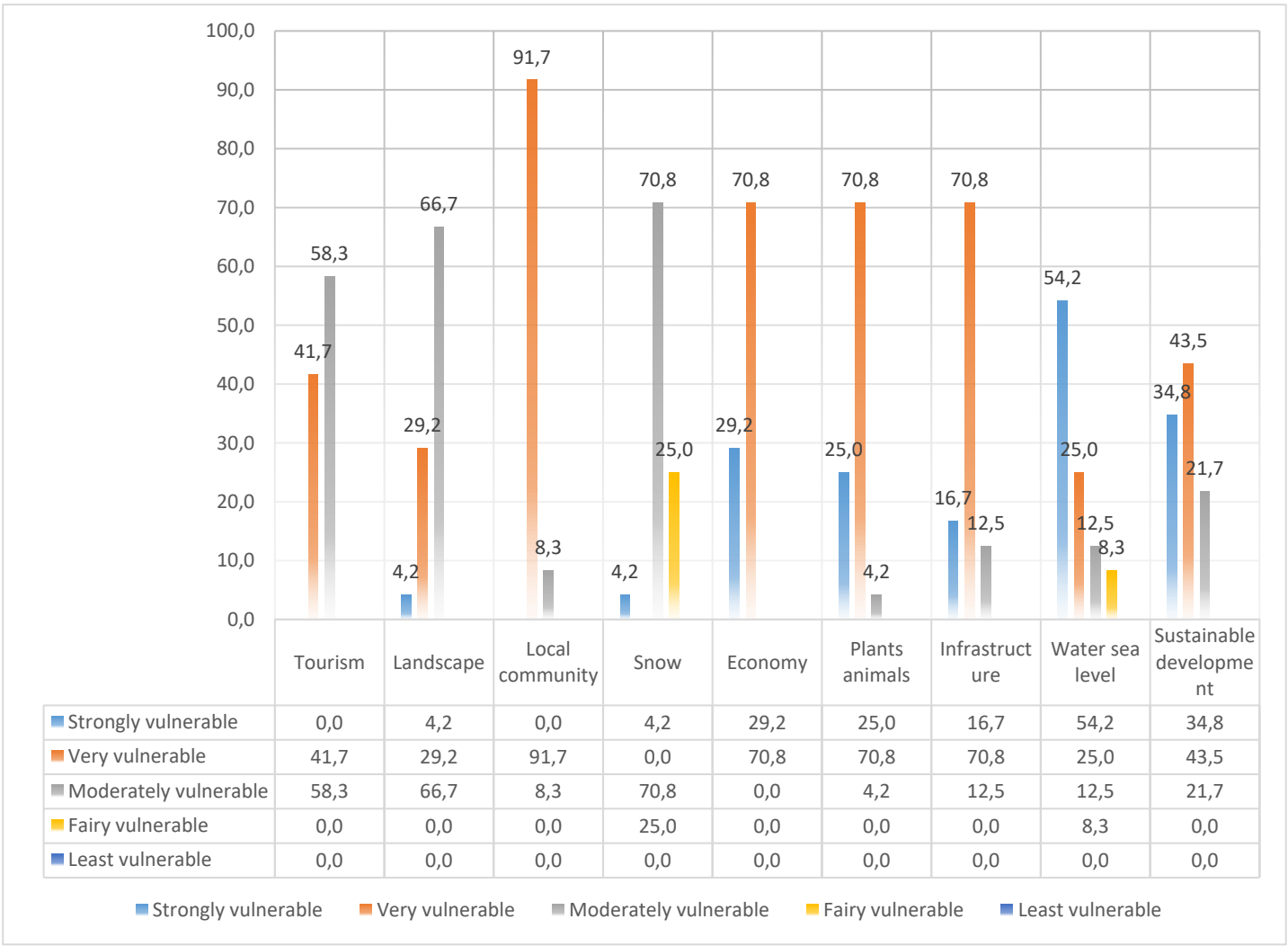
Moreover, a significant majority (70.8%) of the respondents believed that snow in the region is moderately vulnerable to climate change ($P<0.05$). Nonetheless, an overwhelming majority (91.7%) believed that the local community is very vulnerable to climate change in the region ($P<0.05$). In terms of the economy, plants and animals as well as infrastructure, a significant majority (70.8%) viewed these to be very vulnerable to climate change in the region ($P<0.05$). Hence, it was no surprised that more (43.5%) of the respondents thinks that sustainable development in the region is very vulnerable due to climate change. In addition, and in terms of the vulnerability of the water sea level, a significant majority (54.2%) believed this to be strongly susceptible to climate change in the region ($P<0.05$).

Table 6. 32: Rating of CDR Vulnerability to Climate Change Impacts

FACTOR	Strongly vulnerable	Very vulnerable	Moderately vulnerable	Fairy vulnerable	Least vulnerable	Chi Square p-value
Tourism	0.0	41.7	58.3	0.0	0.0	0.414
Landscape	4.2	29.2	66.7	0.0	0.0	0.001
Local community	0.0	91.7	8.3	0.0	0.0	0.000
Snow	4.2	0.0	70.8	25.0	0.0	0.000
Economy	29.2	70.8	0.0	0.0	0.0	0.041
Plants animals	25.0	70.8	4.2	0.0	0.0	0.000
Infrastructure	16.7	70.8	12.5	0.0	0.0	0.000
Water sea level	54.2	25.0	12.5	8.3	0.0	0.006
Sustainable development	34.8	43.5	21.7	0.0	0.0	0.438

Figure 6.34 further depicts the rating of the vulnerability of the region's critical divisions to climate change. At a glance, the most vulnerable division rated by the respondents was the local community.

Figure 6. 34: Rating of Vulnerability of the Region to Climate Change Impacts



6.16 The Research Instrument and Sample

A total of **6** questionnaires were despatched and **6** were accordingly returned which gave a **100%** response rate. The data collection instrument consisted of 119 items, with a level of evaluation at a minimal or an ordinal level. The instrument was separated into 4 sub-divisions which were intended to assess different topics as indicated below:

I	Personal Information
II	Climate Change Impact
III	Environmental Impact
IV	Miscellaneous Questions

6.17 Local Municipality Descriptive Statistics

In this section of the data presentation, the biographical data of the local municipality participants are presented.

6.17.1 Local Municipality

The name of the municipality surveyed is given in Table 6.33. It can be seen that all the respondents surveyed are from UKhahlamba Municipality.

Table 6. 33: Name of the municipality

		Frequency	Percent
Name	UKhahlamba	6	100.0

6.17.2 Respondents' Occupations

The occupation of the respondents is shown in Table 6.34. It was observed each of the 6 respondents in the survey worked as either an administrator, assistant manager, community liaison officer, conservationist, senior tourism information officer, and or tourism officer.

Table 6. 34: Local Municipality Respondents' Occupation

	Frequency	Percent
Administrator	1	16.7
Assistant Manager	1	16.7
community liaison officer	1	16.7
Conservation	1	16.7
Senior Tourism Info Officer	1	16.7
Tourism Officer	1	16.7
Total	6	100.0

6.17.3 Gender and Age Distribution of Local Municipality Respondents

Table 6.35 describes the gender distribution of the local municipality respondents by their age group. As shown in the table below, the respondents constituted an equivalent number of males (50.0%) and females (50.0%). In terms of the age distribution, the proportion of females (33.3%) within the age category of 18-30 years were more than the males (16.7%). There was however an equal number of male and female respondents within the age distribution of 31-40 years. By contrast, no female respondents were represented within the age distribution of 41-50 years. Overall, more (50.0%) of the respondents are within the age distribution of 18-20 years old, with the lowest representation within the age distribution of 41-50 years old (16.7%).

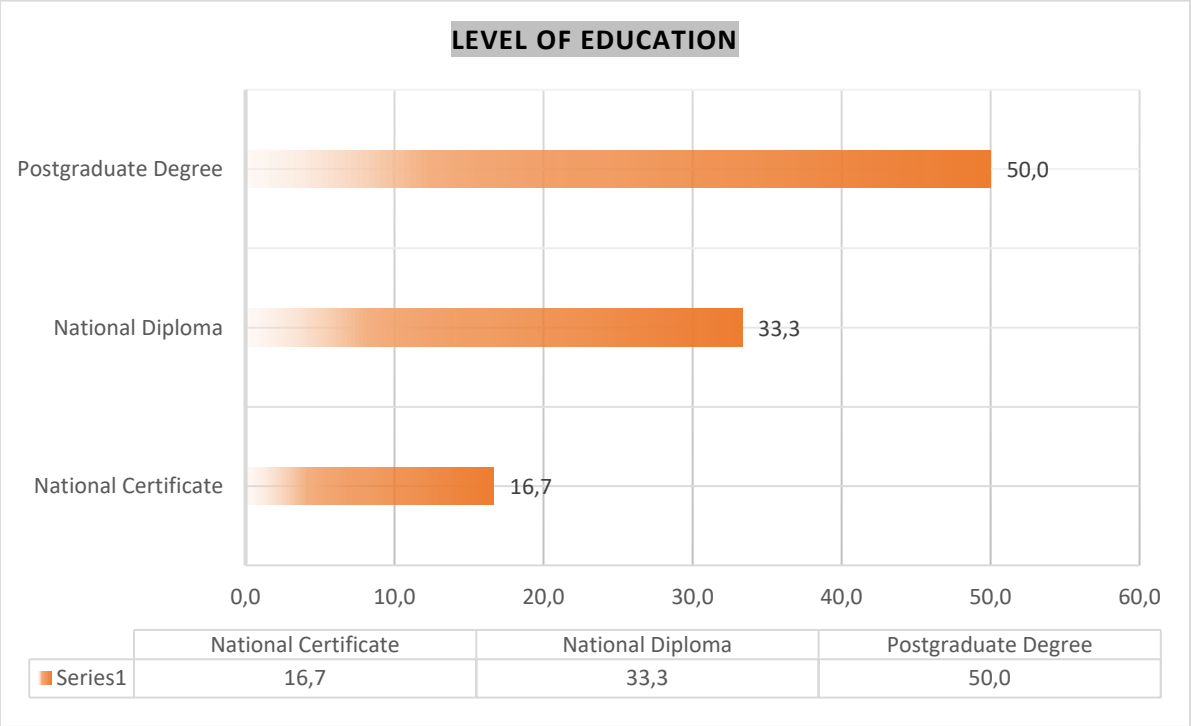
Table 6. 35: Gender and Age Distribution

			Gender		Total
			Male	Female	
Age	18-30	Count	1	2	3
		% of Total	16.7%	33.3%	50.0%
	31-40	Count	1	1	2
		% of Total	16.7%	16.7%	33.3%
	41-50	Count	1	0	1
		% of Total	16.7%	0.0%	16.7%
Total		Count	3	3	6
		% of Total	50.0%	50.0%	100.0%

6.17.4 Highest Level of Education of Local Municipality Respondents

Figure 6.35 depicts the highest level of education of the local municipality respondents. Half (50.0%) of the respondents hold a postgraduate degree, 33.3% a national diploma and 16.7% a national certificate.

Figure 6. 35: Local Municipality Respondents' Level of Education



6.17.5 Level of Involvement in Tourism and Climate Change

The respondents' level of involvement in activities dealing with tourism and climate in the region are described in Table 6.36. It was observed that half (50.0%) indicated having a moderate level of involvement in activities dealing with tourism and climate change in the region, whilst 33.3% indicated having a maximum level of involvement.

Table 6. 36: Level of Involvement in Tourism and Climate Change

Level	Frequency	Percent
Minimum involvement	1	16.7
Moderate involvement	3	50.0
Maximum involvement	2	33.3
Total	**6**	**100.0**

6.17.6 Climate Change Adaptation Support to Tourism Establishment

Table 6.37 describes the responses from the respondents regarding the question: "Is your local municipality currently or previously providing any form of assistance to the surrounding tourism establishments in order to deal with the effects of climate change? A mixed reaction was noted amongst the respondents as a similar number (2/ 33.3%) indicated "yes", "no" and "I don't know". It can therefore be assumed that while some do offer assistance to tourism establishments, others do not necessarily offer any such assistance to deal with the impacts of climate change in the region.

Table 6. 37: Climate Change Adaptation and Mitigation Assistance

	Frequency	Percent
Yes	2	33.3
No	2	33.3
I don't know	2	33.3
Total	**6**	**100.0**

Amongst those who claim not to assist tourism establishments in dealing with the impacts of climate change, the majority (66.7%) do not know if there were any future plans in the pipeline to minimise the negative impacts of climate change (Table 6.38). Given this scenario, it is reasonable to assume that some of the respondents are not in tune with the policies in the municipality. This is however concerning when one considers the adverse impacts of climate change on both the tourism industry and the continuous survival of the earth's species.

Table 6. 38: Future Plans to Address Negative Impacts of Climate Change

		Frequency	Percent
Valid	I don't know	4	66.7
	No response	2	33.3
Total		**6**	**100.0**

6.18 Climate Change Impacts

This section deals with the impacts of climate change in the local municipality surveyed.

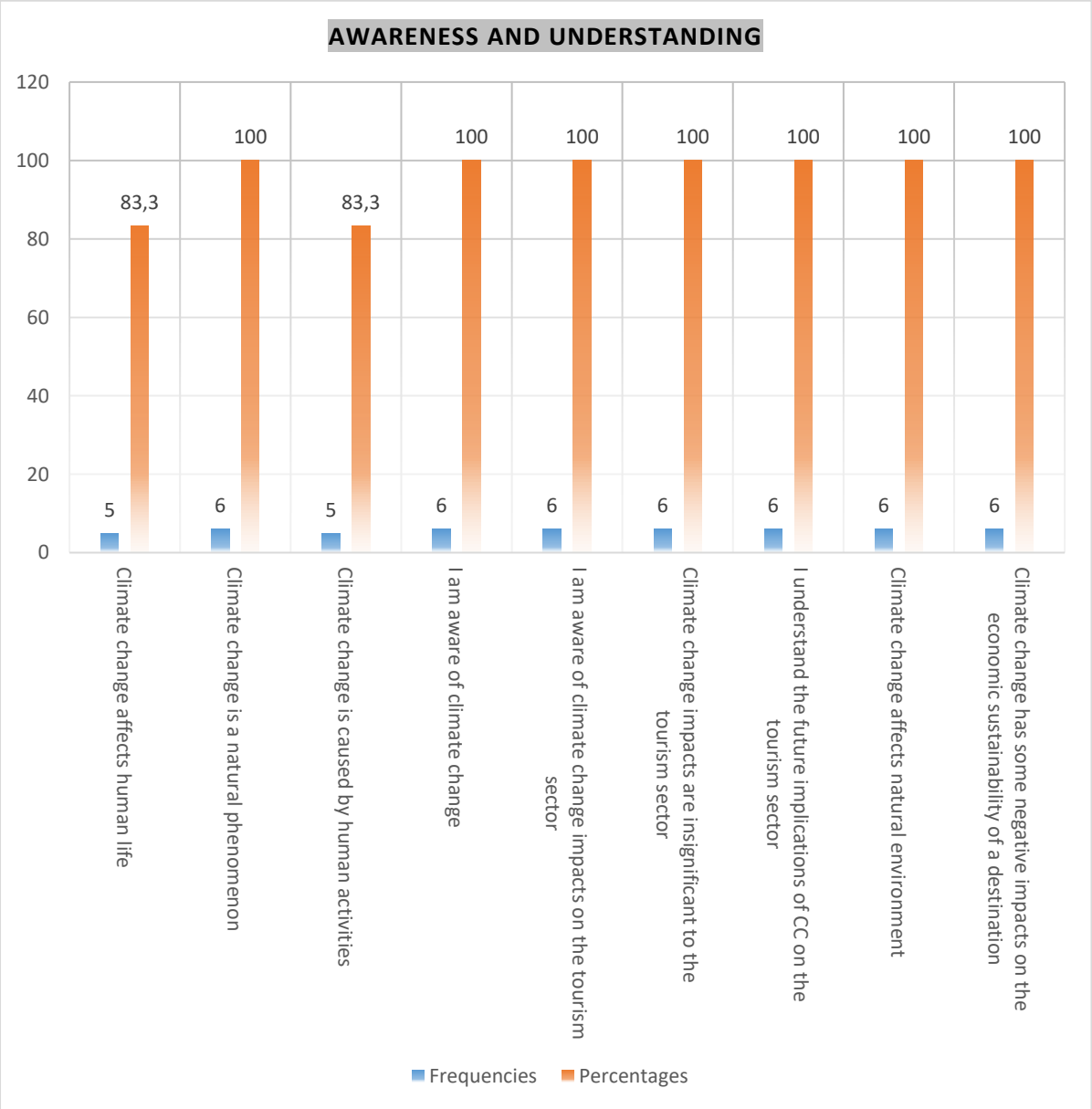
6.18.1 Awareness and Understanding of Climate Change Impacts

While noting from the preceding section that some members of the local municipality have no idea on future plans to address the harmful impacts of climate change, it was sensible to gauge their awareness and understanding of climate change. As shown in Figure 6.36, the awareness and understanding levels of climate change impacts from the local municipality was quite comprehensive, sophisticated and informed. It was found that all the respondents (100%) indicated being aware of climate change, whereas 100% of the respondents think that climate change has some major negative impacts, particularly on the financial sustainability and prosperity of the region.

Contrary to the awareness and understanding levels from other respondent groups, all the respondents (100%) respectively indicated an in-depth awareness and understanding of climate change impacts on the tourism sector, as well as the future implications that are thereof associated with climate change. In order to better understand what is observed to be the major cause of climate change in the region, the visitors were probed to rate to the extent to which they agree with climate change being caused by human activities and to what extent by natural processes.

The majority of respondents (83,3%) agreed that climate change is certainly caused and perpetuated by human activities, whereas 100% agree that climate change is a natural phenomenon. Moreover, just over half (83.3%) of the respondents think that climate change touches human life, while more than a half (100%) of the respondents think that climate change affects the natural environment. In essence, the findings of this particular segment of respondents indicated that the local municipality is indeed in a suitable position to make knowledgeable decisions regarding climate change-related issues as their level of consciousness and understanding of climate change concept is satisfactory and clear-cut.

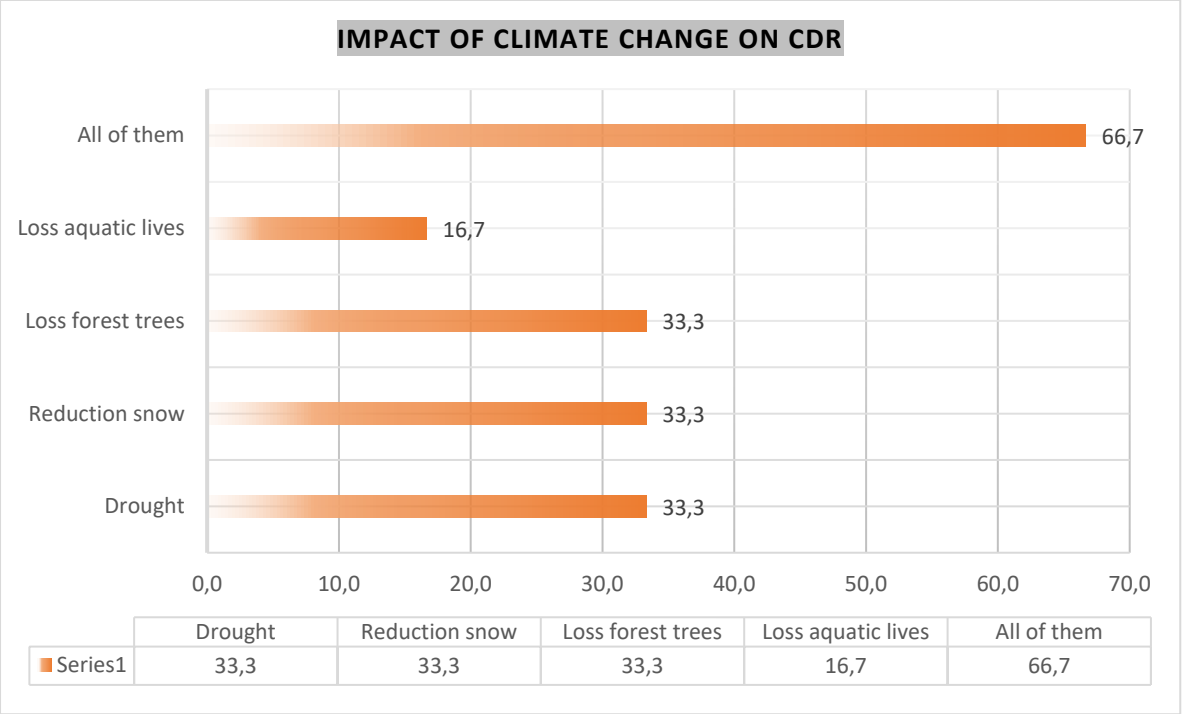
Figure 6. 36: Understanding and Awareness of Climate Change Impacts



6.18.2 Effects of Climate Change on the Central Drakensberg Region

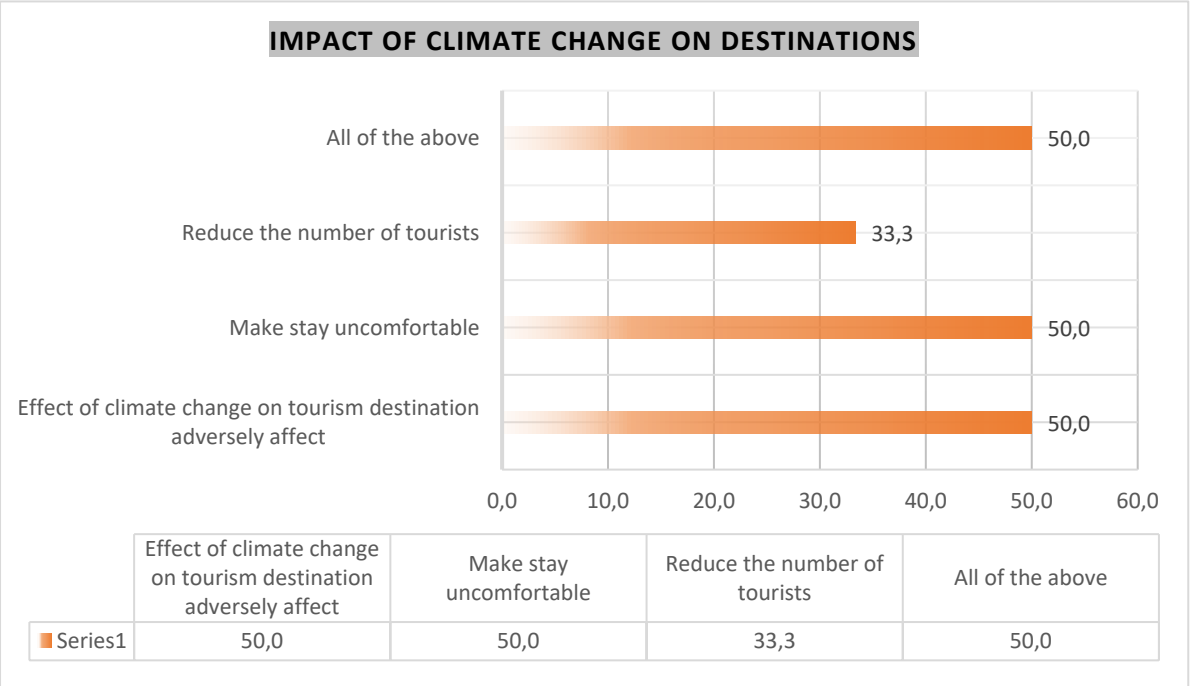
The section deals with the perception of the participants on the effects of climate change on the Central Drakensberg Region. The following question was used to prompt a response from the participants: “In the Central Drakensberg Region, what would you say are the effects of climate change?” As shown in Figure 6.37, a majority (66.7%) of the respondents consider the effect of climate change in the region to encompass the following: drought, reduction in snow, loss of forest/trees and aquatic life.

Figure 6. 37: Impacts of Climate Change in the Region



Furthermore, and in the context of tourism in CDR, half (50.0%) of the respondents believed that climate change adversely affects tourism destinations, makes the stay uncomfortable, as well as reduces the number of tourists in the region (Figure 6.38).

Figure 6. 38: Impacts of Climate Change on Tourism in the Region



From the foregoing, it is sufficient to assume that the effect of climate change is by this time being experienced in the region. This position is further reinforced by all the respondents surveyed (Table 6.39).

Table 6. 39: Time to Experience Effect of Climate Change

	Frequency	Percent
Already experiencing	6	100.0

6.19 Local Municipality Respondents' Concern on Climate Change

Climate change is considered to have a negative impact on the tourism industry. This concern was also expressed by a majority of the tourism guests and authorities previously highlighted in this chapter. With this in mind, it is pertinent to know, from the perspective of the local municipality respondents, whether they consider climate change as a cause of distress for the tourism industry.

A Chi-Square test was used to ascertain whether the scoring patterns of the respondents were expressly different in the way respondents scored (agreed, strongly agree, neutral, disagree and strongly disagree). It can be observed that all of the participants (100%) strongly agree with the statement: "climate change is certainly a cause for concern". Given the high number of participants who consider climate change as a cause of concern, it was not surprising that an overwhelming majority (100.0%) believed (strongly agree=66.7%; agree=33.3%) that climate change is distressing tourism development.

Equally concerning is that an overwhelming majority (100.0%) believed (strongly agree=50.0%; agree=50.0%) that climate conditions in the region are changing. Given the change in climatic conditions in the region, it was not surprising that all of the respondents were in agreement that climate change is reducing visitor flow into the region. The reduction of tourist in the region is highly concerning to the tourism industry as all the respondents (100.0%) believed that it reduces tourism's financial performance (strongly agree=40.0%; agree=60.0%). Nonetheless, half (50.0%) of the respondents were neutral that climate change is instigated by human activities whilst another half (50.0%) believed (strongly agree=16.7%; agree=33.3%) that humans are responsible. On the other hand, all of the respondents (100.0%) believed that climate change is triggered by natural processes. This finding is in contrast to the assertion made by the tourist visitors and authorities who both agreed that climate change is more of a human induced activity than nature.

Despite the above views, the majority (66.7%) were seemingly neutral that the climate conditions of CDR are very decent and friendly. Nevertheless, all the respondents (100.0%) believed that climate change is damaging to the environment (strongly agree=50.0%; agree=50.0%).

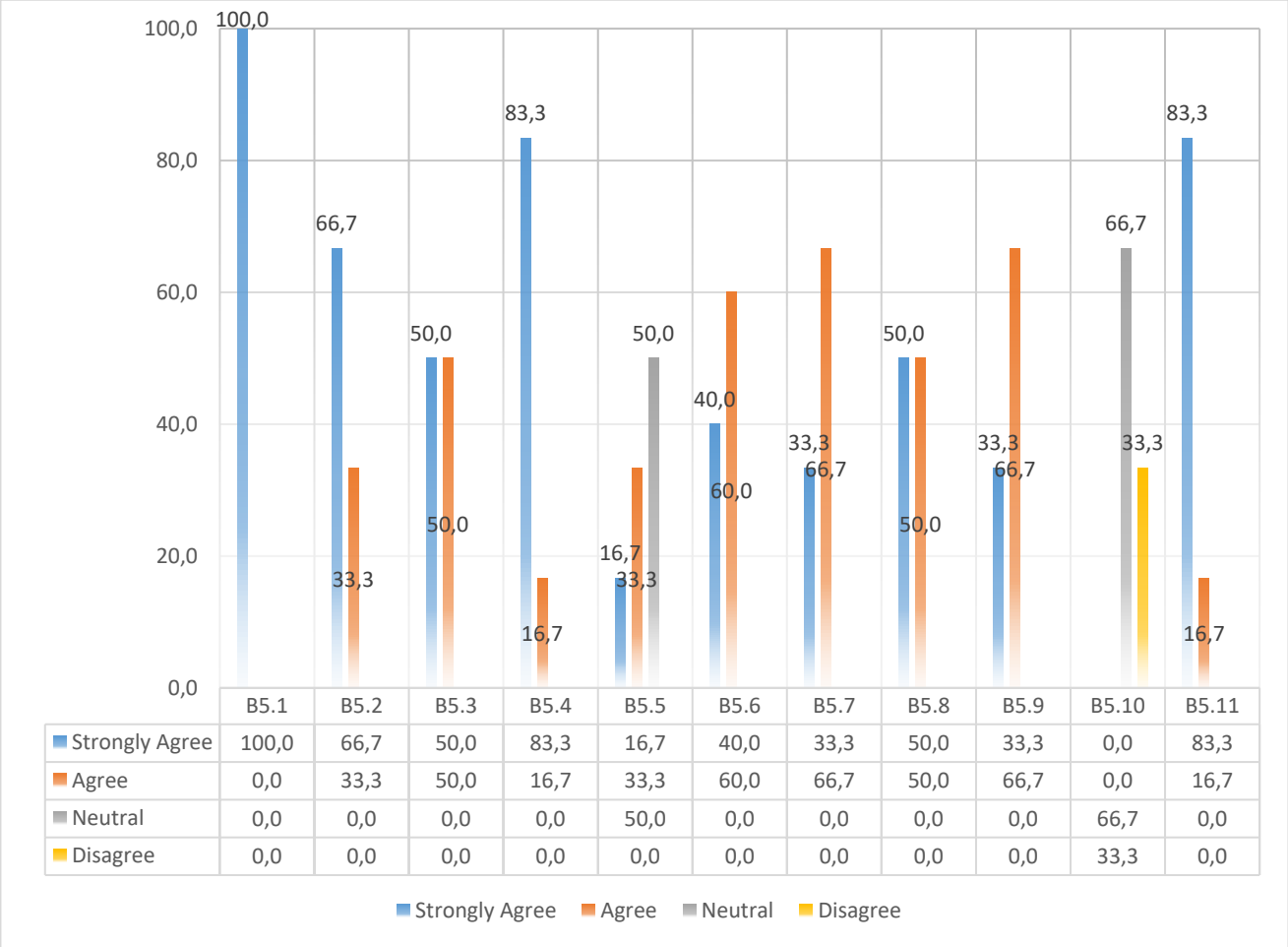
This is further reinforced by the number (100.0%) who believed (strongly agree=83.3%; agree=16.7%) that climate change is harmfully impacting the ecosystem. Hence, it was not surprising that a majority (100.0%) of the respondents have heard of climate change and its impact (strongly agree=4.2%; agree=91.7%).

Table 6. 40: Concerns on Climate Change Impacts on the Tourism Sector

FACTOR	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Chi Square
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Cause for concern	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	-
Distressing tourism development	4	66.7%	2	33.3%	0	0.0%	0	0.0%	0	0.0%	0.414
Conditions are changing	3	50.0%	3	50.0%	0	0.0%	0	0.0%	0	0.0%	1.000
Reducing visitor flow	5	83.3%	1	16.7%	0	0.0%	0	0.0%	0	0.0%	0.102
Instigated by human activity	1	16.7%	2	33.3%	3	50.0%	0	0.0%	0	0.0%	0.607
Reducing financial tourism performance	2	40.0%	3	60.0%	0	0.0%	0	0.0%	0	0.0%	0.655
Triggered by natural processes	2	33.3%	4	66.7%	0	0.0%	0	0.0%	0	0.0%	0.414
Damaging environment	3	50.0%	3	50.0%	0	0.0%	0	0.0%	0	0.0%	1.000
I have heard about it	2	33.3%	4	66.7%	0	0.0%	0	0.0%	0	0.0%	0.414
CDR conditions are decent and friendly	0	0.0%	0	0.0%	4	66.7%	2	33.3%	0	0.0%	0.414
Harmfully impacting ecosystem	5	83.3%	1	16.7%	0	0.0%	0	0.0%	0	0.0%	0.102

Figure 6.39 further depicts the local municipality views on the concerns of climate change. At a glance, it can be understood that a great number of respondents were in consensus that climate change is a cause for concern to the tourism industry.

Figure 6. 39: Perceptions of Climate Change Impacts



	B5.1	B5.2	B5.3	B5.4	B5.5	B5.6	B5.7	B5.8	B5.9	B5.10	B5.11
Strongly Agree	100,0	66,7	50,0	83,3	16,7	40,0	33,3	50,0	33,3	0,0	83,3
Agree	0,0	33,3	50,0	16,7	33,3	60,0	66,7	50,0	66,7	0,0	16,7
Neutral	0,0	0,0	0,0	0,0	50,0	0,0	0,0	0,0	0,0	66,7	0,0
Disagree	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	33,3	0,0

6.19.1 Local Municipality Perceptions on Climatic Conditions in the CDR

Given the above shared environmental impacts of climate change and its impact on tourism destinations, it was critical to know from the standpoint of the local municipality respondents whether the climatic conditions in the Central Drakensberg Region will adversely impact tourism in the region. A Chi-Square test was used to determine whether the scoring patterns of the respondents were expressively different in the way the respondents scored (agreed, strongly agree, neutral, disagree and strongly disagree). The results are summarised in Table 6.41.

In terms of their perceptions on the impacts of climatic condition on tourism destinations in the region, all (100.0%) of the respondents were in agreement that climate change impacts tourism destinations in the region. Regarding the tourism flow in the region, all of the respondents (100.0%) were in agreement (strongly agree=83.3%; agree=16.7%) that climate change impacts on tourism flow in the region.

With reference to the impacts of climate change on financial performance, a majority (83.4%) were in agreement (strongly agree=66.7%; agree=16.7%) that climate change impacts on the financial performance of tourism in the region. As such, it was no surprised that an overwhelming majority (100.0%) consider that climate change impacts on tourism employment in the region.

Regarding the impact of climate change on the ecosystem in the region, all of the respondents (100.0%) were in agreement (strongly agree=66.7%; agree=33.3%) that climate change impacts on the ecosystem. This is also further supported by a majority (100.0%) who believed that climate change impacts on the natural landscapes of the region (strongly agree=66.7%; agree=33.3%). Moreover, a majority (66.7%) consider (strongly agree=50.0%; strongly agree=16.7%) that the climate conditions in the region will adversely impact community participation in tourism. Given the major role of the community in advancing tourism, it was no surprised that the majority (100.0%) believed that the major tourism role-players will be adversely impacted by climate change (strongly agree=50.0%; agree=50.0%).

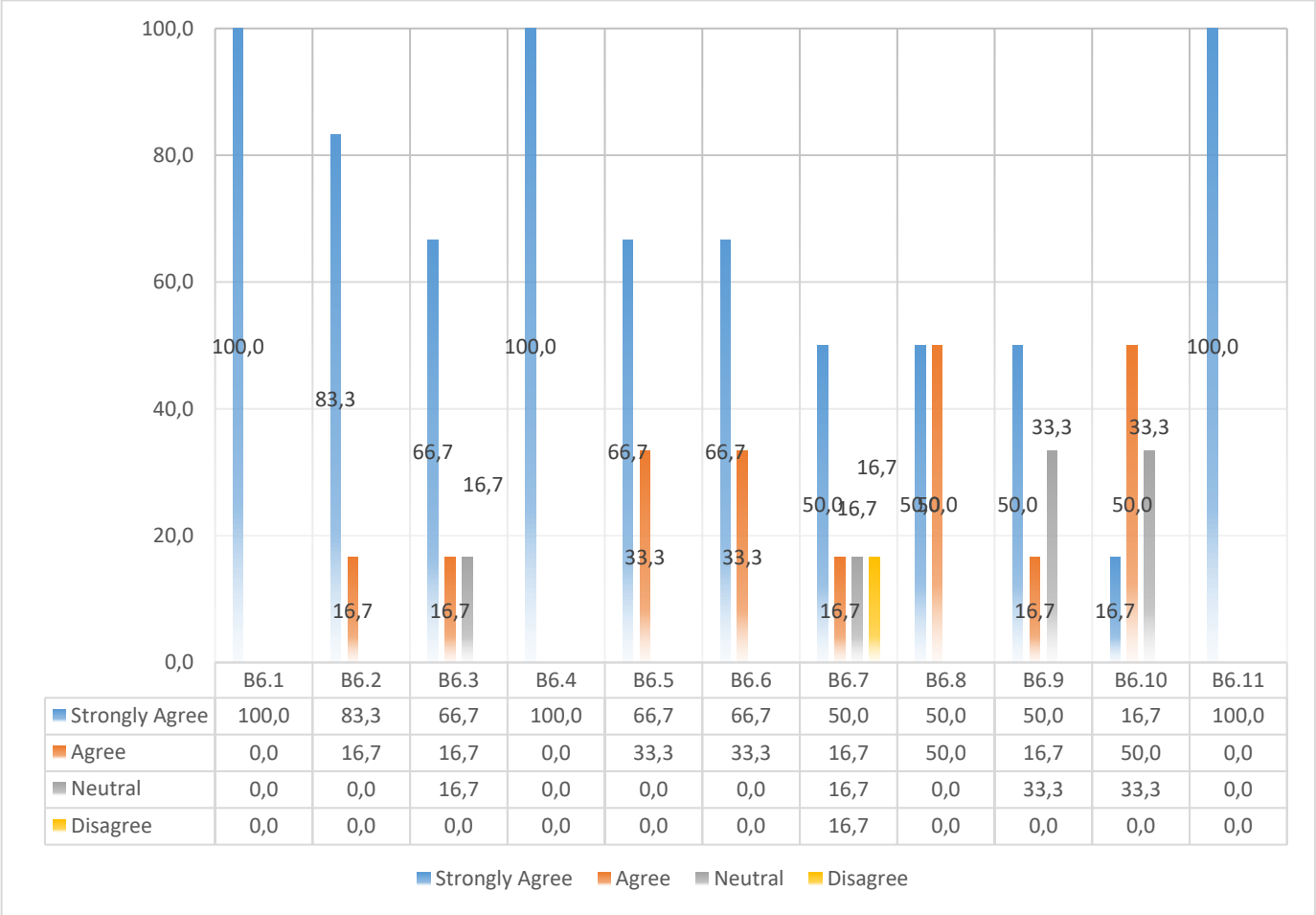
On the investment prospects in the region, the majority (66.7%) believed (strongly agree=50.0%; agree=16.7%) that climate change will adversely impact investment prospects in the region and adversely impact tourism infrastructure (strongly agree=16.7%; agree=50.0%). The absence of investment and infrastructure would ultimately impact on the prospects of tourism in the region. This assertion is reinforced by the majority (100.0%) who believed that climate change will adversely impact on the future of tourism in the region.

Table 6. 41: Impacts of Climate Change in the Central Drakensberg Region

	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Chi Square
IMPACTS	**Count**	**Row N %**	**Count**	**Row N %**	**Count**	**Row N %**	**Count**	**Row N %**	**Count**	**Row N %**	**p-value**
Tourism destination in region	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	-
Tourism flow in region	5	83.3%	1	16.7%	0	0.0%	0	0.0%	0	0.0%	0.102
Financial performance	4	66.7%	1	16.7%	1	16.7%	0	0.0%	0	0.0%	0.223
Tourism employment	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	-
Climatic conditions ecosystem DB	4	66.7%	2	33.3%	0	0.0%	0	0.0%	0	0.0%	0.414
Natural landscapes	4	66.7%	2	33.3%	0	0.0%	0	0.0%	0	0.0%	0.414
Community participation	3	50.0%	1	16.7%	1	16.7%	1	16.7%	0	0.0%	0.572
Major tourism role players	3	50.0%	3	50.0%	0	0.0%	0	0.0%	0	0.0%	1.000
Investment prospects	3	50.0%	1	16.7%	2	33.3%	0	0.0%	0	0.0%	0.607
Tourism infrastructure	1	16.7%	3	50.0%	2	33.3%	0	0.0%	0	0.0%	0.607
Future of tourism	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	-

Figure 6.40 further depicts the local municipality respondents' views on the adverse impacts of climate change in the region. An overwhelming majority of the respondents were in agreement that climate change adversely impacts tourism in the region.

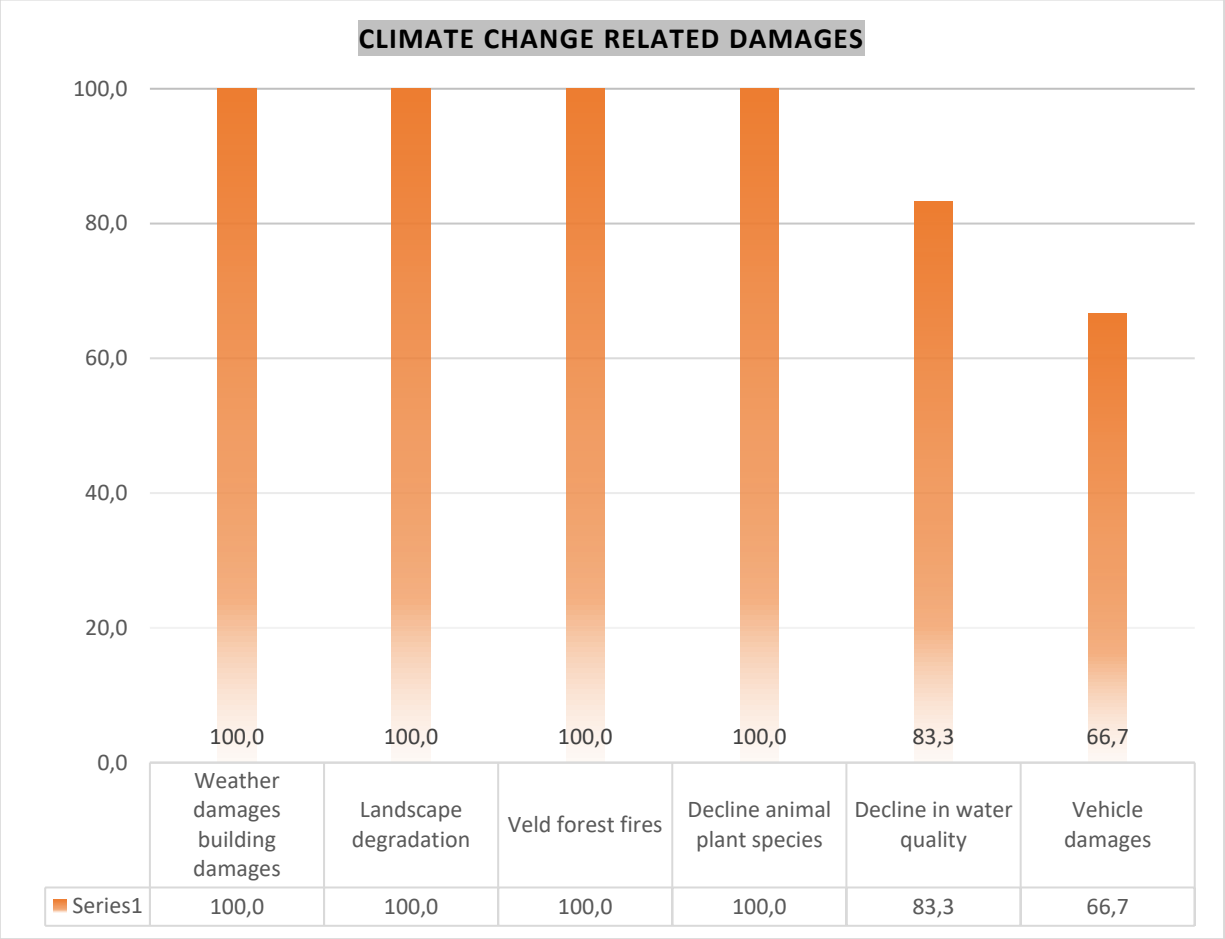
Figure 6. 40: Climate Change Perceptions in CDR



	B6.1	B6.2	B6.3	B6.4	B6.5	B6.6	B6.7	B6.8	B6.9	B6.10	B6.11
Strongly Agree	100,0	83,3	66,7	100,0	66,7	66,7	50,0	50,0	50,0	16,7	100,0
Agree	0,0	16,7	16,7	0,0	33,3	33,3	16,7	50,0	16,7	50,0	0,0
Neutral	0,0	0,0	16,7	0,0	0,0	0,0	16,7	0,0	33,3	33,3	0,0
Disagree	0,0	0,0	0,0	0,0	0,0	0,0	16,7	0,0	0,0	0,0	0,0

Drawing from the above adverse impacts of climate change in the region, it was sensible to explore what form of damaged the local area had experienced from climate change in the last five years. As depicted in Figure 6.41, all the respondents (100.0%) accentuated that the weather has caused damages to buildings, veld forest fires and a decline in plant and animal species. In addition, a majority (83.3%) indicated that climate change lead to a decline in water quality, while 66.7% indicated that climate change had resulted in vehicle damages.

Figure 6. 41: Damage Cause by Climate Change in the Region



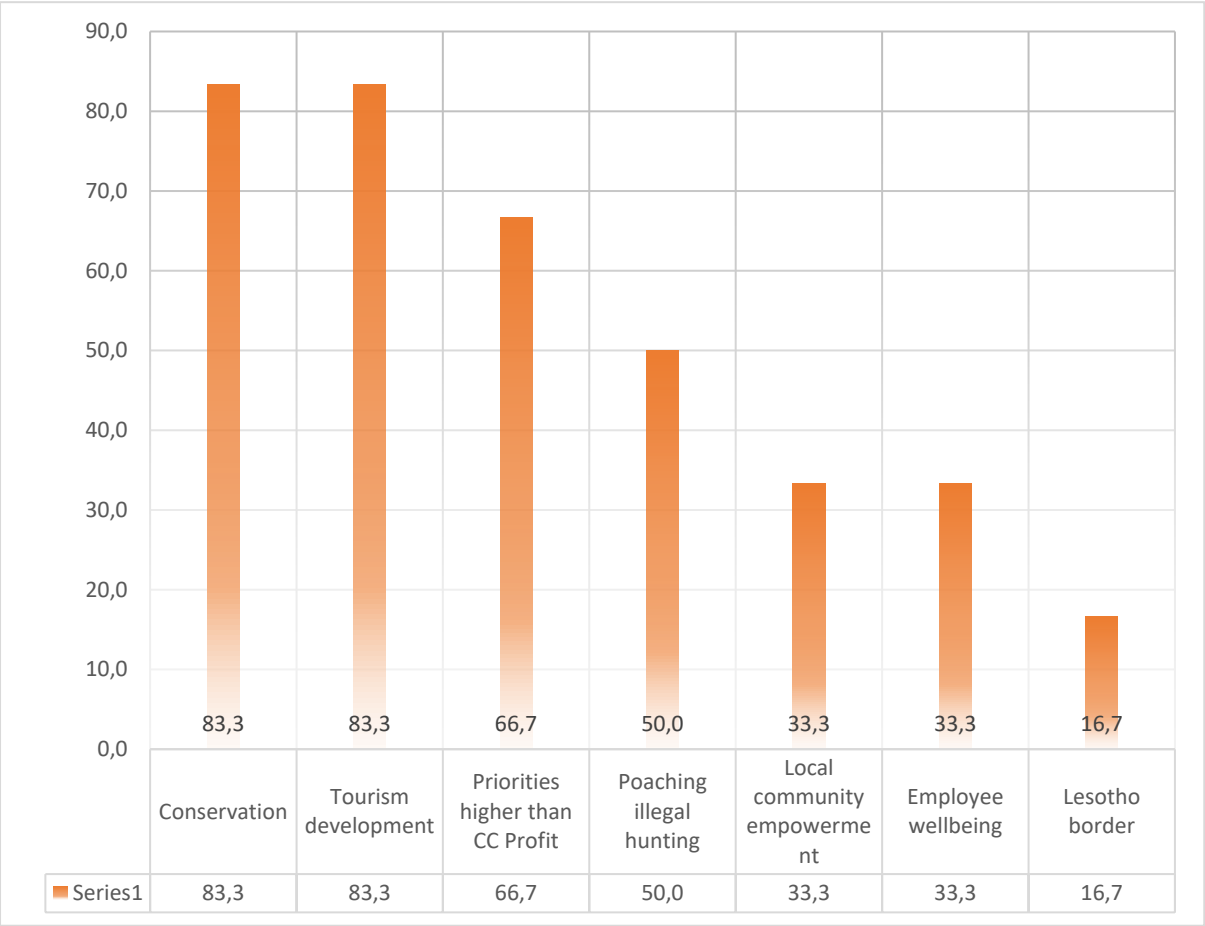
The above damages of climate change present a serious hazard to tourism in the region. Hence it was not surprising that all the respondents indicated that climate change has a damaging impact on the long-term sustainability of tourism in the region (Table 6.42).

Table 6. 42: Impacts of climate change on the long-term sustainability of tourism

	Frequency	Percent
Negative	6	100.0

Given the perceived damaging impact on the long-term prosperity of tourism in the region, it was prudent to know what the local municipality respondents consider as a priority that ranked higher in the municipality than climate change adaptation. As shown in Figure 6.42, conservation and tourism development were ranked as the highest priority area, while the Lesotho border was considered the least priority for the municipality.

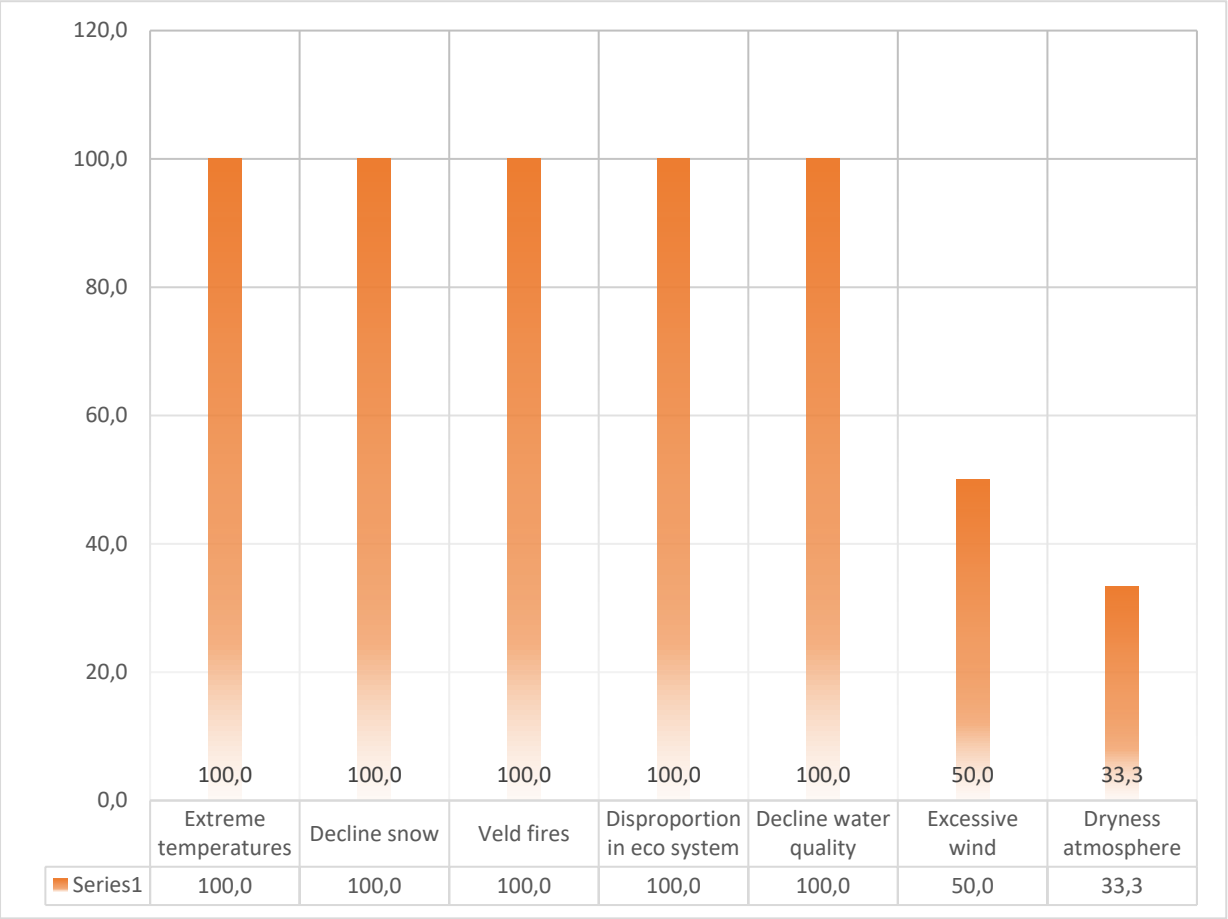
Figure 6. 42: Priority that Ranked Higher in the Region



Given that tourism development was noted to be amongst the highest priority area in the region, it was expedient to know some of the major weather-related damages that have occurred in the region as a result of climate change.

As shown in Figure 6.43, extreme temperature, declining snow, Veld fires, disproportions in the ecosystem and declines in water quality were indicated as some of the major weather-related damages in the region.

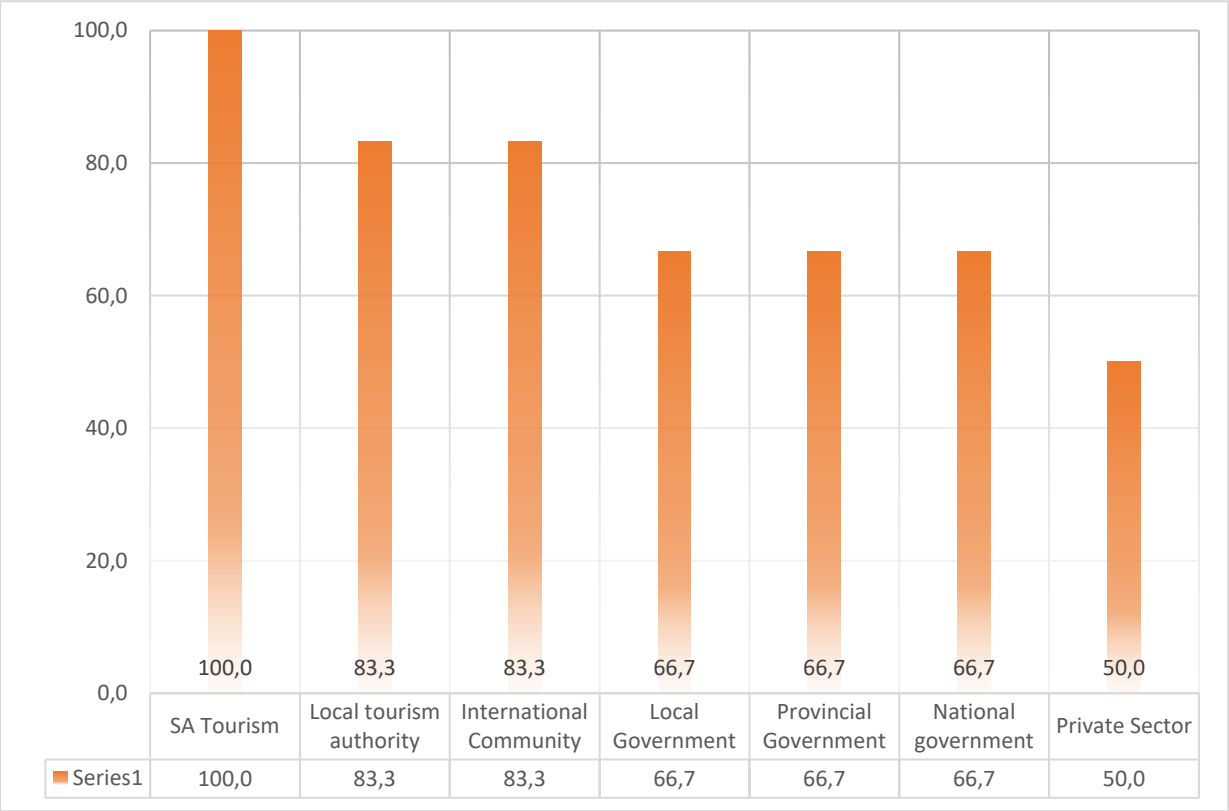
Figure 6. 43: Weather-Related Damages Attributed to Climate Change



6.20 Management of Climate Change Impacts in CDR

This section deals with perceptions of the local municipality participants on which role player/tourism authority is best suited to deal with the economic and environmental effects of climate change on tourism. Contrary to the views of both the tourist visitors and the tourism authority respondents, a majority (100.0%) of the local municipality participants indicated that the South African tourism authority is best suited to deal with the economic and environmental effects of climate change on tourism (Figure 6.44).

Figure 6. 44: Management of Climate Change Impacts



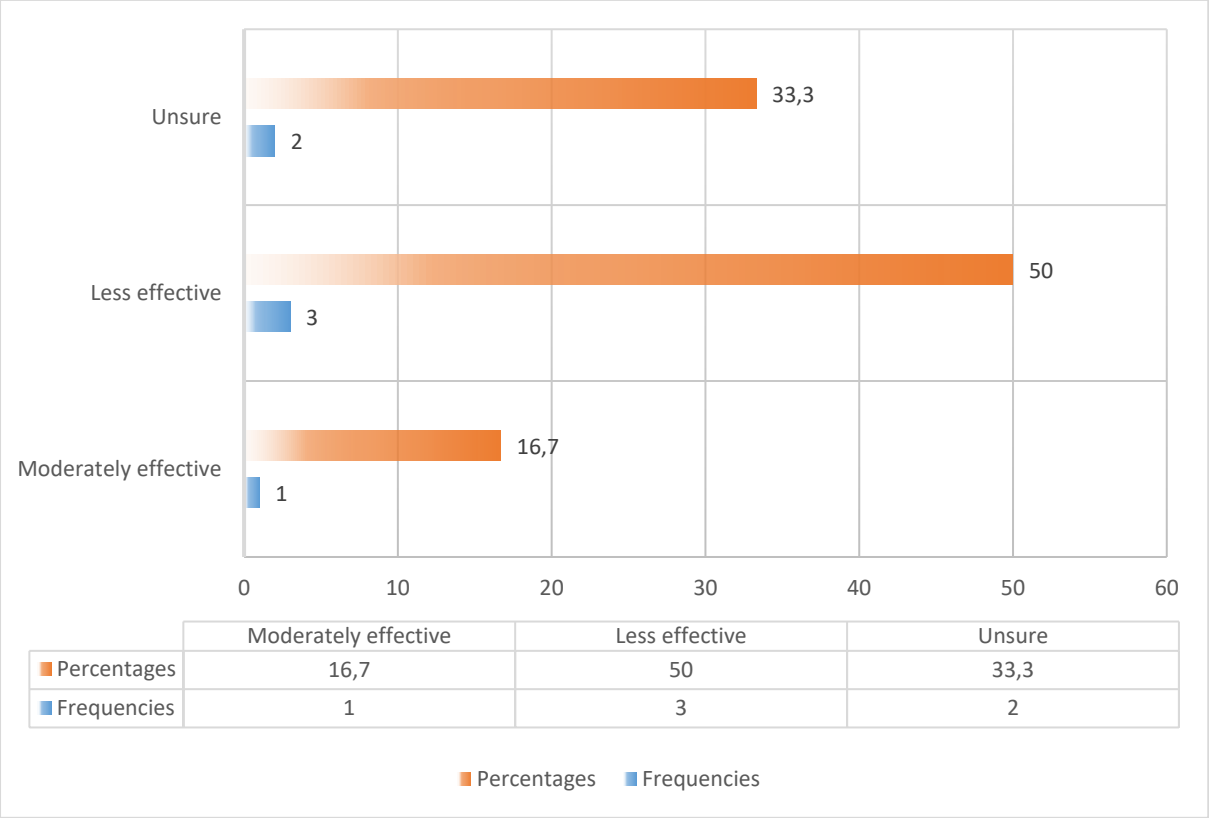
Moreover, the respondents were asked if there have been any strategies introduced to address climate change impacts in the region. As shown in Table 6.43, there was a mixed response to the question as an equal number of respondents indicated “yes” and “no”.

Table 6. 43: Strategies to Reduce the Impacts of Climate Change

	Frequency	**Percent**
Yes	3	50.0
No	3	50.0
Total	**6**	**100.0**

Amongst those who indicated that there are strategies to minimize the impacts of climate change in the region, half (50.0%) of them claim that the strategies are less effective (Figure 6.45). This is understandable when one considers the above impacts and damages of climate change to the environment and tourism economy.

Figure 6. 45: Effectiveness of the Climate Change Policies



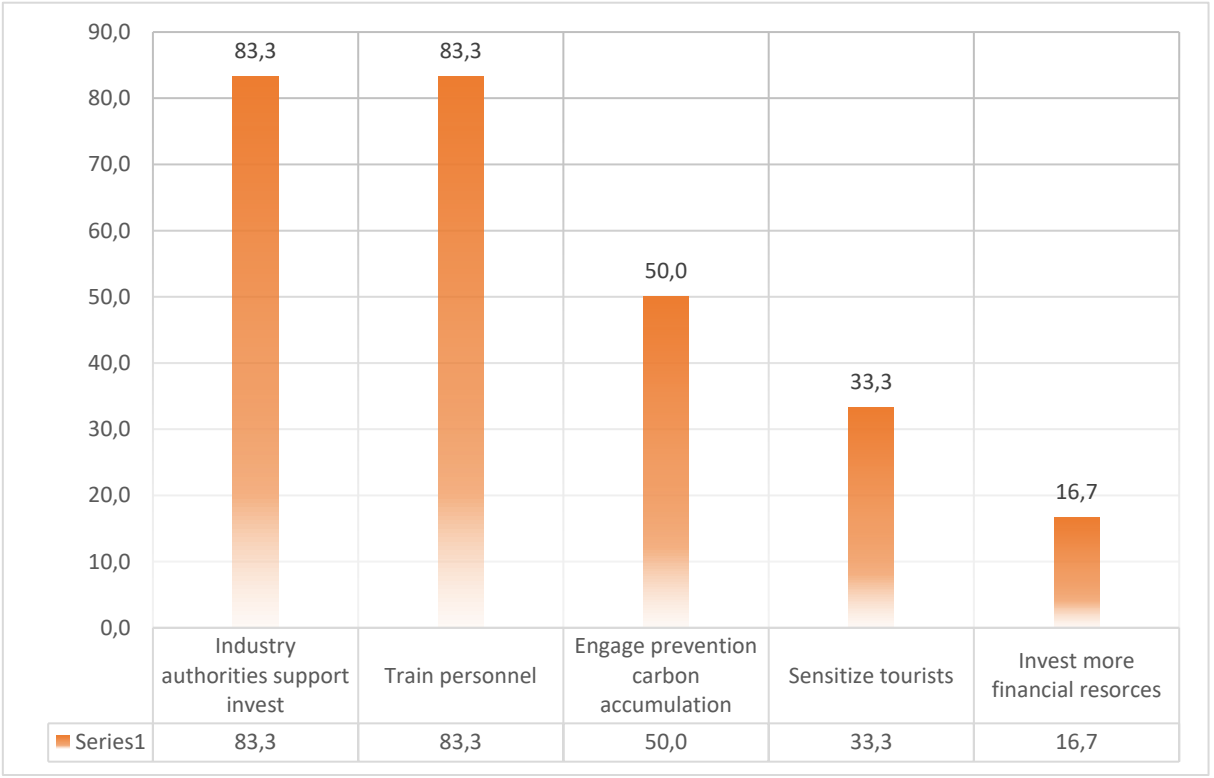
Despite the perceive concern about the effectiveness of the strategies to address climate change in the region, majority (83.3%) claim that the region requires a form of model/theoretical framework that assist sin assessing and managing the negative impact of climate change on tourism (Table 6.44).

Table 6. 44: Framework to Manage the Negative Impacts of Climate Change

	Frequency	**Percent**
Yes	5	83.3
No	1	16.7
Total	**6**	**100.0**

Although there is a claim by the majority of respondents from the local municipality that the climate change policies and policies in the region are guided by frameworks and models, a majority however consider this to be less effective in reducing the impacts of climate change in the region. Given this concern, the respondents were asked what they think the tourism industry authorities should do to deal with the impacts that climate change may have on tourism in the region. As depicted in Figure 6.46, a majority (83.4) stated that industry authorities should support investment, as well as train personnel on how best to mitigate against climate change.

Figure 6. 46: Strategies to Minimise Climate Change Impacts



6.20.1 Climate Change Impacts on the Influx of Visitors to the CDR

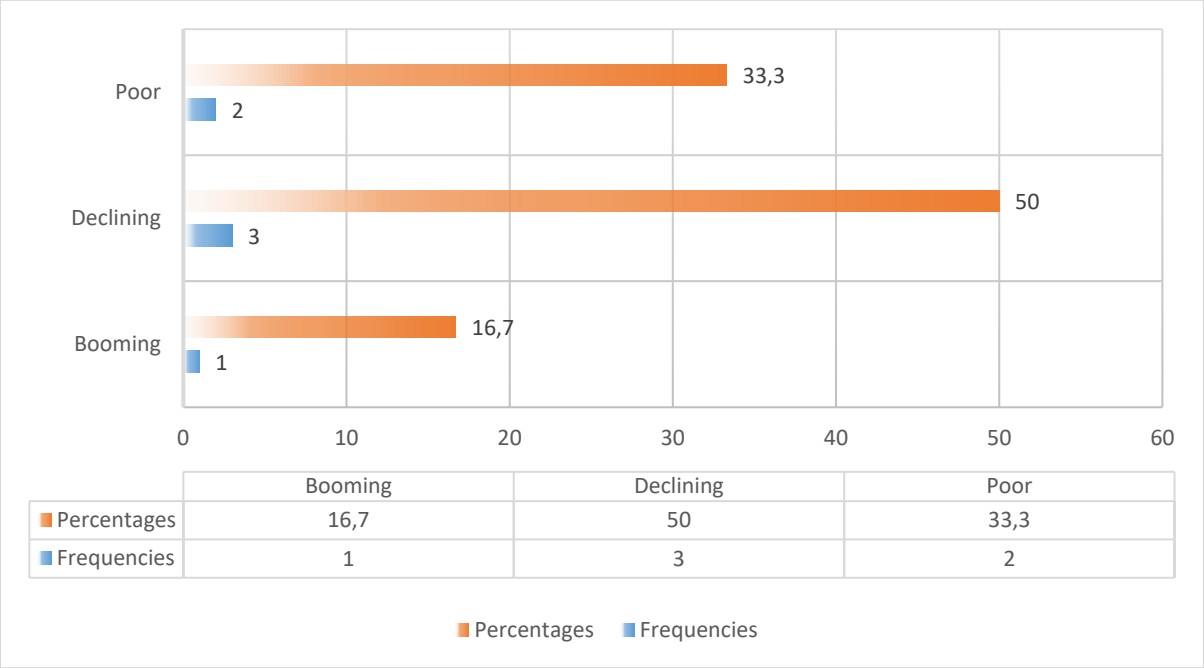
Given the above negative impacts of climate change and the limited strategy available to deal with its adverse effects on the infrastructure in the region, it was not surprising to find the majority (83.3%) viewing the impacts of climate change as a factor in the reduction in the influx of tourists into the region (Table 6.45).

Table 6. 45: Impacts of Climate Change on Tourist Influx into the Region

	Frequency	Percent
Yes	5	83.3
No	1	16.7
Total	**6**	**100.0**

The above result is further supported by the status of tourist influx into the region given in Figure 6.47. The majority (50.0%) see tourist flow into the region declining, whilst 33.3% claimed that the inflow was poor.

Figure 6. 47: Status of Tourist Influx into the Region



Despite the declining tourist influx into the region, respondents appeared to be divided as to whether climate change is responsible for the trend (Table 6.46).

Table 6. 46: Climate Change as the Cause of Decline in the Influx of Tourists

	Frequency	Percent
Yes	3	50.0
No	3	50.0
Total	**6**	**100.0**

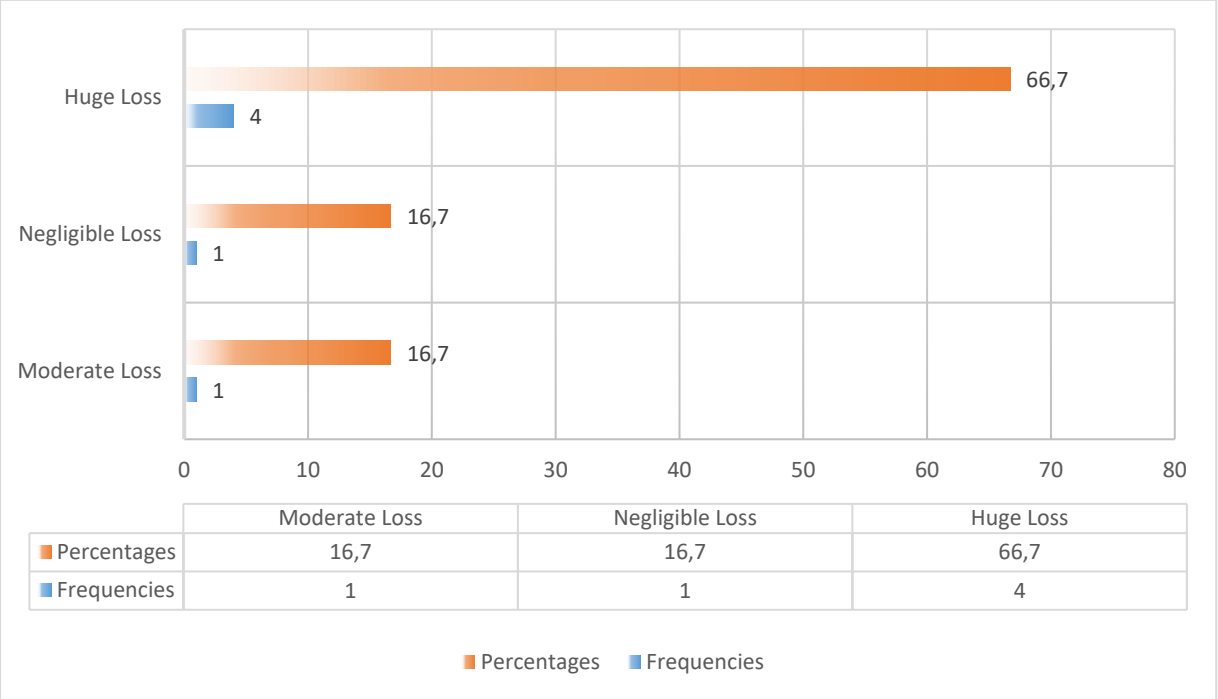
However, when the local municipality respondents were asked: "What influence does climate change have on the environmental characteristics of the region, expectedly the majority of respondents indicated that climate change has a negative influence on the environment (Table 6.47).

Table 6. 47: Environmental Impacts of Climate Change in the CDR

	Frequency	Percent
Negative	6	100.0

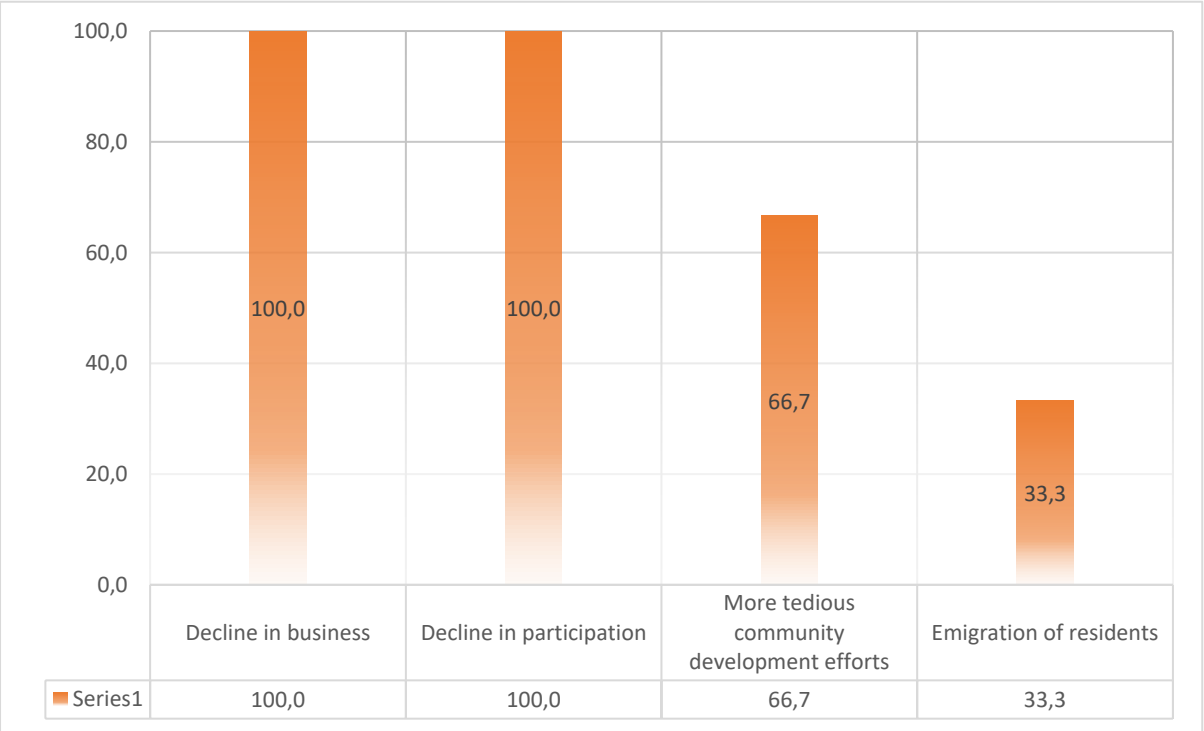
Given the above negative influence of climate change on the environment in the region, it was not surprising that the majority (66.7%) indicated that local tourism had suffered a huge loss economically in the past 5 years (Figure 6.48).

Figure 6. 48: Economic Loss of Local Tourism in the Last Five Years



Further to the above, when asked the following question: "What impact does climate change impose on the local community of the region in relationship to tourism development?", declines in business as well as declines in participation had the greatest impact (Figure 6.49). Other notable impacts include tardiness in community development.

Figure 6. 49: Areas Impacted by Climate Change in CDR Tourism



The above section accentuates that climate change negatively impacts the environment, businesses as well as the development of tourism in the region. Noting this concern, a Chi-Square experiment was used to compare the scoring pattern in the rating of the susceptibility of the critical divisions of climate change in the area. As highlighted in Table 6.48, half (50.0%) of the respondents rated tourism as well as landscape to be strongly vulnerable in the region. Notwithstanding this, 33.3% rated the local community to very vulnerable and moderately vulnerable, respectively.

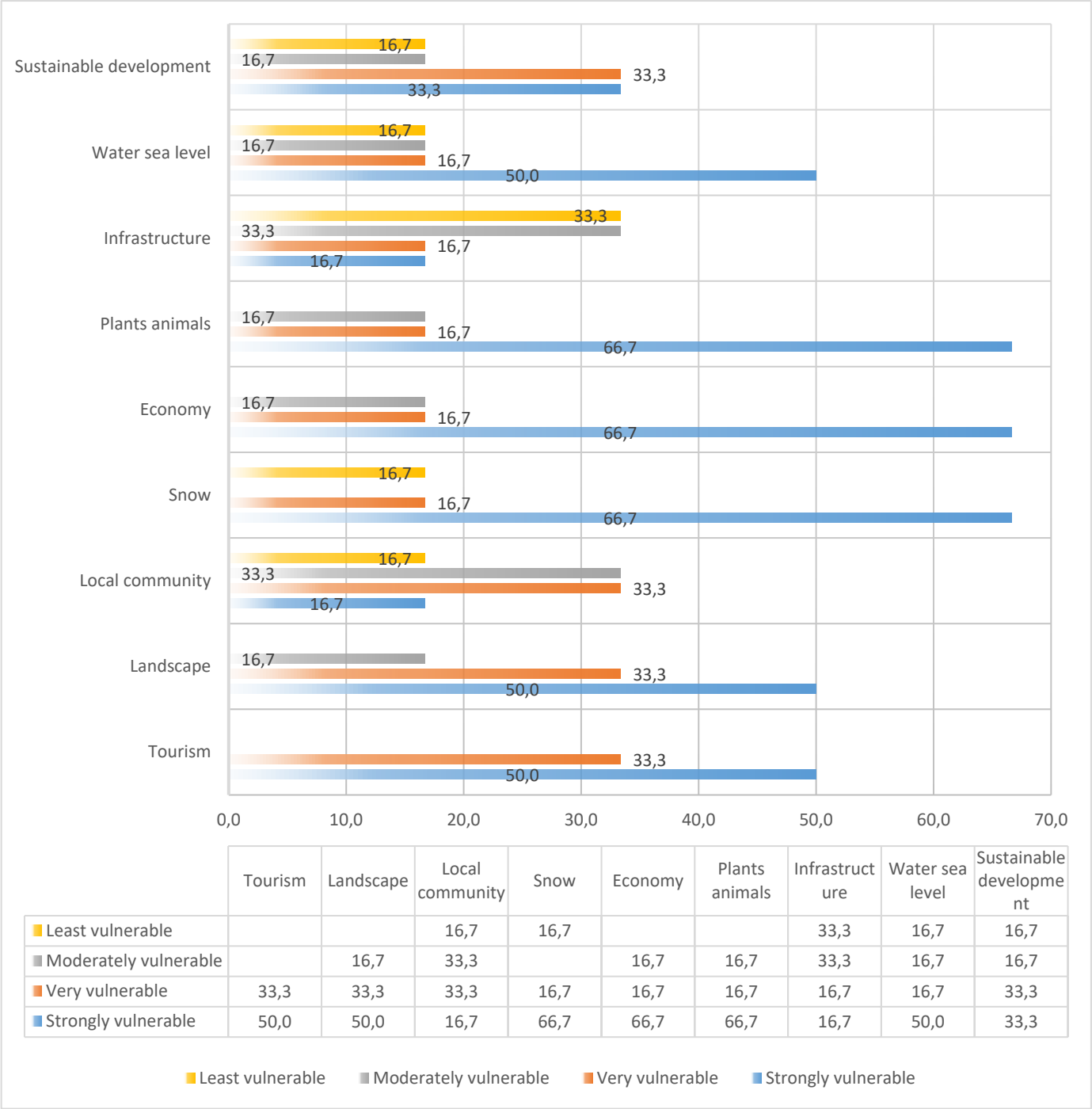
In terms of the economy, snow and plants and animals, a majority (66.7%) viewed these to be strongly susceptible to climate change in the region. However, more participants indicated that infrastructure is moderately or least vulnerable to climate change. In addition, and in terms of the vulnerability of the water sea level, a majority (50.0%) believed this to be strongly susceptible to climate change in the region, whilst sustainable development is viewed to be strongly or very vulnerable in the region by more (33.3%) of the respondents.

Table 6. 48: Sector Vulnerability as Attributed to Climate Change

	Strongly vulnerable	Very vulnerable	Moderately vulnerable	Least vulnerable	Chi Square p-value
Tourism	50.0	33.3			0.607
Landscape	50.0	33.3	16.7		0.607
Local community	16.7	33.3	33.3	16.7	0.881
Snow	66.7	16.7		16.7	0.223
Economy	66.7	16.7	16.7		0.223
Plants animals	66.7	16.7	16.7		0.223
Infrastructure	16.7	16.7	33.3	33.3	0.881
Water sea level	50.0	16.7	16.7	16.7	0.572
Sustainable development	33.3	33.3	16.7	16.7	0.881

Figure 6.50 further provides evidence on the vulnerability of the region due to climate change. The high rating of the economy, snow, plants and animals, and tourism suggests that these sectors present a more vulnerability risk to climate change.

Figure 6. 50: Sector Vulnerability as Attributed to Climate Change



	Tourism	Landscape	Local community	Snow	Economy	Plants animals	Infrastructure	Water sea level	Sustainable development
Least vulnerable			16,7	16,7			33,3	16,7	16,7
Moderately vulnerable		16,7	33,3		16,7	16,7	33,3	16,7	16,7
Very vulnerable	33,3	33,3	33,3	16,7	16,7	16,7	16,7	16,7	33,3
Strongly vulnerable	50,0	50,0	16,7	66,7	66,7	66,7	16,7	50,0	33,3

6.21 Factor Analysis

Factor analysis is utilised in examining the measuring instrument's construct validity. The core aim of factor analysis is identifying items that belong together in such a way that they are similarly answered and they measure the same factor or dimension. Sekaran and Bougie (2014:35) point out that this statistical technique is employed mainly to measure construct validity. Apart from measuring construct validity, factor analysis is utilised to decrease the number of variables from large to small, as well as for the establishment of underlying dimensions between measured constructs and variables. Watkins (2018:226) states that factor analysis is carried out on a set of items and produces a factor loading matrix as its primary output. Factor loading entails a correlation between a factor that has been extracted from the data and variable. The loadings are correlations between factors and items. Normally, large values serve as indicators in which such items are grouped to a particular factor. Below are the three factor tables followed by a brief discussion

Table 6. 49: KMO and Bartlett's Test

Section	Name	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
			Approx. Chi-Square	df	Sig.
B5	Climate change impacts on tourist destination choice	0.641	704.362	55	0.000
B6	Climate change impacts on the tourism industry of CDR	0.675	712.812	55	0.000
B7	Climate change factors that assist and/or prevent visitors choose of a tourist destination	0.641	311.808	10	0.000
C6	Level of influence would be changing climatic conditions have on visitor decision to travel to central Drakensberg region	0.794	2430.184	36	0.000
D3	Fundamental conducts that visitors and local communities can do to minimize the impacts of climate change to tourism	0.674	922.079	21	0.000
D4	Vulnerable of various sectors to climate change in the CDR	0.832	1319.268	36	0.000

All of the elements are accordingly achieved for factor analysis. Specifically, the Kaiser-Meyer-Olkin evaluation of Sampling Adequacy value has to be greater than 0.500 and the Bartlett's Experiment of Sphericity sig. value has to be less than 0.05.

6.21.1 Rotated Component Matrix (RCM)

The rotated component matrix helps the principal investigator to ascertain what the components represent. The details are explained in Tables 6.50 to 6.55 below, in the RCM:

Table 6. 50: Climate change Impacts on Tourist Destination Choice

Rotated Component Matrix[a]			
B5	Component		
	1	2	3
Climate and weather conditions	0.547	0.211	-0.152
Food quality and price	0.368	0.662	-0.103
Quality and the price of accommodation	0.149	0.864	0.014
Cleanliness of destination	-0.158	0.718	0.337
Safety and security	-0.159	0.164	0.722
Easy accessibility of a destination	0.099	0.168	0.725
Beautiful scenery	0.199	-0.294	0.724
Quality of the area's natural setting	0.615	0.051	0.357
Cultural and historical attractions	0.780	-0.005	0.121
Beach facilities/amenities	0.664	0.029	-0.084
The physical images and presentation of the location	0.617	0.063	0.058
Extraction Method: Principal Component Analysis. a. 3 components extracted.			

The statement that constituted this section, "Climate change impacts on the tourist destination choice", loaded completely along a triple component. This implies that the statements that constituted this section perfectly measured what they were set out to measure. It also implies that the respondents understood the meanings and intentions of this set of questions and had comparable perceptions towards these questions. The highest levels of scoring (0.864, 0.780, 0.725, 0.724 and 0.722) indicate that the quality and the price of accommodation; cultural and historical attractions; safety and security; beautiful scenery and easy accessibility of a destination were stated as being highly significant to visitors when choosing a holiday destination.

These results suggest that favourable climatic change conditions which will probably hearten fine-looking scenery, attractive landscape and the physical appearance of the destination are considered as particularly imperative for visitors when selecting a destination. Therefore, such outcomes place great importance for the tourism destination to maintain favourable conditions in order to satisfy the essentials that visitors consider as significant when deciding on a destination.

Table 6. 51: Climate Change Impacts on the Tourism Industry of CDR

Rotated Component Matrix[a]				
B6	Component			
	1	2	3	4
Climate change is certainly a cause for concern	0.684	-0.027	-0.341	0.130
Climate change is distressing tourism development	-0.122	0.788	0.124	0.085
The global climatic conditions are changing	-0.048	0.842	0.079	0.034
Climate change is reducing visitor flow in tourism destinations	-0.117	0.592	0.308	0.265
Climate change is regularly instigated by human activity	0.064	0.266	0.816	-0.022
Climate change is reducing tourism financial performance	-0.097	0.076	0.843	0.185
Climate change is often triggered by natural processes	0.669	-0.423	0.057	0.037
Climate change is damaging the environment	-0.099	0.108	0.122	0.829
I have before heard of climate change and it impacts	0.099	0.087	0.016	0.700
The climate conditions of CDR are very decent and friendly	0.736	-0.121	0.038	-0.051
Climate change is harmfully impacting the ecosystem	0.733	0.038	0.033	-0.045

Extraction Method: Principal Component Analysis.
a. 4 components extracted.

The statement that constituted this section, "Climate change impacts on the tourism industry of CDR", loaded fully along four components. This signifies that the factors that constituted this unit perfectly evaluated what they were designated to evaluate. It also signifies that the participants clearly comprehended the meanings and objectives of this set line of questions and had comparable opinions towards these questions. The maximum levels of scoring (0.843, 0.842, 0829, 0.816 and 0.788) indicate that climate change is a serious concern for the tourism industry of CDR. The highest (0.843) scoring item shows that the problem of changing climatic conditions is reducing tourism's financial performance.

This is supported by Moreno (2010) whose study asserted that the majority of visitors were not willing to visit destinations that are hugely impacted by climate change. Climate change is said to have a dreadful negative effect on the environment, which is clearly indicated on the above table (0.829). These results show that the implications of climate change on the tourism industry are undesirable. As such, the economy of CDR, which is largely dependent on tourism (Ngxongo 2016: 109) is destructively affected. Moreover, the environmental superiority that makes CDR a strategic tourist destination is gradually deteriorating, leaving the tourism sector more vulnerable: all because of climate change.

Table 6. 52: Climate Change Influence on Visitor Behaviour

Rotated Component Matrix[a]		
B7	Component	
	1	2
I am pleased to spend my money in a destination that is environmentally friendly	0.737	0.027
I would be willing to pay higher accommodation prices to assist with the costs associated with adapting to climate change	0.059	0.912
Climate change does impact the visitor's spending pattern and behaviour	0.828	-0.120
I would cancel my vacation if the conditions are unstable due to climatic conditions	0.681	-0.376
I would still visit the destination even if the weather conditions are unfavourable	-0.342	0.749
Extraction Method: Principal Component Analysis. a. 2 components extracted.		

The above section (Table 6.52) also loaded along two constituents. The participants therefore identified different trends with the questions that focused on exploring the influence of climate change on tourists' travel habits. The highest level of the scoring (0.912, and 0.828) indicates that visitors are mindful about the issue of climate change, hence they are more likely to travel to a destination that is actively involved in reducing the impacts of climate change. These outcomes are parallel with the study conducted by Grant (2015:90). In his study, nearly half of the respondents indicated that they would be prepared to pay higher accommodation charges in order to assist the establishment with its climate change mitigation-related costs.

The second highest scoring element was that of spending pattern and behavior. The majority of visitors agreed that changing climatic conditions are harmfully influencing their spending and behavioral pattern when visiting CDR. This was due to the conviction that climate change affects most of the outdoor attractions, therefore making it challenging for visitors to spend their financial resources. Visitors are also willing to spend spontaneously in destinations that offer the finest ecosystems. Moreover, for the reason that climate change damages the environment of CDR, visitor spending and behavior is enormously impacted. Respondents were also probed on whether they would be prepared to spend more money on a destination that is environmentally friendly. A great number of the respondents (0.737) pointed out that they would in fact choose to pay more. This was motivated by the appeal of a "caring" destination that is in support of protecting the environment.

Table 6. 53: Climatic Conditions' Influence on Visitor Decision/Choice

Rotated Component Matrix[a]		
C6	Component	
	1	2
Minimum snow cover in the region	0.718	0.066
Degraded landscapes	-0.166	0.862
Increased rainwater	-0.381	0.517
More storms and lightning	0.188	0.912
High & strong winds	0.199	0.897
Poor air quality & visibility	0.911	0.017
Veld fires	0.939	0.006
Poor water quality	0.929	0.028
Flooding	0.942	-0.022
Extraction Method: Principal Component Analysis. a. 2 components extracted.		

Table 6.53 above also loaded perfectly along two constituents. The participants therefore identified un-alike trends with the questions that concentrated on the level of influence changing climatic conditions would have on visitors' decision to travel to CDR. The highest level of scoring (0.942, 0.939, 0.929 and 0.911) indicates that unfavourable weather conditions (that includes flooding, poor water quality, veld fires and strong winds) have a tremendously high level of influence on the decision to visit CDR. Flooding was rated as the weather condition that would have the highest impact on travel decisions as it would damage infrastructure, potentially resulting in roads being closed or difficult to drive along. Veld fires were rated as the second condition to have the highest impact as that will compromise the landscape ecology, flora and fauna of the region, which the tourism sector is largely dependent on. Poor water quality and air visibility were also highly rated to have an influence on visitors' decision to travel to the destination.

This is due to the fact that a major part of what makes a destination appealing is to have a clear and good view in order for visitors to enjoy the scenery. These results clearly suggest that favourable climatic conditions are evidently important in influencing the decision to travel to a region. Therefore, it is important for CDR to invest as many resources as possible into mitigating climate change impacts so that visitors are encouraged to visit the destination in numbers and recurrently.

Table 6. 54: Strategies to Minimise Climate Change Impacts

Rotated Component Matrix[a]		
D3	Component	
	1	2
Educate local community about CC	0.827	0.071
Invest more resources in cc research	0.897	0.180
Turn off lights/electrical appliances when not used	0.874	0.126
Use energy wisely	0.510	0.436
Minimise pollution	0.070	0.676
Recycle as much as possible	0.148	0.848
Invest in renewable resources	0.156	0.770
Extraction Method: Principal Component Analysis. a. 2 components extracted.		

Table 6.54 above also loaded along two components. Participants therefore identified different trends with the questions that focused on the important role that visitors and local communities can undertake to minimise the effects of climate change on tourism. The highest level of scoring (0.897, 0.848 and 0.874) indicates that there should be more resource investment in research projects that clearly expound the occurrence of climate change; recycling as much as possible; and practicing energy-efficiency by switching off electrical appliances when not in use. According to Csete and Szécsi's (2015: 483) pioneering research studies, recycling initiatives and education have an essential role to play in lessening and alleviating both the economic and environmental effects in order to evade exceedingly precarious climatic changes. These findings correspondingly emphasise sufficient recognition of mitigation and adaptation capacity initiatives that are intended to lessen the impacts and promote sustainable development goals in the region.

Table 6. 55: Vulnerability of Various Sectors to Climate Change in the CDR

Rotated Component Matrix[a]		
D4	Component	
	1	2
Tourism	0.907	0.073
Landscape	0.861	0.062
Local community	0.540	0.267
Snow	0.612	0.290
Economy	-0.056	0.851
Plants and animals	0.743	0.299
Infrastructure	0.448	0.695
Water and sea level	0.755	0.238
Sustainable development	0.450	0.641
Extraction Method: Principal Component Analysis. a. 2 components extracted.		

It is acknowledged that the study variables that made up this section: "vulnerability of various sectors to climate change", also loaded perfectly along 2 components. This signifies that participants identified different trends within the section. The highest scorings (0.907, 0.861 and 0.851) indicate that tourism, landscape and the economy are the most susceptible sectors to the effects of climate change. These findings are corroborated by the conclusions of Sajjad *et al*. (2014: 12409), Intergovernmental Panel on Climate Change (IPCC) (2019), Chersich and Wright (2019) and World Bank (2020) underlining that the tourism industry, particularly in developing countries like South Africa, is considered to be the most threatened sector by the impacts of climate change, with a relatively lesser adaptive capacity therefore placing the industry at much greater risk of the implications of climate change. Consequentially, these negative impacts generally affect the environment which is an integral part of tourism, therefore impacting the economy as less visitors are willing to visit a destination that is not appealing as far as the scenery and environment is concerned.

For the above results, the rotation method through Varimax with Kaiser Normalisation and the principle component analysis was utilised as the extraction method. The orthogonal rotation method lowers the number of variables on each factor that have loadings. The statements that constituted sections B (Table 6.52 to Table 6.55) loaded perfectly along a single component. This implies that the statements that constituted these sections perfectly measured what they set out to measure. It is noted that the variables that constituted Section D (Table 6.50-6.51) loaded along 3 components (sub-themes). This means that respondents identified different trends within the section. Within the section, the splits are colour-coded. These sub-themes are quality, speed and efficiency. Therefore, each component that comprised the questionnaire measured the construct validity positively.

6.22 Regression and Inferential Analysis

Regression analysis in the context of the research refers to the process that involves modelling and analysing several variables, where the correlation includes a dependent unit (variable) and one or more independent units (variables) (Uyanik and Guler 2013: 237). The study variances that are analysed are tourism development, climate change, economic implications and environmental vulnerability. According to Plotts (2011: 484), regression analysis refers to a measureable technique that is applied to assess the nature of correlations between a dependent unit (variable) and one or more independent units (variables). In addition, this section also includes inferential statistics that were exploited to test hypotheses and predictions. In order to make sense of the results, the main experiments conducted were regression analysis, Pearson's Chi-square and Fisher's Exact Test.

6.22.1 Climate Change and Tourism Development

A Multiple linear regression analysis (MLRA) was carried out to establish whether the independent variable (climate change) influences the dependent variable (tourism development). Moreover, multiple linear regression analysis was also carried out in establishing which amongst the independent sub-variables (climate change, economic implications and environmental vulnerability) has a higher impact on the variation of the dependent variable (tourism development). The outcomes relating to the two above-mentioned variables (climate change and tourism development) are accordingly explained in the following tables: 6.56, 6.57, and 6.58.

Table 6. 56: Model Summary (n=347)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.866[a]	.750	.584	2.79015
a. Predictors: (Constant), Climate Change, Tourism Development				

The R-square value shown in the 'model summary' assists in explaining the variance in the dependent variable (Tourism Development). In Table 6:56, the value of R-square is 0.866. This points to the independent variable (Climate Change) as a predictor (influencing) of the dependent variable (Tourism Development) by 86.6%. This also means that there are other independent variables which were not taken into consideration in this study, but are fundamental in explaining climate change impacts on the tourism industry.

Table 6. 57: Analysis of Variance (ANOVA) (n=347)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.145	2	35.073	4.505	.025[b]
	Residual	23.355	3	7.785		
	Total	93.500	5			
a. Dependent Variable: Tourism Development						
b. Predictors: (Constant), Climate Change, Economic Implications, Environmental Vulnerability						

For testing the statistical significance of the regression model, the ANOVA was carried out. ANOVA tests whether the regression model is a perfect descriptor of the relationship between predictor variables (climate change, economic implications and environmental vulnerability) and dependent variables (tourism development).

Hence, in considering the results in Table 6.57, the model is a perfect descriptor of the connection between independent variables (climate change) and the dependent variable (tourism development) (F= 4.505; p=0.025). A high F-value reflects a good descriptor value, while a small p-value means that the results are significant and hence become sufficient for predicting the response. The F-value is utilised to conclude whether the entire model has a statistically significant predictive capability. The p-value is considered statistically significant when it is less than or equal to 0.05. Therefore, this indicates that the independent variable (climate change) is greatly significant in explaining the variation in the dependent variable (tourism development). Table 6.58 below interprets the coefficients of the above analysed variances.

Table 6. 58: Coefficients (n=347)

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	96.274	7.159		13.448	.001	73.491	119.056
	Environmental Vulnerability	.554	.298	.540	1.857	.040	-.396	1.504
	Climate Change	.279	.108	.750	2.577	.002	-.623	.066
a. Dependent Variable: Tourism Development								

Table 6.58 contain the coefficients that allow one to make a comparison as to which of the independent sub-variables (climate change, economic implications and environmental vulnerability) makes the highest contribution to the variation of tourism development (dependent variable). Therefore, the Beta standardised coefficients were utilised in making comparisons. The results indicate that climate change is the highest predictor (influencing) variable that contributes the most to the variation of tourism development (β= 0.750; p= 0.002). Following was environmental vulnerability (β= 0.540; p= 0.040). The following sub-section reports on the results of a multiple linear regression analysis for environmental vulnerability and tourism development.

6.22.2 Environmental Vulnerability and Tourism Development

The MLRA was carried out to establish whether the independent variable (environmental vulnerability) influences the dependent variable (tourism development). Moreover, a multiple linear regression analysis was also carried out in establishing which amongst the independent sub-variables (environmental vulnerability, economic implications and climate change) has a higher impact on the variation of the dependent variable (tourism development).

The outcomes relating to the two above-mentioned variables (environmental vulnerability and tourism development) are accordingly explained in the following tables: 6.59, 6.60 and 6.61.

Table 6. 59: Model Summary (n=347)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.364[a]	.132	.149	2.51411
a. Predictors: (Constant), Environmental Vulnerability, Tourism Development				

The (R-square) value shown in the 'model summary' assists to explicate the variance in the dependent variable (Tourism Development). In Table 6:59, the value of R-square is 0.364. This points to the independent variable (Environmental Impact) as a predictor (influencing) of the dependent variable (Tourism Development) by 36.4%. This also means that there are other independent variables which were not taken into consideration in this study, but are fundamental in explaining the environmental vulnerability impacts on the tourism industry.

Table 6. 60: Analysis of Variance (ANOVA) (n=347)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.211	2	10.106	1.599	.026[b]
	Residual	132.736	21	6.321		
	Total	152.947	23			
a. Dependent Variable: Tourism Development						
b. Predictors: (Constant), Environmental Vulnerability, Economic Implications & Climate Change						

For testing the statistical significance of the regression model, the ANOVA was carried out. ANOVA tests whether the regression model is a perfect descriptor of the relationship between predictor variables (environmental vulnerability, economic implications and climate change) and dependent variables (tourism development). Hence, in considering the results in Table 6.60, the model is a perfect descriptor of the connection between the independent variable (environmental vulnerability) and the dependent variable (tourism development) (F= 1.599; p=0.026). A high F-value reflects a good descriptor value, while a small p-value means that the results are significant and hence become sufficient for predicting the response.

The F-value is utilised to conclude whether the entire model has statistically significant predictive capability. The p-value is considered statistically significant when it is less than or equal to 0.05. Therefore, this indicates that the independent variables (environmental vulnerability and economic implications) are greatly significant predictors in explaining the variation in the dependent variable (tourism development). Table 6.61 below interprets the coefficients of the above analysed variances.

Table 6. 61: Coefficients (n=347)

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
1	(Constant)	120.587	12.848		9.386	.000	93.869	147.306
	Environmental Vulnerability	.443	.251	.585	1.765	.002	.965	.079
a. Dependent Variable: Tourism Development								

Table 6.61 contain the coefficients that allow one to make a comparison as to which of the three independent sub-variables (environmental vulnerability, economic implications and climate change) makes the highest contribution to the variation of tourism development (dependent variable). Hence, the Beta standardised coefficients were utilised in making comparisons. The results indicate that environmental vulnerability is the highest predictor (influencing) variable that contributes the most to the variation of tourism development (β= 0.585; p= 0.002). The following sub-section reports on the results of a multiple linear regression analysis for economic implications and tourism development.

6.22.3 Economic Implications and Tourism Development

An MLRA was carried out to establish whether the independent variable (economic implications) influences the dependent variable (tourism development). Moreover, multiple linear regression analysis was carried out to establish which amongst the independent sub-variables (environmental vulnerability, climate change and economic implications) has a higher impact on the variation of the dependent variable (tourism development). The outcomes relating to the two above-mentioned variables (economic implications and tourism development) are accordingly explained in the following tables: 6.62, 6.63 and 6.64.

Table 6. 62: Model Summary (n=347)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.594[a]	.132	.049	2.51411
a. Predictors: (Constant), Economic impact, Tourism Development				

The R-square value shown in the 'model summary' assists in explaining the variance in the dependent variable (tourism development). In Table 6.62, the value of R-square is 0.594. This points to the independent variable (economic Implications) as a predictor (influencing) of the dependent variable (tourism development) by 59.4%. This also means that there are other independent variables which were not taken into consideration in this study, but which are fundamental in explaining the economic implications of climate change for the tourism industry.

Table 6. 63: Analysis of Variance (ANOVA) (n=347)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.211	2	10.106	1.599	.026[b]
	Residual	132.736	21	6.321		
	Total	152.947	23			
a. Dependent Variable: Climate change impact						
b. Predictors: (Constant), Economic Implications, Environmental Vulnerability and Tourism Development						

In order to test the statistical significance of the regression model, the ANOVA was carried out. ANOVA tests whether the regression model is a perfect descriptor of the relationship between predictor variables (environmental vulnerability, climate change and economic implications) and the dependent variable (tourism development). Hence, in considering the results in Table 6.63, the model is a perfect descriptor of the connection between the independent variable (economic implication) and the dependent variable (tourism development) (F= 1.599; p=0.026). A high F-value reflects a good descriptor value, while a small p-value means that the results are significant and hence become sufficient for predicting the response. The F-value is utilised to conclude whether the entire model has statistically significant predictive capability. The p-value is considered statistically significant when it is less than or equal to 0.05. Therefore, this indicates that the independent variable (economic implications) is a greatly significant predictor in explaining the variation in the dependent variable (tourism development). Table 6.64 below interprets the coefficients of the above analysed variances.

Table 6. 64: Coefficients (n=347)

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	120.587	12.848		9.386	.000	93.869	147.306
	Environmental Vulnerability	.443	.251	.477	1.765	.002	.965	.079
	Economic Implications	.065	.243	.284	.265	.033	.570	.441
a. Dependent Variable: Climate Change								

Table 6.64 contains the coefficients that allow one to make a comparison as to which of the three independent sub-variables (environmental vulnerability, economic implications and climate change) makes the highest contribution to the variation of tourism development (dependent variable). Hence, the Beta standardised coefficients were utilised in making comparisons. The results indicate that environmental vulnerability is the highest predictor (influencing) variable that contributes the most to the variation of tourism development (β= 0.477; p= 0.002). Following was economic implications (β= 0.284; p= 0.033). The following sub-section reports on the results of a multiple linear regression analysis for environmental vulnerability and climate change.

6.22.4 Environmental Vulnerability and Climate Change

The MLRA was carried out to establish whether the independent variable (environmental vulnerability) influences the dependent variable (climate change). Moreover, a multiple linear regression analysis was also carried out to establish which amongst the independent sub-variables (climate change and economic implication) has a higher impact on the variation of the dependent variable (tourism development). The outcomes relating to the two above-mentioned variables (environmental vulnerability and climate change) are accordingly explained in the following tables: 6.65, 6.66 and 6.67.

Table 6. 65: Model Summary (n=347)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.359[a]	.129	.290	2.46042
a. Predictors: (Constant), Environmental Vulnerability				

The R-square value shown in the 'model summary' assists in explaining the variance in the dependent variable (climate change). In Table 6.65, the value of R-square is 0.359. This points to the independent variable (environmental vulnerability) as a predictor (influencing) of the dependent variable (climate change) by 35.9%. This also means that there are other independent variables which were not taken into consideration in this study, but which are fundamental in explaining the environmental implications of climate change on the tourism industry.

Table 6. 66: Analysis of Variance (ANOVA) (n=347)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.766	1	19.766	3.265	.004[b]
	Residual	133.181	22	6.054		
	Total	152.947	23			
a. Dependent Variable: Climate Change						
b. Predictors: (Constant), Environmental impact						

For testing the statistical significance of the regression model, the ANOVA was carried out. ANOVA tests whether the regression model is a perfect descriptor of the relationship between predictor variables (climate change and economic implication) and dependent variables (environmental vulnerability). Hence, in considering the results in Table 6.66, the model is a perfect descriptor of the connection between the independent variable (environmental vulnerability) and the dependent variable (climate change) (F= 3.265; p=0.004).

A high F-value reflects a good descriptor value, while a small p-value means that the results are significant and hence become sufficient for predicting the response. The F-value is utilised to conclude whether the entire model has statistically significant predictive capability. The p-value is considered statistically significant when it is less than or equal to 0.05. Therefore, this indicates that the independent variable (environmental vulnerability) is a greatly significant predictor in explaining the variation in the dependent variable (climate change). Table 6.67 below interprets the coefficients of the above analysed variances.

Table 6. 67: Coefficients (n=347)

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	117.549	5.698		20.629	.000	105.732	129.366
	Environmental Vulnerability	.423	.234	.459	1.807	.004	.908	.062
a. Dependent Variable: Climate Change								

Table 6.67 contain the coefficients that allow one to make a comparison as to which of the three independent sub-variables (environmental vulnerability and economic implications) makes the highest contribution to the variation of climate change (dependent variable). Hence, the Beta standardised coefficients were utilised in making comparisons. The results indicate that environmental vulnerability is the highest predictor (influencing) variable that contributes the most to the variation of climate change (β= -.459; p= 0.004). The following sub-section reports on the results of a multiple linear regression analysis for economic implications and climate change.

6.22.5 Economic Implications and Climate Change

An MLRA was carried out to establish whether the independent variable (economic implications) influences the dependent variable (climate change). Moreover, a multiple linear regression analysis was also carried out in establishing which amongst the independent sub-variables (environmental vulnerability, economic implications and climate change) has a higher impact on the variation of the dependent variable (tourism development). The outcomes relating to the two above-mentioned variables (economic implications and climate change) are accordingly explained in the following tables: 6.68, 6.69 and 6.70.

Table 6. 68: Model Summary (n=347)

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.580[a]	.003	-.042	2.63224
a. Predictors: (Constant), Economic Impact				

The R-square value shown in the 'model summary' assists to explicate the variance in the dependent variable (Climate Change). In Table 6.68, the value of R-square is 0.580.

This points to the independent variable (Economic Implications) as a predictor (influencing) of the dependent variable (Climate Change) by 58.0%. This also means that there are other independent variables which were not taken into consideration in this study, but which are fundamental in explaining the economic implications of climate change impacts on the tourism industry.

Table 6. 69: Analysis of Variance (ANOVA) (n=347)

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.516	1	.516	4.275	.007[b]
	Residual	152.431	22	6.929		
	Total	152.947	23			
a. Dependent Variable: Climate change impact						
b. Predictors: (Constant), Economic impact						

For testing the statistical significance of the regression model, the ANOVA was carried out. ANOVA tests whether the regression model is a perfect descriptor of the relationship between predictor variables (environmental vulnerability, economic implications and climate change) and dependent variables (tourism development). Hence, in considering the results in Table 6.69, the model is a perfect descriptor of the connection between the independent variable (environmental vulnerability) and the dependent variable (tourism development) (F= .4275; p=0.007). A high F-value reflects a good descriptor value, while a small p-value means that the results are significant and hence become sufficient for predicting the response. The F-value is utilised to conclude whether the entire model has statistically significant predictive capability. The p-value is considered statistically significant when it is less than or equal to 0.05. Therefore, this indicates that the independent variable (economic implications) is a greatly significant predictor in explaining the variation in the dependent variable (climate change). Table 6.70 below interprets the coefficients of the above analysed variances.

Table 6. 70: Coefficients (n=347)

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
Model		B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
1	(Constant)	104.680	9.587		10.919	.000	84.797	124.562
	Economic Implications	.566	.243	.358	.273	.007	.437	.569
a. Dependent Variable: Climate Change								

Table 6.70 contain the coefficients that allow one to make a comparison as to which of the three independent sub-variables (economic implications and environmental vulnerability) makes the highest contribution to the variation of climate change (dependent variable). Hence, the Beta standardised coefficients were utilised in making comparisons. The results indicate that economic implication is the highest predictor (influencing) variable that contributes the most to the variation of climate change (β= 0.358; p= 0.007).

6.23 Hypothesis Testing

Hypothesis testing is an exploit in research statistics whereby the researcher tests a statement in relation to a population parameter. According to Hay and Knechel. (2017:141), hypothesis testing involves an analysis of the statements and/or questions that produce a statistical value. The Pearson's Chi-square and Fisher's Exact Tests were conducted to assess hypotheses using SPSS version 25.0. The P value or calculated probability is generated by the test statistics. The Pearson's Chi-square and Fisher's Exact Tests were carried out for all eleven formulated statements to ascertain whether there was a statistically significant connection between the variables. Equally, the two tests were used to calculate the statistical value for each hypothesis.

H1: *There is a significant correlation between choosing an environmentally sustainable destination and increased climate change research investment*

Table 6. 71: Tourism Destination and Climate Change Research (n=347)

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	
Pearson Chi-Square	172.783[a]	16	0.000		
Likelihood Ratio	192.387	16	0.000		
Fisher's Exact Test	34.387			0.000	
Linear-by-Linear Association	16.900	1	0.000		
N of Valid Cases	313				

The above table (6.71) reveals a Pearson Chi-Square value of 172. 783, surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, Pearson Chi-Square results of the p<0.000 is under the cut-off parameter that is Pearson (p<0.05). The outcomes of the statistical test reveal that there is a significant correlation between choosing a destination for the reason that they are actively involved in climate change combat initiatives and investing more resources in climate change research. The Fisher's Exact Test is similarly assenting with the Pearson test as the p<0.000 is under the cut-off parameter that is Pearson (p<0.05), consequently confirming the correlation. Therefore, the hypothesis is accepted.

H2: *There is a significant correlation between choosing an environmentally sustainable destination and vacation cancelation due to inclement climate conditions.*

Table 6. 72: Tourism Destination and Climatic Conditions (n=347)

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability	
Pearson Chi-Square	51.849[a]	12	0.000				
Likelihood Ratio	52.681	12	0.000				
Fisher's Exact Test	29.681			0.000			
Linear-by-Linear Association	1.574[c]	1	0.210	0.224	0.115	0.014	
N of Valid Cases	316						

The above table (6.72) reveals that the Pearson Chi-Square value is 51. 849, surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, Pearson Chi-Square results of the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$). The outcomes of the statistical test reveal that there is a significant correlation between choosing a destination for the reason that they are actively involved in climate change combat initiatives and cancelling a vacation if the conditions are unstable due to climatic conditions. The Fisher's Exact Test is similarly assenting with the Pearson test as the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$), consequently confirming the correlation. Therefore, the hypothesis is accepted.

H3: *There is a significant correlation between choosing an environmentally sustainable destination and increased tourist expenditure.*

Table 6. 73: Tourism Destination and Economy (n=347)

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability	
Pearson Chi-Square	133.252[a]	16	0.000				
Likelihood Ratio	108.481	16	0.000				
Fisher's Exact Test	28.481			0.000			
Linear-by-Linear Association	5.600[c]	1	0.018	0.019	0.012	0.002	
N of Valid Cases	316						

The above table (6.73) reveals that the Pearson Chi-Square value is 133. 252 surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the p<0.000 is under the cut-off parameter that is Pearson (p<0.05). The outcomes of the statistical test reveal that there is a significant correlation between choosing a destination for the reason that they are actively involved in climate change combat initiatives and spending money in a destination that is environmentally friendly. The Fisher's Exact Test is similarly assenting with the Pearson test as the p<0.000 is under the cut-off parameter that is Pearson (p<0.05), consequently confirming the correlation. Hence, the hypothesis is accepted.

H4: *There is a significant correlation between the quality of a destination's natural surroundings and its accessibility.*

Table 6. 74: Environmental Vulnerability and Tourism Destination (n=347)

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	
Pearson Chi-Square	262.536[a]	16	0.000		
Likelihood Ratio	73.233	16	0.000		
Fisher's Exact Test	36.458			0.000	
Linear-by-Linear Association	27.126	1	0.000		
N of Valid Cases	312				

The above table (6.74) reveals that the Pearson Chi-Square value is 262. 536 surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the p<0.000 is under the cut-off parameter that is Pearson (p<0.05). The outcomes of the statistical test reveal that there is a significant correlation between the quality of the area's natural setting and easy accessibility of a destination. The Fisher's Exact Test is similarly assenting with Pearson test as the p<0.000 is under the cut-off parameter that is Pearson (p<0.05), consequently confirming the correlation. Therefore, the hypothesis is accepted.

H5: *There is a significant correlation between climate change affecting visitor flow to tourism destinations and climate change reducing profitability and efficiency of tourism.*

Table 6. 75: Tourism Destination and Financial Performance (n=347)

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability	
Pearson Chi-Square	102.951[a]	4	0.000	0.000			
Likelihood Ratio	96.969	4	0.000	0.000			
Fisher's Exact Test	96.070			0.000			

Linear-by-Linear Association	26.510[b]	1	0.000	0.000	0.000	0.000	
N of Valid Cases	314						

The above table (6.75) reveals that the Pearson Chi-Square value is 102. 951 surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the p<0.000 is under the cut-off parameter that is Pearson (p<0.05). The outcomes of the statistical test reveal that there is a significant correlation between climate change reducing visitor flow in tourism destinations and climate change reducing tourism's financial performance. The Fisher's Exact Test is similarly assenting with the Pearson test as the p<0.000 is under the cut-off parameter that is Pearson (p<0.05), consequently confirming the correlation. As a result, the hypothesis is accepted.

H6: *There is a significant correlation between sustainable development and weather and climatic conditions.*

Table 6. 76: Environmental Vulnerability and Climate Change (n=347)

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability	
Pearson Chi-Square	51.083[a]	12	0.000	0.002			
Likelihood Ratio	33.066	12	0.001	0.000			
Fisher's Exact Test	37.584			0.000			
Linear-by-Linear Association	20.345[b]	1	0.000	0.000	0.000	0.000	
N of Valid Cases	312						

The above table (6.76) reveals a Pearson Chi-Square value of 51. 038, surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the p<0.002 is under the cut-off parameter that is Pearson (p<0.05). The outcomes of the statistical test reveal a significant correlation between sustainable development and climate & weather conditions. The Fisher's Exact Test is similarly assenting with the Pearson test as the p<0.000 is under the cut-off parameter that is Pearson (p<0.05), consequently confirming the correlation. Accordingly, the hypothesis is accepted.

H7: *There is a significant correlation between the impact of climate change on tourist spending behavior and tourism's financial success.*

Table 6. 77: Climate Change and Financial Performance (n=347)

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability	
Pearson Chi-Square	46.314[a]	8	0.000	0.000			
Likelihood Ratio	36.906	8	0.000	0.000			
Fisher's Exact Test	36.162			0.000			
Linear-by-Linear Association	19.282[b]	1	0.000	0.000	0.000	0.000	
N of Valid Cases	313						

The above table (6.77) reveals a Pearson Chi-Square value of 46. 314 surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$). The outcomes of the statistical test reveal a significant correlation between climate change impacting visitors' spending patterns and behavior and Climate change reducing tourism's financial performance. The Fisher's Exact Test is similarly assenting with the Pearson test as the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$), consequently confirming the correlation. For that reason, the hypothesis is accepted.

H8: *There is a significant correlation between investment opportunities and the tourism's prospects.*

Table 6. 78: Sustainability and Tourism (n=347)

Chi-Square Tests							
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability	
Pearson Chi-Square	4.608[a]	1	0.032	0.047	0.040		
Continuity Correction[b]	2.997	1	0.083				
Likelihood Ratio	4.847	1	0.028	0.047	0.040		
Fisher's Exact Test				0.047	0.040		
Linear-by-Linear Association	4.416[c]	1	0.036	0.047	0.040	0.036	
N of Valid Cases	24						

The above table (6.78) reveals that the Pearson Chi-Square value is 4. 608, surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the $p<0.047$ is under the cut-off parameter that is Pearson ($p<0.05$).

The outcomes of the statistical test reveal a significant correlation between sustainability and the future of tourism. The Fisher's Exact Test is similarly assenting with the Pearson test as the $p<0.047$ is under the cut-off parameter that is Pearson ($p<0.05$), consequently confirming the correlation. Consequently, the hypothesis is accepted.

H9: *There is a significant correlation between the quality of the natural surroundings and the cultural and historical attractions in the region.*

Table 6. 79: Heritage and Environment (n=347)

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	
Pearson Chi-Square	428.103[a]	16	0.000			
Likelihood Ratio	170.491	16	0.000			
Fisher's Exact Test				0.000		
Linear-by-Linear Association	69.982	1	0.000			
N of Valid Cases	311					

The above table (6.79) reveals that the Pearson Chi-Square value is 428. 103 surpassing the minimum expected value X^2 cut-off value of 26.296. In addition, the Pearson Chi-Square results of the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$). The outcomes of the statistical test reveal a significant correlation between cultural & historical attractions and the quality of the area's natural setting. Hence, the hypothesis is accordingly accepted.

6.24 Chapter Summary

This section of the study presented the findings and also interpreted the outcomes of the information gathered from the structured questionnaire. The analysed information is presented in three different sections with the purpose of understanding the enlightenments of each respondent group that was part of the study. The quantitative information as collected from the respondents was analysed using SPSS version 25.0. and the data analysis in this study is presented in the form of tables, figures, graphs and statistical tests. This chapter also presented ten significant correlations and one non-significant correlation of the variables in the study. A total of eleven hypotheses were tested statistically using Pearson's Chi-square and Fisher's Exact Test.

This research study has comprehensively investigated the economic and environmental impacts of climate change on the tourism industry of CDR. Evidently, it is apparent that changing climatic conditions in the region have an immensely negative impact on the tourism industry.

The percentage (number) of visitors has drastically plummeted in the past five years; destinations are struggling to achieve full capacity; the long-term changes in climatic conditions have lessened the level of comfort for visitors; and all these issues can be directly attributed to changing climatic conditions. Climatic settings of the region are without doubt an important element that entices visitors to the destination, hence any form of tourist distress because of changing climatic conditions will only embolden visitors to pick out alternative tourism destinations in future.

The region is largely affected by shrinkages in snow levels, rises in sea levels, natural disasters and all major destinations in the region are already experiencing the undesirable impacts of climate change. To exacerbate the situation, there is presently no adaptation policies in place to deal with the impact of climate change, nor is there a local government agency in place to assist tourism establishments and other businesses in curbing the impact of changing climatic conditions. The study respondents, particularly the tourism authorities and the tourism establishments, recognize the threat of climate change to be already affecting the region; that it is a long-term threat; and perceive that the national government has an obligation to deal with the impacts and consequences of climate change on the tourism industry.

The next chapter delves into the study's analysis in order to make sense of the findings. The findings are then contrasted to the literature on the issue to see if the study's conclusions are consistent with prior research or if something new has emerged.

Chapter 7 of 8: Discussion on the Findings

7.1 Introduction

In light of the contentious points found in the analysis of the data obtained as presented in the previous chapter, the findings revealed that the change of climate negatively affects the environment, businesses as well as the development of tourism in the Central Drakensberg Region (CDR). The findings of the research further noted that the areas that suffer the most from climate change are the economy and biological life forms, that is, plants and animals in the region. The majority of tourism authority respondents had a reasonable level of understanding of the meaning and implications of climate change as compared to other the study respondents. In line with previous studies of a similar nature, the national government and tourism authorities were stated as best suited in dealing with climate change. The findings also indicated that local tourism suffered a huge loss of money in the past five years due to climate change. Visitors, local municipality and local tourism authorities confirmed that climatic conditions are changing in the region.

7.2 Summary of Results in Respect of Biographical Information

In terms of visitors who participated in this study, there were more male respondents than the female respondents. The bulk of those visitors who participated in this study were between 18-50 years of age. The highest percentage of visitors were in this age range which shows that young people want to visit places. The lowest percentage of visitors were in the age group of 51-60 years, which indicates that old people either do not want to travel much possibly because they have already experienced and seen most of the fauna and flora or are possibly restricted due to unmentioned reasons, like health, job responsibilities and so on. In addition, in this age group, a lot prioritise rest and view that visiting places is an activity for young people. The majority of visitors (66.9%) were local South Africans whereas the other 33.1% were international visitors. This was particularly distressing for the future of the tourism sector, yet predictable to some extent considering the new report (PwC Africa Hotels Outlook report 2019: 1) that a smaller number of international travellers are visiting South Africa as compared to other popular destinations on the continent. Conversely, the aforementioned findings can be seen as a positive stride towards the NDT determinations and undertaking of promoting domestic tourism in South Africa.

The study international respondents were from countries including the United Kingdom (UK), United States of America (USA), India, Germany and Italy. A possible justification for the high presence of visitors from western countries and East Asia is the element that the focus area of South African Tourism marketing strategy is mostly concentrated on the European market (Visser 2016a). Furthermore, there was a great presence of visitors from other Southern African Development Community (SADC) countries (from Lesotho, Botswana, Mozambique, and Zimbabwe).

With regard to tourism authorities who participated in this study, the authorities were from Monks Cowl, Giants Castle, Cathedral peak, Queen Elizabeth Park and Didima. Those authorities enthusiastically chose to participate in this study. The tourism respondents who participated in this study constituted an equal number of males and females. A significant number of the tourism authority participants were in the age range of 31-40 years. It is interesting to note, that almost half of the tourism authority respondents who participated in this study had a post-graduate degree. In relation to the municipality, all the respondents who participated in this study were from UKhahlamba Municipality.

These finding are to a certain extent contradictory to that found in the literature, which report that the majority of employees from particularly state-owned tourism destinations are not adequately qualified which thus pointing to a skills deficit. These findings suggest that although the skills were not wide-ranging and sufficient enough to deal with the impact of climate change, at least the personnel are capable of dealing with the most basic issues relating to tourism climate change. Respondents from this municipality constituted an equal number of females and males. About half of the respondents from the municipality who participated in this study were post-graduate degree holders.

These findings also collaborate with Ledley *et al.* (2017: 11) assertion that "formal and informal education in the tourism industry is essential, particularly in the circumstance of climate change since learning from experience has proven to be rather expensive and not preemptive enough. The delay between decisions that cause climate change and their full impact can range from decades to millennia". Consequently, the philosophy of learning from knowledge rather than experience is a better option if the industry hopes to mitigate the impact of climate change.

7.3 Key Findings Summarised in Respect of the Study Objectives

The key study objectives are as follows:

- To assess the effects of climate change on the Central Drakensberg Region's tourism;
- To investigate the visitors/tourists and tourism establishments' awareness and understanding of climate change's impact on tourism in the Central Drakensberg Region;
- To determine the vulnerability of tourism activities to the impact of climate change in the Central Drakensberg Region;
- To investigate the tourism sector's mitigation and adaptation practices for climate change's impact in the Central Drakensberg Region.;
- To evaluate the potential influence of climate change on destination choices of tourists visiting the Central Drakensberg Region; and
- To develop a model that shows the impact of climate change on tourism development in the Central Drakensberg Region of KwaZulu-Natal.

The summarised findings in respect of each key objective which guided this study are as follows:

Objective 1: Assess the Effects of Climate Change on the Central Drakensberg Region's Tourism

Constant changes in climatic conditions are a natural phenomenon that have caused many challenges for planet earth for millenia. Nonetheless, there is growing distress about the increasing impact of climate change on different sectors of society, particularly on the tourism sector, which is considered by many scholars as a strategic sector for the developing of economies (Glazewski and Collier 2012: 329 and March *et al.* 2014: 1194). The phenomenon of climate change has been recognized as a global reality, thus has become a subject of significant global attention and research. Locally, modern climate change models forecast that South Africa will most likely experience unstable weather patterns, environmental degradation, unfriendly weather events, unexpected heat waves and rises in natural disasters (Rogerson 2016; Department of Environmental Affairs 2011). In turn, all these drastic weather conditions will likely have some impact on key national and locally tourism indicators, some of which are investment opportunities, attractiveness of destinations, flow of visitors and profit, products and services.

In line with the primary objective of the study, this research endeavored to qualify the impacts of climate change on the tourism industry of CDR. Therefore, a series of questions intended to clearly paint a clear picture of the current situation as far as the impact of climate change is concerned were asked, with a particular focus on the environmental and economic aspects. As a consequence of changing climatic conditions, the tourism sector in the region has been affected, the results indicated a wide disparity between regular visitors and first visitors, which is primarily attributed to elements of climate change. A favorable scenario should have a high level of regular visitors as compared to once-off visitors. However, the findings of this study reflected an unfavorable result where regular visitors are rather low in comparison with once-off visitors.

The literature supports these findings by asserting that "climate change brings more risks than opportunities by causing regional and seasonal shifts in tourist flows" (Grillakis *et al.* 2016: 33). Additionally, Guliyeva (2018: 86) asserts that the element of climate change is causing a shift in the destination choice of visitors, which by default, will lead to negative financial impacts in the destinations with an unfavourable climate. Schwirplies *et al.* (2017: 1281) concur with Guliyeva's statement, and maintain that a number of tourism destinations will suffer deterioration with regard to attractiveness because of climate change, and in turn, resulting in major changes that will place the future of tourism at risk. Based on these findings, one can deduce that the reality of the few visitors travelling to the region may be caused by the expectations of the visitors not being met. Climate change has shortened the rainy season, thereby affecting the aquatic life, environment and consequently causing tourist destinations to be less attractive, hence the number is gradually declining.

On whether climate change is a cause for panic, a great number of respondents suggested that climate change in indeed changing at a radical speed and the impacts of climate change have encroached on the region already, as there were clear signs that included environment degradation, with diminishing numbers of visitors in the area and animal and plant species. The impacts of climate change were further probed by examining how precisely the respondents thought changing climatic conditions would affect CDR. It was indicated that climate change will have damaging impacts as the number of visitors would decline, thereby resulting increasing unemployment in the region. The tourism authorities also feel that visitors will be less attracted to the region as climate change will damage the environment and the ability of destinations to efficiently meet the desired needs and wants of visitors. Loss of income, loss of credibility, publicity damages and loss of potential business opportunities are some of the major negative impacts that were highlighted by respondents as attributed to the climate change. As previously mentioned, the majority of activities are weather-dependent, hence it was indicated that the CDR will lose its ability to offer some activities, particularly the ones that are linked to the snow and mountains, such as hiking trails, snow trails and hunting. This is a major conundrum for the region as it may possibly lose its competitive advantage, which is by no means a favourable scenario.

In terms of the respondents who visited the region for the purpose of enjoying the flora and fauna, the majority of them visited twice. Therefore, the fact that a notable number of visitors, particularly the ones that came for "fauna and flora", only visited twice and never returned again may be attributed by the depletion of the environment, which discourages many visitors from visiting the region again. In this case, on their first visit, the environment was attractive enough to convince and entice them to come back for the second time. However, after they visited for the second, they decided not to pitch again because what initially attracted them in the first place was no longer there, and the environment was no longer as pleasing to the eye. This view also aligns with those that visit for holidays, the bulk of which only end up visiting the region once, signalling that the place may have fallen short of their expectations and that their needs were not met.

de Oliveira (2020) also notes that visitor satisfaction is to some extent determined by climate conditions, and because of this interconnection between recreation and weather, the sustainability of climate-reliant activities such as mountain climbing, winter trails and snowboarding are also at risk. Furthermore, it was found that a major proportion of guests visited the region because of South African wildlife, followed by those who visited for wildlife un-related holiday purposes. Therefore, the research can conclude that an approximate percentage of 70% respondents came to CDR for the main purpose of appreciating the blossoming view of fauna and flora and the quality of the area's natural setting as those that visited for holidays could have chosen the place to view the fauna and flora. Mathivha *et al.* (2017: 21) maintain that for many tourist destinations, flora and fauna species are mainly used as a drawcard to attract as many customers as possible.

Regarding the impact of climatic related temperatures impacting tourism in the area, the majority of visitors conceded that high temperatures and heat waves associated with climate change have undesirably affected the regions, thereby reducing the number of visitors as the general temperature of the region becomes unbearable. One may conclude that unreliable and rather higher than average temperatures compromises the comfort of visitors. In light of the above contentions, too low and high temperature are found to be a factor that discourages tourists to visit a particular destination. With time, tourism destinations with unreliable temperatures typically experience a gradual fall in visitor flow as negative perceptions about the area spread. Siddiqui and Imran (2018) concede that the increases in temperatures will cause rivalry in the tourism sector, as visitors will make every effort to spend their resources where they feel more comfortable in terms of weather and environmental conditions. For Grimm *et al.* (2018: 4) state that the change in climate has the potential to increase tourism proceeds in regions with favourable temperatures and climate conditions, whereas the tourism industry proceeds in regions with high temperatures will decrease.

Although most of the visitors were content with the safety and security of the region, it is still worrisome to note that one-third of the visitors felt insecure and unsafe. One can conclude that significant work is still needed to properly bolster security and safety measures around the region to protect visitors. Guliyeva (2018) buttresses that since environmental protection, economic sustainability and visitor's well-being are interdependent, the decisions of visitors on which destinations to visit are closely linked with safety and security challenges resulting from not only social disorder, misbehaviour, violence, but also health hazards and natural disasters which are closely related to climate change. Therefore, by addressing the effects of climate change, tourism authorities would be indirectly enhancing the safety measures of the region.

Additionally, a great deal of thought has to be given to increasing destination accessibility, as almost half of the visitors indicated that both the region and some destination are difficult to access. The roads were said to be rather narrow because of plant life that have encroached into the road; substantial potholes due to heavy rainfalls were stated to be a major stumbling block to visitors who are interested in accessing some of these places; and the deterioration of signage because of weather- related impacts such as soil erosion were indicated to have a negative impact in relation to accessing the destinations and/or region. This research therefore calls for proper pathways and roads to be constructed and for the refurbishment of the existing roads and physical pathways.

In conclusion, the study outcomes indicate that the impact of climate change on the environment and local economy, have greatly impacted both the sustainability and the future of tourism in CDR. Some components of the industry, particularly the environmental side, are already displaying a number of signs of climate change's impact, especially on industry activities.

Nevertheless, the full acknowledgement of the degree of climate change impacts on the sector still needs to be acknowledged by tourism authorities. The decline in visitor flow to the CDR is a catastrophe in its formative stages that the tourism sector is facing because of climate change.

Objective 2: To Investigate the Visitors'/Tourists' and Tourism Establishments' Awareness and Understanding of Climate Change Impacts on Tourism in the Central Drakensberg Region

Understanding the devastating effects of climate change on tourism in the CDR is rather important to travel decision-making process, environmental management and the economic sustainability of both local-based business and the tourism industry in the area. The nature of the tourism industry is that most activities are weather-reliant and by extension, climate-reliant as well. Hence it is to be anticipated that climate change will by some means impact the economy of the area, the tourism flow, spending patterns and behaviour, and local businesses (Damm *et al.* 2016: 41). In addition, climate change has the capacity to lessen snow cover, upsurge and lengthen high temperatures or alter the weather seasons. All of these complications are detrimental to the tourism industry. The prospects of the tourism industry in the CDR are highly interconnected to tourism authorities understanding these complications; future implications of climate change on the economy as well as the local community, and formulating strategies & policies that are directed at confronting the situation at hand.

In order to measure the climate change awareness and understanding level of respondents, they were probed to rate a series of climate-focused issues, ranging from 'strongly agree' in one end to 'strongly disagree' in another. A great majority of respondents were aware of climate change, whereas similarly a great number of the respondents think that climate change has some major negative impact, particularly on the financial sustainability and prosperity of the region. Sadly, a small number of respondents had little understanding of climate change impacts on the tourism sector. The future implications that are thereof associated with climate change remain unknown, which in essence paints a fuzzy future for the tourism industry. In order to better understand what is observed to be the major cause of climate change in the region, visitors were probed to rate to what extent they agree with climate change was caused by human activities and to what extent by natural processes. Just over half of the respondents agreed that climate change is caused and perpetuated by human activities, whereas one-third of respondents agreed that climate change is a natural phenomenon. Moreover, a majority of the respondents think that climate change affects the natural environment. In essence, the outcomes of this study indicated that a great number of study respondents have some level of understanding and familiarity with the concept of climate change. The news and travel magazines were identified as the main source of information by respondents about climate change. And regarding the actual impacts of climate change on tourism, the majority of respondents indicated that they did not have a clear understanding relating to the implications of climate change.

As indicated in the above paragraph, the worrisome factor with the findings was that the majority of respondents indicated some element of ignorance regarding the direct impact of climate change on the tourism sector.

Contrary to the findings from the visitors and locally-based tourism establishments, the results further indicated a rather sophisticated and comprehensive awareness and understanding levels of climate change from the local municipality respondents. The respondents from the tourism department indicated being fully mindful of climate change and the complications and/or impacts that are thereof associated with climate change. This is attributed to the fact that the local municipality remains the primary custodian of tourism sector in the region. Moreover, they are the designated authority that mainly deal with any issues that threaten the progress and success of tourism, including that of climate change. Although the local municipality could not have done as much to minimise the impacts of climate change because of insufficient resources, nonetheless, it was still promising to note that the understanding, awareness and implications associated with changing climate conditions are clearly understood.

The findings likewise suggest that tourism stakeholders to a certain degree are gradually getting acquainted with the aspects that are taking place in the environment. These results suggest great strides are being slowly made to make people knowledgeable about climate change. However, it is still disturbing to note that one third of the visitors did not have a clue about climate change. This is particularly worrisome because it ultimately renders the consistent efforts that are being made to create awareness about climate change in tourism ineffective. The grounds for this limited understanding and awareness amongst tourism stakeholders in the CDR according to the outcomes can be attributed to two reasons. Firstly, the level of consciousness relating to climate change impacts on the tourism industry of CDR is insufficient and there are noticeable information gaps that require immediate and thorough attention. The second reason relates to the factions that exists amongst various tourism stakeholders, whereby some are still more engrossed in the short-term benefits (mostly profits) of the sector over the long-term economic and environmental consequences of climate change.

One may clearly deduce that a lot still needs to be done to educate people about the causes and the dangers associated with climate change. Nwakwoala (2015) admits that one fundamental reason that the tourism sector has not been able to win the fight against climate change is the absence of understanding and awareness amongst people who are directly and indirectly involved in the tourism business. Moreover, tourism stakeholders need to acquaint themselves with relevant facts so that they can be in a better position to understand how human activities are contributing towards the changing climate conditions at a global and local level. In Nwakwoala's (2015) study of the causes and climate and environmental changes, the findings were that there is an apparent ignorance and disregard of climate and environmental related education and awareness in many developing countries, using Nigeria as an example, hence the tourism industry continues to suffer.

It was based on this indication that Nwakwoala's study supported the inclusion and/or addition of climate and environmental curriculum in Nigeria's education policy. On the basis of the above-mentioned outcome, this research has proven beyond reasonable doubt that the lack of understanding and awareness of climate change impacts on tourism have some devastating outcomes for the future of tourism. From all indications, CDR tourism stakeholders to a large extent lack the much-needed understanding and awareness of the requirement to be eco-friendly and to be mindful of climate change when discussing tourism in the area. This study is of the view that awareness and education related initiatives can play a rather pivotal role in promoting the much-required awareness about climate change impacts.

It is therefore hoped that if and when the tourism authorities of the region decide to draft a climate change/tourism strategy in the near future, a component of education and awareness will be incorporated, as this approach empowers all the involved industry stakeholders to enhance their understanding of the exact meaning and impact of climate change, particularly in the context of tourism. Once more, these findings are comparable with Nwakwoala (2015), who concluded that "there's an urgent need to develop an environmental-friendly education policy in Nigeria that will hopefully enhance climate and environmental education which will enlighten people about the dangers of causing needless harm to the environment. When this done, it is anticipated that there will be a drastic reduction in the negative effects of climate and general environmental changes".

These outcomes are similar to that of Randles *et al.* (2009: 101); Barr *et al.* (2011: 1135); Chersich and Wright (2019) and Eckstein *et al.* (2021) that in many developing countries, South Africa included, the tourism sector and other environmental-dependent sectors are the most vulnerable to the effects of climate change. Yet the custodians of these sectors, tourism workers included, still lack the fundamental understanding and awareness of climate change. A growing emphasis has been placed to on climate change adaption and mitigation, but the people remain ignorant as to what precisely they are adapting to. They further state that the tourism industry particularly, still has a lot do towards raising change awareness and understanding about the dynamics of climate change. Similarly, the outcomes of the study also support the deduction of Weber *et al.* (2018: 649), who note that the majority of visitors around the world are mainly domestic travelers, thus tend to have less developed awareness and understanding of what climate change is really about. In addition, the study reports that tourism stakeholders at large have very little knowledge about climate change.

Even though government agencies have implemented some number of initiatives that are aimed at educating people about these impacts, the awareness levels are simply just not enough. The element of education was found to be inconsequential, as the level of awareness of study respondents' relating to climate change was similarly the same.

In essence, the majority of visitors were aware of the general impacts of climate change. However, it is still mind boggling to see that some of the people that understood the meaning of climate change were not aware of the negative consequences of climate change particularly to the tourism sector. This is witnessed by the increase in the percentage of people who conceded that they were not familiar of the dangers of climate change. One may conclude that South Africa is still far from effectively countering climate change due to the fact that it is difficult to minimise the man-made activities that contribute to climate change, as some people do not know what climate change is all about in the first place.

The impacts of climate change on the tourism sector can have a manifold of manifestations, all of which are typically negative and devastating. According to the study outcome, the region is not amply acquainted and equipped to deal with the impact of climate change, hence the tourism sector will continue suffering from the negative impacts. Comprehensive awareness initiatives and capacity building programs need to be introduced to better inform tourism authorities about the intricacies of climate change, and only then they will be in a position to minimise the negative impact.

Objective 3: Evaluate the Potential Influence of Climate Change on the Choice of Tourists Visiting the Central Drakensberg Region

The changes to any tourist destination as a results of climate change can influence tourists' destination choice (Becken and Wilson 2013: 625 and Jeuring 2017). Accordingly, changing climatic conditions in the CDR are anticipated to influence destination choice, as changes in climate patterns of the destinations generally influence visitors to make changes in their choices and travel to the alternative destinations with more favourable climatic conditions. In addition, climate change is considered to have great influence on visitors' decisions concerning the timing and the length of travel, and which destination to visit (Dube and Nhamo 2019: 2031). Moreover, it is rather important for visitors to feel safe during their outings, therefore, unfavourable and extreme weather conditions such as very cold temperature or drastic weather changes can adversely influence tourist's safety (Gossling *et al.* 2012: 44). Climate change can influence satisfaction and well-being of tourists during the holiday, therefore, favourable and conducive weather conditions are often considered by many scholars as the most essential component of a destination.

To a deeper extent, climate change influence on visitor choice of destination will have devastating economic implications for both the CDR and the entire tourism sector of KZN, as spending pattern and the travel behaviour of visitors are generally affected negatively if/when climatic conditions are not favourable. The empirical findings of this research confirmed that climate change is causing harm to the ecosystem and the region is already experiencing the impact of climate change. For this reason, most visitors indicated that they would rather visit a destination where the tourism authorities and local government within that region are actively embarking on implementing climate change initiatives.

This entails that tourist visitors are very conscious about their safety. They need assurance of their health, security and safety before they visit a place. They also need to know the efforts that authorities within that place that are putting to reduce impact of climate change. This means that turning a blind eye to climate changes impact instigates tourist visitors to shun visiting the place. The majority of the tourists emphasised that they are willing to spend their money in destinations and regions that are environmentally and eco-friendly. Therefore, those destinations that overlook the environment are likely to incur a huge loss of tourist visitors. Tourist visitors are also willing to pay increased accommodation prices in an effort of assisting authorities to cover financially-related costs that are associated with climate change adaptations. Support given by these visitors is likely to boost the financial resources that cater for resuscitation of damages caused by climate change. The study's findings also reveal that spending patterns and behaviour of tourist visitors have been heavily disturbed by climate change.

Therefore, the study outcomes revealed that in situations where visitors find that the destination they are planning to visit is experiencing unstable climate conditions they would cancel the trip and claim their refunds. This diminishes the financial contribution by tourism sector, and it compromises the sustainability of employment opportunities for the locals. Consequently, one can conclude that unreliable and spontaneous climatic conditions are not good for the economy and the world at large, as it has the potential to negatively influence visitor's choice when choosing a destination. Lastly, the visitors conceded that they are willing to put in more financial resources to tackle the effects and human causes of climate change in the tourism sector.

The two-folded implications of these results present a rather mounting challenge for the tourism industry in a sense that the findings can be considered as instrumental in the context of protecting the environment, as well as the prosperity of the economy as the bulk of visitors are willing and readily available to assist wherever and however possible. On the other side, these outcomes can be seen as a drawback to the tourism industry as visitor choices are to a larger extent interconnected to climate. In essence, the CDR visitor flow will continue to decline as the region is not presently doing anything to redress the rampant issue of climate change.

In relation to the other studies of a similar nature, the results present dissimilar scenarios as they corroborated findings with some studies and controverted other studies. For instance, in Guliyeva (2018) study, the findings indicated that climate change will not influence the choices of tourists visiting Peniche as they were still willing to travel to Peniche. However, climate change was indicated as a factor that influenced the timing of travel, as respondents declared that they will not visit Peniche in the peak seasons due to the changes in weather and climate patterns.

Moreover, the findings of Hamilton and Lau (2004); Bigano *et al.* (2006) and Tol and Walsh (2012) indicated that climate change is an essential feature in destination choice. Additionally, the study highlighted the major role of climate and weather data collection in the different stages of the decision-making process, thereby confirming the importance of climate change in visitor's choice of destination and the importance of information gathering before making a decision.

Objective 4: To Determine the Vulnerability of Tourism Activities to the Impacts of Climate Change in the Central Drakensberg Region

The industry of tourism is a considered by many as a major global economic sector that has seen remarkable growth over the last 50 years (Runge 2020). The prominence of the tourism sector in the economic framework is even more demonstrated by the fact that in over 90 countries the tourism sector represents more than 10% of National Gross Domestic Product (GDP) and a significant proportion of employment as it is the case with South Africa (WTTC 2016b). However, tourism is a rather vulnerable and highly climate-sensitive industry that is also greatly affected by a number of aspects, including the state of natural environment, weather conditions, safety & security and the capacity to meet travel costs which can all be attributed to changing climatic conditions. This objective was mainly intended to evaluate the susceptibility of the tourism sector in the region, because any detrimental influences of changing climatic conditions will have harmful and undesirable impact on the industry.

Climate change by nature impacts tourism and the tourism industry greatly as its contingent on the environment and climate. Therefore, practical adaptation, mitigation strategies and policies are requisite to ensure the prosperity and the sustainability of a destination. The usefulness of these strategies is a great indicator that determines the sensitive nature and the vulnerability of tourism destinations (Moyle *et al.* 2018: 11). According to Gossling (2018: 103), despite enhancing the industry awareness of the vulnerability of tourism sector to the implications of climate change, the reality of the impact of climate change on the tourism industry at the regional and destination level remains uncertain. Hence it was essential for this investigation to scrutinize the vulnerability of tourism in CDR in relation to climate change.

The key finding indicated that the tourism sector in the CDR is found to be at great risk, extremely sensitive, very much exposed, with minimum adaptive strategies and consequently massively vulnerable to climate change related impacts. Furthermore, the findings of the study pointed out that the future of investment, the long-term sustainability of the protected species, areas and tourism business are hugely restrained by climate change in the region. Furthermore, the results also highlighted the that tourism infrastructure, flora and fauna are similarly harmfully affected by the change of climate in the region.

The study respondents further indicated that the climate change conditions are drastically changing in the region and thereby contributing towards the increasing volatility of the sector. It can be deduced that the tourism authorities demonstrated a great concern that the financial tourism performance is negatively affected by this climate change.

The outcomes further indicated that the identified vulnerabilities and climate change risks are not clearly understood by the CDR tourism authorities, and in that way are not presently being considered for the climate change strategies or tourism development plans. If the CDR tourism sector is to be part of the new climate economy in the near future, such inattention about the vulnerability of tourism needs to be addressed immediately. Furthermore, climatic conditions that included increased rainwater, heavy storms, lighting and high temperatures are some of the prevalent weather-related conditions that have further compromised the performance of tourism. Consequently, because of these problems, the number of visitors to the region has declined and so has the income generated from tourism. This is being supported by both the tourism authorities and businesses who indicated that climate change has adversely affected the tourism destinations in the area, and so as the perception of the visitors.

The findings are in parallel with the IPCC (2014c: 1522) report that highlighted Africa, the Middle East and South Asia as the main tourism vulnerable hotspots with reference to the Global Vulnerability Index. As it is the case with South African tourism, the report further emphasizes that the highest levels of risk and vulnerability relating to tourism susceptibility still exists in many developing countries, where tourism business is predominantly the main industry of the national economy and the largest employer. In essence, the fundamental substance generated from the study outcome is that the tourism sector remains more vulnerable than before, that it is exposed and affected by the occurrence of climate change. The future of tourism appears to be flimsy as the manifestation of climate change will certainly continue to have widespread consequences for the industry, unless some innovative and modern strategies are implemented to lessen the vulnerability of tourism to the effect of climate change. Therefore, the research can conclude that in the absence of some global responses in addressing the vulnerability of tourism sector, the catastrophe of climate change will continue to pose a mounting threat against the development of tourism, compromising tourism competitiveness and its ability to contribute to the sustainable advancement goals in many developing countries and destinations.

Objective 5: To Investigate Tourism Sector Mitigation and Adaptation Practices to Climate Change Impacts in the Central Drakensberg Region

The outcomes of this study indicated that policies and approaches to reduce the impact of climate change in the region are poor and not effective. The local tourism authorities indicated that environmental and economic impact of climate change in tourism industry should be dealt with at both local and national government level in order to contain the situation.

They disputed that local the local community and visitors (tourists) should be responsible for dealing with effects of climate change. In order to assess the mitigation and adaptation practices of tourism stakeholders in the region, respondents were probed to rate a series of climate-related issues, ranging from 'strongly disagree' to 'strongly agree'. There was a fairly communal view as the majority of the respondents indicated that there should be a dynamic and common group effort between all tourist stakeholder's in the quest of addressing the challenge of climate change. The respondents think that visitors, tourism establishments, government at different levels and international organizations should work together to deal with climate change impacts.

The outcomes indicated that the majority of respondents (18.7%) consider the international community in the form of UNTWO, WTTC, IPCC to be the primary custodians that have the responsibility to deal with the effects of climate change. The rationale for this according to the respondents was the fact that these international organizations are better placed than anyone to study the impacts of climate change for the reason that they have ample of resources, that is, financial and human capital. Additionally, they yield some world-renowned climate change/tourism experts and they have some powers to force governments to take a stand in the fight against climate change. Another 18.3% of the respondents indicated that the national department of tourism, as the main custodian of tourism related issues in the country, must assume most of the responsibilities as far as introducing management strategies is concerned.

However, some of the respondents (14.9% and 14.2%) think that local and national government should bear the responsibility of climate change problems because of the same basis/rationale provided above. Some (10.7%) of the respondents think that visitors and local community are responsible for climate change impacts and they should deal with it alone. It was interesting to note that a small number (9.3%) of respondents think that local tourism authorities must deal with the impacts of climate change on their own capacities and astonishingly, (6.4%) of the respondents indicated that tourism establishments should be responsibility to deal with the implications of climate change. However, others think that visitors and tourism establishments should cooperate to deal with climate change impacts.

These findings are to a larger context consistent with Giliyeva's (2018: 73) findings that all tourism stakeholders are equally responsible for tackling climate change impacts and tourists, tourism enterprises and government should work together to acclimatize to climate change and to minimize its impacts as far as possible. The study outcomes further revealed that the local authorities have not yet equipped, offered nor suggested any form of required support to locally-based businesses in the region to dealing with impacts of climate change. The authorities indicated that the decline in the water table, water sea level, aquatic life, drought, damages to building, veld forest fires, decline animal plant species, vehicle damages and quality are indicators of environmental climate change. In addition, the local municipality believed that declining snow level in the area is as result of climate change.

However, in the absence of appropriate mitigation and adaption strategies, the region will continue to experience the above-mentioned adverse impacts. These findings are parallel with Buggy and McNamara's (2016: 274) conclusions, namely, that tourism destinations and protected areas without self-protective and counteractive measures in place are particularly susceptible to climate change impacts for the reason that they have limited climate change related expertise, inadequate information and low adaptive capacity.

The findings of the study indicated that there are no future plans are in the pipeline to counter the negative impacts of climate change. Another major finding relating to this issue was the fact that there seems to be no efforts to collaborate by tourism stakeholders in the region to address the issue of climate change. This is a depressing reality, as teamwork at different levels is very much required in the tourism sector in order to effectively address the challenges of climate change (Njoroge 2015: 98). The importance of this type of affiliation in managing and addressing the impacts of climate change in the tourism sector was further emphasized by Shakeela and Becken (2015: 76), who pointed out that teamwork is the future of globalisation's struggle to seek immediate solutions, and to put in place some modern policies and strategies that are aimed at confronting the cataclysm of climate change.

Instead of conjoining with each other on this important issue, various tourism stakeholders appear to be too occupied with daily events, trying to survive in the short-term, while totally disregarding the reality that a long-term vision with common-input from all the interested and affected parties is what the tourism industry needs to avert future disasters. Tourism destinations, protected areas and weather-dependent activities of the affected areas cannot wait any longer for governments to act. In essence, by forming these much-needed partnerships; the whole industry could well be on the road to much-needed solutions to climate issues.

The findings of this study moreover indicated that the local municipality is aware of the impact of climate change. In an attempt to mitigate climate change, Amusan and Olutola (2017) and Atzori *et al.* (2018) propose that an important element in the success of mitigation approach is the ability of tourism establishments to modernize and embrace renewable energies, including new energy-responsible technologies and to offer more of eco-friendly products to all their visitors. From a similar perspective, Becken (2005: 384) and Njoroge (2015) suggests the implementation of solar panels, low energy lighting, room keys to operate lights, light sensors and the synchronized education & sensitisation of visitors and human capital in the problem of climate change. Additionally, the use of such technological oriented solutions is the key to assist in lessening the carbon print of tourism, specifically in the accommodation sub-sector.

Muchoki (2018), in an attempt to be prepare for climate change, proposes that some of the prominent tourism organizations should campaign and take initiative in assimilating locally-based tourism companies into government planning processes. Malla (2008: 65) also notes that although the impacts of climate change cannot be entirely managed, some efficient planning and change in visitor behaviour towards a minimal carbon economy can cut-down on possible disasters. Although there is a claim by majority of the participants from the local municipality that there are climate change policies and strategies in the region, they conceded to state that there is no model to track the impact of climate change to tourism development. Therefore, an integrated model was developed in line with the study outcomes, which is further explicated on the next section, Objective 6.

Objective 6: To Develop a Model That Shows the Impact of Climate Change on Tourism Development in the Central Drakensberg Region of Kwazulu-Natal

According to Nilsen (2015: 53), a model is seen as the connection between independent and dependent variables. For this study, the dependent variable is 'tourism development' while the independent variable is represented by the 'climate change'. For capturing accurate data in respect of a phenomenon, correct measurement systems need to be used (Bodrožić and Adler 2018: 85). In the context of this study, the connection is specified mathematically through the utilization of correlation analysis, hypotheses testing and regression analysis. Taking this into consideration, the connection was found between the variables tested (climate change and tourism development). One may conclude that the model adequately gives a truly and accurate tested relationships between the variables. The accurate interpretation of the relationships and tests results was performed mathematically using regression analysis and Pearson's Chi-square. The Integrated Model of Climate Change and Tourism Development in Figure 7.1 was developed based on the outcomes of this study.

Figure 7. 1: Validated Integrated Model

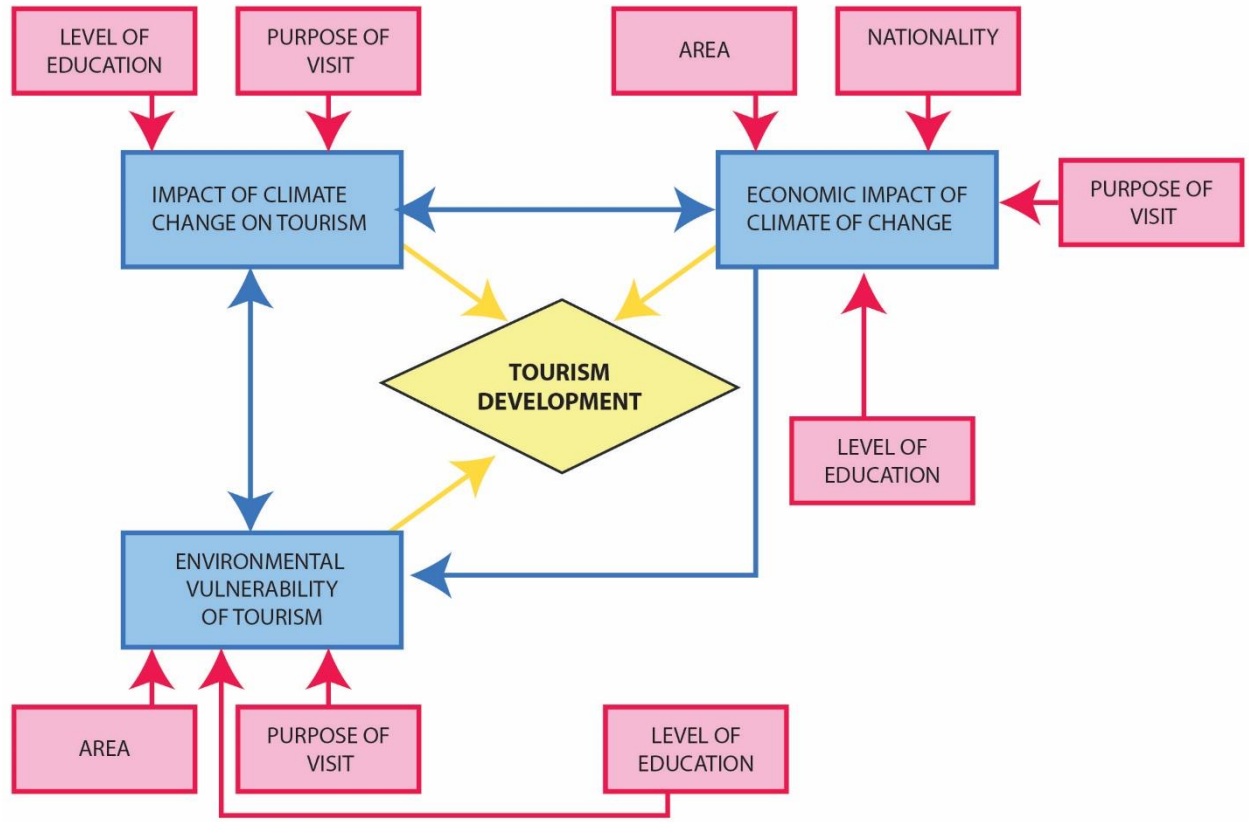


Figure 7.1 above depicts the impact of climate change on tourism development. The regression analysis and hypothesis testing indicated that climate change impacts tourism development. In Figure 7.1, this is shown by the yellow arrow from the 'climate change box' pointing to the 'tourism development box'. Considering the results in Table 7.1, the model is a perfect descriptor of the connection between independent variables (climate change) and the dependent variable (tourism development) ($F=4.505$; $p=0.025$). Therefore, this indicates that the independent variable (climate change) is greatly significant in explaining the variation in the dependent variable (tourism development). In addition, the Pearson Chi-Square results of the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$). The results of the statistical tests reveal that there is a significant correlation between climate change conditions and tourism development.

Fort (2015: 19) relays that such regions are intensely impacted by climate change, as it affects specific ecosystem services that benefit communities and visitors through impacts on food quality and sustainability, water quality and accessibility, natural hazards by-laws, religious and cultural identity, aesthetics and recreation. The findings of this study, through the use of regression analysis, also indicated that the economic implications impact tourism development. In Figure 7.1, this is shown by a yellow arrow from the 'economic impact box' pointing to the 'tourism development box'.

The model is a perfect descriptor of the connection between independent variables (economic implication) and the dependent variable (tourism development) (F=1.599; p=0.026). Therefore, this indicates that the independent variables (economic implications) are greatly significant predictors in explaining the variation in the dependent variable (tourism development). This points to the independent variable (economic Implications) as a predictor (influencing) of the dependent variable (tourism development). The Pearson Chi-Square results of the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$). The results of the statistical test reveal that there is a significant relationship between economic implications and tourism development. As Nwankwoala (2015:224) states, human lives are directly connected to the climate, hence one can arguably state that human endeavor is currently changing the climate and as such, climate change in turn impacts on the ecosystems of the world.

The findings of this study revealed through regression analysis and Pearson's Chi-Square testing that there is a connection between environmental vulnerability and tourism development. In Figure 7.1, this is shown by a yellow arrow from the 'environmental vulnerability box' pointing to the 'tourism development box'. This points to the independent variable (Environmental Impact) as a predictor (influencing) of the dependent variable (Tourism Development) by 36.4%. The model is a perfect descriptor of the connection between independent variables (environmental vulnerability) and the dependent variable (tourism development) (F= 1.599; p=0.026). In addition, the Pearson Chi-Square results of the $p<0.000$ is under the cut-off parameter that is Pearson ($p<0.05$). The results of the statistical test reveal that there is a significant correlation between environmental vulnerability and tourism development. Therefore, this indicates that the independent variables (environmental vulnerability and economic implications) are significant predictors in clarifying the variation in the dependent variable (tourism development). This point is echoed by Moreno (2010: 16), that environmental vulnerability and tourism have a very close correlation and that this correlation is even more pronounced for coastal tourism, mountain tourism and general nature-based tourism.

The findings of this study revealed through regression analysis that economic implications influence climate change. In Figure 7.1, this is shown by an arrow from the 'economic impact box' pointing to and from the 'climate change box'. This points to the independent variable (Economic Implications) as a predictor (influencing) of the dependent variable (Climate Change) by 58.0%. Therefore, this indicates that the independent variable (economic implications) is a greatly significant predictor in explaining the variation in the dependent variable (climate change). The results indicate that economic implications are the predictor (influencing) variable that contributes to the variation of climate change ($\beta= 0.358$; $p= 0.007$). Climate is a primary dynamic for sustainable agricultural output, such that a little environmental change may possibly impact plant and animal production (Shongwe *et al.* 2014: 41).

The results of the study also revealed through regression analysis that there is connection between environmental vulnerability and climate change. In Figure 7.1, this is shown by an arrow from the 'environmental vulnerability box' pointing to and from the 'climate change box' The model is a perfect descriptor of the connection between independent variables (environmental vulnerability) and the dependent variable (climate change) ($F= 3.265$; $p=0.004$). The results indicate that environmental vulnerability is the predictor (influencing) variable that contributes the highest to the variation of climate change ($\beta= .459$; $p= 0.004$). Therefore, this indicates that the independent variable (environmental vulnerability) is a significant predictor in explaining the variation in the dependent variable (climate change).

7.4 Chapter Summary

Although visitors viewed the climate conditions of the CDR as habitable, the authorities are worried by the rate of deterioration of the climatic conditions of the CDR, and the rapid decline in the number of visitors. The outcomes of the study point out that the prospects of investment are hugely stifled by climate change in the area. Not only that, the findings also indicated that tourism infrastructure, wildlife and the environment are adversely affected by the change of climate in the region. The study outcomes moreover revealed that climate change is negatively impacting the long-term sustainability of the protected species and areas, tourism sector and businesses. Simbanegavi and Arndt (2014: 114) highlight that from an economic perspective, climate change will undesirably impact Africa's growth and development prospects, mainly because of the non-existence of adaptation and mitigation initiatives.

The following chapter, which is also a concluding chapter of the study, presents the summary of the key findings, summary of the study, limitations and recommendations for further research.

Chapter 8 of 8: Summary, Findings, Conclusions and Recommendations

8.1 Introduction

This chapter serves as the concluding section of this investigation. The previous chapter presented all the outcomes derived from the questionnaire, which was conducted amongst domestic and international tourists visiting the CDR, as well as tourism authorities. This chapter is presented in different sections, starting with the summary of the investigation by highlighting the key findings of the study, and presents suggestions for future research. The outcomes presented in this research are based on the investigation performed using specific contexts, variables and methodology. The study is quantitative in nature, which was intended to investigate the economic and environmental impacts of climate change on the tourism industry in the Central Drakensberg Region in KZN.

The intention of this dissertation was to explore how changing climatic conditions in the Central Drakensberg Region are affecting the tourism industry in relation to the economy and the environment. To investigate this aim, tourism climatology was employed as a conceptual framework to guide the direction of the study. This study was explored through understanding the participants' involvement and understanding of climate change, current practices, future plans, and their attitudes and beliefs towards the general impacts of climate change.

A case study approach using various major protected areas and tourism authorities was employed in order to achieve the most reliable and conclusive possible results. Structured questionnaires with 320 visitors and 6 tourism officials from the local municipality combined with input from 26 tourism stakeholders provided information that was analysed using SPSS 25. Recommendations relating to the study and for further studies are presented in this chapter as an input towards understanding the catastrophe of climate change, and the creation of new strategies and initiatives relating to the impact of climate change, particularly to the tourism industry.

8.2 Summary Overview of The Study

The study goal was to demonstrate how vulnerable the tourism sector is to both the environmental and economic impacts of climate change, thus resulting in the most devastating outcomes. As earlier mentioned in Chapter 1 of the investigation, this research study is presented in eight (8) chapters. The chapters are further explicated upon below:

- **CHAPTER 1** presented an overview of the impact of climate change on tourism, research context of the variables and background of the research. The nature of the research problem, rationale for the study, research objectives and specific research questions are also declared.

- **CHAPTER 2** outlines the spatial setting of the study area, which is the Central Drakensberg Region, paying special attention to the historical environmental background information, current state of natural components, tourism sector and layout map of the area, including the location of the study area.

- **CHAPTER 3** outlined the critical and in-depth evaluation of previous research that relates to the variables of the study. Previous findings and studies relating to climate change and tourism were discussed.

- **CHAPTER 4** presented details relating to the conceptual framework, "tourism climatology", that informs and directs the study. This chapter reviewed the theoretical inclinations of this study with a view to creating/contextualizing the conceptual underpinning within the tenets of this study.

- **CHAPTER 5** provided sufficient detail about the methodology employed in this particular study. Subsequent to that, it offered a thorough narrative of the research methods utilised in the research study. The selection of the preferred methodologies in this study is supported by the relevant literature.

- **CHAPTER 6** presented the analysis and interpretation of the findings from the questionnaires that were used to solicit information from the respondents. The findings are presented in the form of statistical analyses. As part of the presentation of the outcomes, this section outlines the findings in relation to climate change and the subsequent impact of tourism, the environment and the economy of CDR.

- **CHAPTER 7** presented a detailed argument of the data analysed in the previous chapter and proposed a new model that seeks to contribute to the mitigation strategies of climate change. The literature review was used to make sense of the outcomes, to strengthen the discussion and to compare the findings with previous findings from other researchers.

- **CHAPTER 8** is a concluding section of the study that provided a synthesis of the research. Major findings will be discussed and interpreted according to the general outcome of the study, as well as the literature review. Limitations of the study and implications for further research will be presented, followed by the recommendations and possible strategies that can be implemented in dealing with the detrimental phenomenon of climate change in the region.

8.3 Summary of Major Findings of the Study

This section of the chapter is intended to provide a comprehensive summary of the major findings/outcomes that were generated from the two preceding chapters. The key purpose of this research study was to investigate and determine the environmental vulnerability and economic implications of climate change on the development of tourism in the Central Drakensberg Region. The spatial setting of this investigation was a UNESCO World Heritage Site-declared destination(s)/region situated in the great Drakensberg mountain. A thorough statistically analysis was carried out on 4 sections of the two (2) questionnaires that were formulated for the respective respondents, namely Section A (demographics); Section B (Climate Change); Section C (Environmental Vulnerability and Management Approach to Climate Change); and Section D (miscellaneous). In order to make sense of the results, two distribution free tests in the form of Pearson's Chi-square and Fisher's Exact Test which are interpreted using the p-values were used to test all the hypotheses formulated. In the context of the methodology used, a quantitative approach was adopted using a non-probability sampling method of purposive and convenience sampling.

A number of critical findings arose from the empirical data analysis. The major part of the findings in the previous chapter was supplemented and corroborated by other scholars and authors who carried out comparable and/or approximately similar studies in the past. Furthermore, the study outcomes have fundamental practical implications for all the industry stakeholders, mainly the tourism sector, authorities, businesses, academics, local community and visitors. Evidently, it is becoming progressively apparent that climate change is indeed impacting the tourism sector both economically and environmentally. Notwithstanding that the findings could be generalised to other destinations with similar characteristics, conversely, it should be noted with great concern that some tourism destinations, regions and authorities might have distinctly different factors than that of CDR, hence making it difficult to generalise the results. Additionally, the investigation focused on the impact's aspect of climate change, namely economic and environmental. Therefore, the findings cannot be fully generalised when dealing with the mitigation and management of climate change as that was not the primary purpose of the study. The following points highlight the focal findings identified by the research and explained below:

8.3.1 Tourism and Visitor Flow in CDR

The research outcome indicated that the number of visitors travelling to the CDR for tourism purposes is drastically declining. This outcome was also affirmed by evidence that a great number of visitors who participated in the research project were first time travellers. Ideally, a more encouraging situation would be for tourism destinations to have more returning tourist visitations than to have first-time visitors. Customer satisfaction in closely linked to repeat business.

Hence, If the visitors are not pleased with the quality of products and services a destination is offering, it is more likely that they will not come back. In the context of this research, the outcome suggests that because of the impact of climate change tourist sites in the region, visitor arrivals will likely continue to decline. In addition, the majority of activities in the region are weather-dependent. Hence, most of the activities are highly compromised because of changing climatic conditions. The region has lost its appeal to travellers because of environmental damages caused by climate change. The scenery is no longer as captivating as it was before, a typical case being the lessed snow cover because of unstable and high temperatures. Such changes are a deterrent to visitors, therefore leading to a decline in visitor flow to the region. The results further indicated that visitors would no longer visit the region as well as surrounding destinations if the majority of tourist activities are cannot be undertaken. The visitors also asserted that unfavourable weather conditions would likely make them cancel their vacations. Realistically, the weather conditions of the region are gradually worsening due to a changing climate and the long-term implications of the changing climatic conditions are reduction of tourist flow, degradation of landscapes and losses of profit, hence the present situation in the CDR.

8.3.2 Awareness and Understanding of Climate Change

Regarding the awareness and understanding of climate change, the outcomes indicated that the large portion of the visitors had some basic understanding of the meaning of climate change. This is a sign that more people are gradually becoming familiar with the varying climate conditions. However, it is still alarming and bothersome to note that one-third of the visitors did not have a clue about the damaging consequences of climate change. This is an alarming revelation and makes efforts being implemented to raise awareness and understanding about climate change seem futile. This is corroborated by the upsurge in the percentage of individuals who conceded that they are honestly not aware of the menaces related to climate change. Many study respondents were even unsure about what exactly climate change is and how it impacts tourism destinations.

On the topic of the awareness level of visitors, the outcomes indicated that most respondents are aware of climate change. However, regarding the cause of climate change, almost half of the respondents consider it a natural occurrence and put all responsibility for climate change on nature. Despite this, the general sense from respondents is that climate change is indeed a concern. On the basis of these outcomes, the study conclude that RSA has come a long way but is still far from addressing the calamity of climate change due to the fact that it is rather problematic to minimise the man-made impacts that contribute to climate change as some industry stakeholders, including visitors, remain ignorant about what climate change is all about; how it effects the industry; and how earnestly it compromises the future and prosperity of the tourism sector. Lastly, one can summarise that a lot still needs to be done to create awareness and educate all tourism stakeholders on the accurate implications of climate change.

8.3.3 Influence of Climate on Visitors' Destination of Choice

The empirical findings of this research confirmed that climate change is causing harm to the local ecosystem, and that the region is already experiencing the negative impact of climate change. For this reason, most visitors indicated that they prefer to visit a destination where the authorities and people within that area are actively embarking on implementing climate change mitigation and adaptation initiatives. This shows that visitors are reasonably conscious about their safety, needs and wants. They need assurance of their health, security and safety before they visit a place. In addition, they need to also know the efforts that authorities within that area are putting in place to reduce the impact of climate change. This means that turning a blind eye to the impact of climate change provokes visitors to shun visiting the place. The majority of the tourists emphasised that they are willing to spend their money in destinations that are environmentally friendly. Therefore, those places that overlook the environment are likely to incur a huge loss of visitors. Visitors are also willing to pay increased accommodation prices as some means of assisting with the costs and ingenuities associated with climate change adaptations. This support given by visitors is likely to boost the financial coffers that cater for the resuscitation of damages caused by climate change. The study's findings also reveal that spending patterns and the behaviour of tourist visitors has been greatly disturbed by climate change.

8.3.4 Economic Impact of Climate Change

The spatial setting of this investigation remains greatly dependent on the tourism industry as one of the main economic activities. Therefore, any undesirable changes in the climate setting of the CDR will probably affect not only the tourism sector, but also the economy and livelihood of the people in the region. It is clear for all to see that indeed the calamity of climate change has encroached the region. In essence, one may argue that without practical actions in place, the region may well be completely deserted by visitors, hence a huge blow to the proceeds contributed by investors and visitors.

In line with the study objectives and questions, the study established and can therefore conclude that the tourism industry in CDR has been, and still remains, the main source of business for most organisations in the region, making it the main economic driver for the region. The tourism industry is tremendously vital for the town, the region and the province, which suggests that the undesirable effects of climate change on this sector are having shattering consequences for the economy and the sustenance of businesses, as well as the employment opportunities for the people that work within the tourism sector. Although the economic impacts of climate change have been analysed in South Africa at the national level, the impacts of climate change on the tourism sector have been inadvertently overlooked hence posing long-term unfavourable threats to the sustainable of the sector. The outcome indicated that the comprehensive economic impact of climate change on tourism activities is much more understood at the regional/destination level.

8.3.5 Climate Change Mitigation and Adaptation

In line with the fifth objective, which was to examine mitigation and adaptation strategies presently in place to deal with the impacts of climate change in the CDR, the outcome of the study indicated that initiatives, programs and policies to effectively minimise the effects of climate change in the region are futile and often impractical. Local tourism authorities asserted that both the ecological and economic impacts of climate change for the tourism industry should be dealt with at both local and national government levels in order to contain the condition. Although there is a claim by the majority of respondents from the local municipality that there are climate change policies and strategies in the region, they conceded that there is no model to track the impact of climate change on tourism development. The respondents from UKhahlamba Municipality further conceded that even with the existing policies, there is no mechanism in place that tracks the impact of climate change in general. Moreover, the efficacy of these policies and strategies remain unknown as no assessment examinations have been conducted. The long-term implication of this negligence is that the undesirable effects of climate change on tourism will continue to prevail as there are no actions being taken to reduce its impact.

The findings of this study further indicated that the local authorities have thus far not offered any form of assistance to locally-based businesses as far as dealing with the calamity of climate change. The most prominent environmental impacts of climate change have affected the following: decline in the water table, water sea level, aquatic life, drought, damages to buildings. Veld forest fires, declines in animal/plant species, vehicle damages and quality are indicators of environmental climate change. The local municipality believed that the declining snow cover in the region is caused by climate change. The level of unease that was highlighted about climate change by the study participants is reasonably high as some of them, with tourism authorities are quite familiar with the challenges and the potential impact of climate change. Regardless of this, the results indicated otherwise, as the lack of action in addressing climate change through implementing adaptation methods remains noticeable. Instead of putting in place some preventive adaptation strategies, many of the businesses including the local government rely heavily on a reactive adaptation approach, which is costly and difficult to sustain and evaluate.

8.3.6 General Impact and Management of Climate Change

In summarizing the study outcomes, the analysed data points out the negative impact of climate change on the tourism industry in Central Drakensberg Region. The study respondents (including guests/visitors, tourism authorities, government officials and the literature-based evidence) suggests that international tourism organisations have a primary responsibility to effectively and thoroughly respond to climate change impacts.

The majority of respondents further consented that all the tourism stakeholders are equally responsible for tackling climate change impacts, and that visitors, tourism authorities and government agencies should work together to adapt to climate change and to minimize its impacts as far as possible. The findings also indicated that tourism authorities should engage in the prevention of carbon accumulation. This view also resonates with international frameworks that aim to reduce the carbon footprint in the earth's atmosphere as a measure to mitigate climate change. Although the tourism industry at a national level has put more emphasis on adaptations, the tourism sector at a local level is still faced with several challenges such as a lack of adaptation strategies and a scarcity of specialists and information. The provincial tourism authorities in KZN have made esteemable efforts towards formulating policies on climate change impacts. However, most content of these policies is not put into practice at regional levels and is not based on primary research.

The findings are in line with Averchenkova *et al.* (2019: 15) reported outcomes that climate change is a global-scale phenomenon hence requires coordinated global-scale transformations that can only be implemented by all national governments working together. Granted, private companies, public-private organisations and tourists can at most be responsible for their own actions to minimize the impacts of climate change. Ultimately, the buck stops with the government. In the context of South Africa, government at different levels yields an adequate amount of influence to put in place legislature that coerces tourism businesses and other prominent industry stakeholders to act sustainably for the furtherance of the tourism sector. South African governments have the responsibility and the capacity to support climate change adaptation initiatives, assist tourism businesses with coping mechanisms and endorse policies which could regulate the tourism industry to adhere to environmental protection standards. Tourism organisations and/or business should be compelled to purchase hunting, fishing and emission rights, the proceeds from which can be used to support climate vulnerable regions.

8.4 Limitations of the Study

The study has the following delimitations:

i. The present study is limited to the study variables, namely environmental vulnerability, tourism development and economic implications and its influencing factor, which is climate change;
ii. The population/visitors under study are limited to the municipal limits of uKhahlamba Local Municipality situated in the Central Drakensberg Region;
iii. The sample size of the present study is limited to 350 respondents; and
iv. The study is restricted in its research design, technique, measuring tools and statistical methods.

8.5 Recommendations for Future Research

This study has exposed a number of gaps around the topic of climate change impacts on the tourism sector in CDR and globally. Hereafter, it is imperative to suggest recommendations for future research. The major part of these recommendations is derived from the problem that was identified in the introductory chapter of this research, as well as the empirical outcomes of this study as presented in Chapters 6 and 7. The recommendations are presented parallel with the focal aim of the study, which is to investigate the climate change impacts on the tourism sector of CDR. The restrictions of the study and the recommendations for further research are also presented under this section of the chapter. It is hoped that the suggested recommendations be taken into serious consideration by all interested parties and affected tourism stakeholders in order to minimise the impact of climate change. The future and prosperity of the tourism sector can greatly benefit from these recommendations, as only those who are willing to listen have a chance of succeeding tomorrow. Therefore, on the basis of the aforementioned, some recommendations are proffered as follows:

8.5.1 Recommendations Relating to the Study:

8.5.1.1 Climate Services (CS) Framework

The study proposes the application of a climate services (CS) framework in the CDR. In the tourism context, CS is a tool that can be applied as an approach to strengthen decision-making processes in order for various stakeholders to better prepare and acclimatize to the risks and impacts of changing climatic conditions. Regardless of the prevailing vulnerability of the tourism sector to climate change, the actual use and familiarity of CS amongst South African tourism destinations and stakeholders is reasonably limited and unknown. According to the literature, the key obstacles to the use of CS in the tourism sector particularly in developing countries, take account of low levels of impacts and risk awareness associated with climate change; denialism among tourism stakeholders; a lacking sense of expertise; and a lack of support and willpower from government, which all lead to a low prioritisation of climate change concerns. Therefore, the study recommends for the CDR tourism authorities to implement a CS framework that will prepare stakeholders and decision-makers in the tourism sector with better information to make climate-smart decisions and adapt to the long-term impacts of climate change.

8.5.1.2 Climate Change Adaptation and Mitigation Framework

The outcome of the study indicated that at present, there is no suitable model in place in use to deal with the impacts of climate change in the region. In addition to that, the existing policies and strategies are very much impractical and ineffective. On the basis of this information, the study recommends the development of a well-versed Climate Change Adaptation and Mitigation framework for the region.

The framework must include the evaluation and monitoring plan that that will assist to track and assess the outcome of the interventions throughout the proposed framework. Because of the tourism industry's close relation to the environment and climate itself, it is considered to be a highly vulnerable and critically climate-sensitive economic sector. The long-term implication of this recommendation is that it will enable the environment to adapt naturally to climate change and ensure that the tourism sector is not vulnerable, as well as to enable financial development to take place in a sustainable manner.

8.5.1.3 Public-Private Partnerships (PPP)

The outcome of this research indicated that the government has invested little to no aid to local businesses to deal with the challenge of climate change. Additionally, there are currently no initiatives or programs involving all the tourism stakeholders in an effort to address the current problem. Hence, the study recommends some public-private partnerships (PPP). A significant effort needs to be made in order to foster the relationship between state-owned tourism organizations, private tourism establishments and the government through the Ministry of Tourism and locally-based tourism authorities (local municipality). In the context of this study, PPPs are referred to as a relationship that consist of group effort between government tourism agencies and a private-sector tourism companies that can be used to seek solutions to existing challenges; fund projects to address certain issues; and to strengthen the relationship between the public sector and private sector.

Previous studies have repeatedly highlighted the importance of private tourism establishments in advocating for eco-friendly practices and for helping to lessen the impacts of climate change in the tourism industry. As part of a new paradigm shift towards natural resource protection, some major destinations and visitors are becoming more attuned to the impacts of climate change. Consequently, more tourism destinations are becoming environmentally friendly. Nevertheless, the shift into responsible tourism is easier said than done. It requires stable public-private cooperation and a drastic change in the practices, behavior and attitudes in the tourism industry. Hence the study suggests that the first step in the right direction would be a mutual affiliation amongst the public and private sectors, working side-by-side in addressing the disaster of climate change impacts in the tourism sector. This would aid in increasing the sectors defense mechanism, investment of additional financial and human capital that are meant to address the problem of climate change.

8.5.1.4 Climate Change Education and Awareness

Notwithstanding the outcomes of study, which suggested that a great number of participants had some level of knowledge and awareness on climate change, the accurate meaning, vulnerability, implications, effects and responsibilities that are directly and indirectly associated with climate change remains unknown to many participants.

As such, the study recommends for the sensitisation of tourism stakeholders, through educational capacity building initiatives in order to enhance awareness. This recommendation is both inspired by the study outcomes and the UNTWO proposition that education in the tourism sector is a necessary factor of the global response to climate change. Such initiatives will assist various tourism stakeholders to clearly understand and work towards minimising the impact of climate change, to enhance climate literacy amongst decision makers, to inspire positive changes in visitor attitude and behaviors, and ultimately help tourism destinations to competently adapt to climate change interrelated impacts.

More than that, education and awareness-raising in the tourism sector assist in making informed decisions, and plays a crucial role in promoting the increasing the adaptation and mitigation capacity of tourist destinations. Climate change awareness and education is part of UNESCO's Education for Sustainable Development (ESD) programme. The long-term intention is to endorse the climate change curriculum to be a more fundamental and key part of the international response to climate change. It is in this view that the study recommends awareness and educational interventions as a tool to address the concern of varying climatic conditions.

8.5.1.5 Climate Change Impact on Visitor Destination Choice

As the issue of climate change gains more attention from the global community, the literature is similarly growing rapidly, particularly giving more attention to research on the relationship between climate change and tourism. The outcome of this study indicated that, to some degree, climate change certainly influences visitor choices and spending patterns, thus negatively impacting the tourism sector. Therefore, with the drive to contribute to the tourism-climate change related literature in South Africa, which is still seen as a major singular challenge facing the tourism industry in this century. This study recommends an investigation that will exclusively focus on examining the impact of climate change on destination choice and how it may influence the choice of tourists visiting the CDR or any other destination in RSA. The recommended study will also pay attention to how climate change influences the spending pattern of visitors and how the spending patterns impacts the overall future of tourism.

According to Guliyeva (2018), the potential changes to any tourist destination due to climate change can negatively influence tourists' destination choice. Evidently, climate change is considered to be a major factor that has the potential to influence destination choice, as changes in the climatic conditions of any destination might induce visitors to make changes to their choices and travel to alternative destinations with more acceptable and favourable climate conditions. It is on this basis that this study recommends the investigation of the influence of climate change on visitors' destination of choice.

8.5.2 General Recommendations Relating to the Study:

8.5.2.1 Same Study in Different Setting(s)

The research study focus was on the Central Drakensberg Region, a major tourist destination situated in KZN. Therefore, it is recommended that similar studies on other major tourist destinations in South Africa be carried out, especially those with similar characteristics, as this may provide more detail and insight into how other destinations may be impacted by changing climatic conditions. Above and beyond, it may present an opportunity for future collaborations on how different destinations respond to the phenomenon of climate change, as well as to share practices and approaches that are considered resourceful with reference to managing the impact of climate change.

8.5.2.2 Investigate other Forms of Climate Change Impacts

This research study's main focus was to investigate the impacts of climate change on the tourism sector of the region. Thus, another recommendation would be that further investigations could be aimed at addressing other types of climate change impacts, such as species and natural area impacts, degradation of the environment impacts, and socio-economic impacts, particularly in relation to the surrounding local communities. This could be useful in gaining insight into how climate change affects different components of the tourism industry. Apart from that, the information will assist in acquiring an overall state of affairs of the tourism industry within locally-based peoples, as well as in determining the extent to which climate change is affecting the communities in relation to tourism.

8.5.2.3 Environmental Awareness

Strategies and policies that are aimed at addressing the environmental impacts of climate change on tourism in the CDR are an area that is in dire need of atttention. In the long-run, these policies can serve manifold purposes by reducing the environmental degradation of climate change; decreasing the susceptibility of the tourism sector to climate change; and promoting the development of sustainable and responsible tourism practices. On the basis of the study findings, it is recommended that a wide range of research studies ought to be instigated on why environmental awareness does not always transform into eco-friendly attitudes/behaviors when it comes to climate change and tourism outings. Tourism by nature is sought for pleasure and fulfillment, hence many visitors are disinclined to make major changes to their lifestyles. When such fulfilling and emotional benefits are associated with tourism outings, finding methods to induce positive attitude towards sustaining the environment is important for the unrelenting long-term future of the tourism industry.

In line with the afore-mentioned list of recommendations, suggested remedial actions and/or corrective measures may possibly be valuable in contributing to South Africa's climate change knowledge by precisely ascertaining the level of tourism vulnerability in relation to climate change. Therefore, this study could also serve as a groundwork for future research studies in an effort to build resilient defense mechanisms and be useful in assisting the tourism sector to develop pioneering policies and plans to manage the future ramifications of climate change.

8.6 Concluding Remarks and Conclusion

This research intended to explore the threats of climate change for the tourism sector in the economic and environmental aspects. In so doing, it has a substantial impact on tourism-climate change related research in South Africa. It fuses the fields of tourism and climate change as there is a pressing need for this type of research, particularly considering the key role the tourism industry plays in the South African economy. Over the last 20 years, South Africa has adopted the UNWTO resolution by embracing a wide range of national and sectoral policies, plans and strategies that are aimed at de-carbonising the tourism sector economically and environmentally, while meeting broad sustainable developmental goals. Nonetheless, South Africa is still lagging far behind in the climate change battle as compared to other developing countries, as the country's political responses, especially in key sectors like tourism and agriculture, are nowhere near comprehensive enough.

Although there is a rich body of knowledge with reference to the impacts of climate change on tourism in other areas, this topic has limitedly explored the context of the Central Drakensberg Region. Therefore, this research study is significant due to its contribution on the literature of climate change impacts on CDR and KZN tourism. Furthermore, the findings of this research can be selectively applied as a foundation to similar tourism destinations elsewhere in South Africa and beyond, to study other potential impacts of climate change. Moreover, the thesis contributes to the literature on factors that mostly influence visitor choices in relation to climate change.

As articulated in the previous chapters, the effect of climate change on the tourism sector seems to be an extensive, complex and compound topic which has been perceived and will almost certainly continue to receive a great deal of consideration due to its implications, particularly in recent years and hereafter. Throughout the outcomes of this research and from previous studies of a similar nature, it is by no means unheard of to acknowledge that tourism, be it in RSA or elsewhere in other African countries, is strongly impacted by changing climatic conditions. The occurrence of climate change as a result of the greenhouse effect, appears to be one of the ultimate natural catastrophes of our era and is adversely affecting one of the major sectors of the national economy.

It is the researchers considered view that if some adaptive and mitigation strategies are not put in place immediately, the tourism sector will continue to suffer the consequences of climate change. As a natural phenomenon, the evidence and current practices still forecast unceasing negative impacts and the only optimism is that this challenge would not entirely hinder the prosperity and development of the tourism sector, which has and still is the economic backbone for many developing countries continentally and globally.

The reality of climate change is taking place whether one concedes it or not, hence the tourism industry needs to introduce some insightful adaptive measures in order to remain prosperous. Indeed, there will be future challenges concerning the tourism industry in the CDR and South Africa, but with good redressing strategies and policies, the future can be optimistic. Change is difficult but not changing is disastrous. Those destinations that adapt the best will possibly be the biggest winners. The research concludes as is was hypothesized, climate change will most likely influence tourism patterns, destination choices, environmental quality and economic activities. Hence, solution-driven attitudes ought to be adopted. A better understanding of how climate change impacts and threatens the tourism sector is a step towards the right direction, no matter how discouraging the findings appear. Understanding can in the long-run advance the sector's capacity for resourceful mitigation and adaptation.

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List of Annexures

02-07-2018

LETTER OF INFORMATION

Title of the Research Study:

Environmental Vulnerability and the Economic Implications of Climate Change for Tourism Development in the Central Drakensberg Region (CDR) of KwaZulu-Natal

BRIEF INTRODUCTION AND PURPOSE OF THE STUDY:

My name is Nduduzo Ngxongo (Student Number: 20823410), a doctoral student in the department of Hospitality & Tourism at the Durban University of Technology. I am presently conducting a research study that's intended to investigate the economic and environmental impacts of climate change on the tourism industry of central Drakensberg Region in KwaZulu-Natal. The purpose of this research study is to investigate and explore the environmental vulnerability and economic implications of climate change on the development of tourism in Central Drakensberg Region. The study further seeks to assist tourism authorities and other relevant stakeholders to reduce vulnerability of the tourism sector, and improve adaptation efforts.

This information letter is intended for the study participant who is eligible to participate in this study. Please note, the term 'you' used in this form refers to the selected participant. This letter provides information describing the purpose, procedures, benefits, discomforts, risks if any, and precautions associated with this study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision.

RISKS OR DISCOMFORTS TO THE PARTICIPANT: There are no known risks or discomfort, burden, or inconvenience that you as a study participant may experience as a result of participating in this research study and/or by the research procedures. The study questions are general, they do not include personal, religious and traditional questions, and there is no psychosomatic testing involve.

BENEFITS: The study endeavours to trigger a channel of communication amongst tourism role players in South Africa and universal with the hope to share ideas on how we can best deal with crisis of climate change. The results of this research will enhance the understanding of the multifaceted nature of current vulnerability of tourism sector to climate change, and how it may change over the coming decades in order to assist in coping with existing and potential changes. In addition, the study will provide valuable prospect for tourism role players in the region of Central Drakensberg to expand their understanding, expertise and competence, and put in place an effective strategy in order to address the tourism impact that are associated with climate change.

Lastly, the proposed study has a number of uniqueness academic potential contributions for scholars, authorities and practitioners, particularly in the domain of tourism geography. For theoretical perspective, this study provides basis for the researchers to further test the integrated correlation between climate change, environmental and economic impact in the context of tourism development.

PARTICIPATION AND WITHDRAWAL: Your participation in this research project is completely voluntary. You may decline altogether, or leave blank any questions you do not wish to answer.

REMUNERATION: There are no monetary ruminations or any other financial gains for participating in this research study. However, justice and respect will be acknowledged, the time and effort of participation is greatly valuable and appreciated. The principal researcher will also ensure that the participants are not unduly influenced into consenting to participate.

COSTS OF THE STUDY: The study participants are not expected to cover any costs relating to this study.

CONFIDENTIALITY: The study investigators, supervisor, co-supervisor and the institution (hereby referred to as "study personnel") are committed to respecting your privacy. No other persons will have access to your personal information or identifying information without your consent, unless required by law. Any documentation, or information related to you will be coded by study numbers to ensure that persons outside of the study will not be able to identify you. All information that identifies you will be kept confidential and stored and locked in a secure place that only the study personnel will have access to. In addition, electronic files will be stored on a secure institutional network and will be password protected. No identifying information about you will be allowed off site in any form. The principal investigator will protect your records and keep all the information in your study file confidential to the greatest extent possible.

PUBLICATION OF RESULTS: The results of this research study will be presented at various conferences, and will be published in scientific journals. Your name will not appear in any presentation or publication.

RESEARCH RELATED INJURY: The study participants are expected to sustain no injuries and/or harm.

PERSONS TO CONTACT IN THE EVENT OF ANY PROBLEMS OR QUERIES:

Principal Researcher:	Nduduzo Ngxongo, Mr.	Tel no: 082 666 4674
Research Supervisor:	Nsizwazikhona Chili. Dr.	Tel no: 033 845 8810
Co-supervisor:	Paul Green, Prof	Tel no: 021 460 3146

Institutional Research Ethics Administrator on 031 373 2375.

Complaints can be reported to the DVC: Research, Innovation and Engagement Prof S Moyo on 031 373 2577 or moyos@dut.ac.za.

02-07-2018

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the research, **NDUDUZO NGXONGO**, about the nature, conduct, benefits and risks of this study – Research Ethics Clearance Number:
- I have also received, read and understood the above written information (Participant Letter of information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

I, **NDUDUZO NGXONGO**, herewith confirm that the above participant has been fully informed about the nature, conducts and risks of the above study.

Nduduzo Andrias Ngxongo	02 July 2018	
Full Name of Researcher	**Date**	**Signature**
Nsizwazikhona Simon Chili	04 July 2018	
Full Name of Supervisor	**Date**	**Signature**

02-07-2018

PERMISSION TO CONDUCT AN ACADEMIC RESEARCH STUDY

TITLE OF THE STUDY:

Environmental Vulnerability and the Economic Implications of Climate Change for Tourism Development in the Central Drakensberg Region [CDR] of KwaZulu-Natal

PRINCIPAL RESEARCHER:
Nduduzo Ngxongo, Durban University of Technology
ngxongonduduzo@gmail.com, 082 666 4674

Dear Participant,

My name is Nduduzo Ngxongo, a [insert degree registered for] student at the Durban University of Technology. The research I wish to conduct for my Doctoral thesis involves environmental vulnerability and the economic implications of climate change for tourism development in the Central Drakensberg Region (CDR) of KwaZulu-Natal.

I am hereby seeking your consent to invite individuals from your organisation to participate in this study. Managers, general employees, and visitors are the primary participants that will be expected to partake in the research. If they agree, they will be asked to answer questionnaires on the following themes; tourism development, climate change, economic impact, and environmental vulnerability. Data will be collected on-site and during working hours, with no audio or video recording of participant responses.

Participants will be asked to give their written consent before the research begins. Their responses will be treated confidentially, and identities (their names and the name of the organisation) will be anonymous unless otherwise expressly indicated. Individual privacy will be maintained in all published and written data resulting from the study. The research participants will not be advantaged or disadvantaged in any way. They will be reassured that they can withdraw their permission at any time during this project without any penalty. There are no foreseeable risks in participating in this study. The participants will not be paid for this study.

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC). The study findings and recommendations will be made available to your office, which may help your organisation deal with challenges related to climate change impacts on the CDR tourism development. Academically, the results will be communicated in a form of a dissertation and academic journals.

I therefore request permission in writing to conduct my research at your organisation. The permission letter should be on your organisation's headed paper, signed and dated, and specifically referring to myself by name and the title of my study.

If you require any further information, please do not hesitate to contact me at the above-mentioned information.

Thank you for your time and consideration in this matter.

Nduduzo Andrias Ngxongo	02 July 2018	
Full Name of Researcher	**Date**	**Signature**
Nsizwazikhona Simon Chili	04 July 2018	
Full Name of Supervisor	**Date**	**Signature**

Questionnaire [Visitors/Guests]

Instructions

a) This questionnaire comprises of four (4) sections.
b) You are kindly requested to answer all statements.
c) Please mark (X) to the relevant pre-coded response.
d) Please mark (X) for one response only.

Part A: Personal Information

1. Gender

1.1	Male	
1.2	Female	

2. Nationality

2.1	Local	
2.2	International	
2.3	Specify:	

3. Highest Level of Education

3.1	No Formal Education	
3.2	Grade 12	
3.3	National Certificate	
3.4	National Diploma	
3.5	Postgraduate Degree	
3.6	Other/Cannot Disclose	

4. Age category

4.1	18-30 years	
4.2	31-40 years	
4.3	41-50 years	
4.4	51-60 years	
4.5	61-70 years	
4.6	Cannot Disclose	

5. Current occupation?

……

6. How many times have you visited the area/region?

6.1	1st Visit	
6.2	Twice	
6.3	Thrice	
6.4	More than 5 Times	
6.5	Regular Visitor	

7. Main Purpose for the Vacation

7.1	Holiday & leisure	
7.2	Family & friends	
7.3	Flora & Fauna	
7.4	Business	
7.5	Education	
7.6	Sports	

7.7	Other, please specify……	

Part B: Climate Change Impacts

8. Awareness and Understanding of Climate Change?

		SD	D	N	A	SA
8.1	Climate change is caused by human activities					
8.2	Climate change affects human life					
8.3	Climate change is a natural phenomenon					
8.4	Climate change is caused by human activities					
8.5	I am aware of climate change					
8.6	I am aware of climate change impacts on the tourism sector					
8.7	Climate change impacts are insignificant to the tourism sector					
8.8	I understand the future implications of CC on the tourism sector					
8.9	Climate change affects natural environment					
8.10	Climate change has some negative impacts on the economic sustainability of a destination					

9. In your understanding, what would you say are the effects of climate change?

9.1	Drought	
9.2	reduction in snow ice level over the years	
9.3	loss of forest trees	
9.4	loss of aquatic lives	
9.5	reduction in mountain altitudes	
9.6	all of the above	
9.7	None of the above	

10. How do you think climate change is affecting tourism in this destination?

10.1	Adversely affects the outlook of tourist attractions	
10.2	Reduce the number of tourists visiting the region	
10.3	Affect the perception of tourists about the region	
10.4	Make tourists' stay very uncomfortable	
10.5	All of the above	
10.6	None of the above	

11. When Do you think the region will start experiencing the impacts of climate change?

11.1	Already experiencing the effects	
11.2	After 10 years from now	
11.3	After 20 years from now	
11.4	After 100 years from now	
11.5	Will never experience the effects	

12. Climate change impacts on tourist destination choice:
Please rate how significant each element is to you when choosing a holiday destination:

very significant [VS] - slightly significant [SS] – Moderately significant [MS] - fairly significant [FS] - least significant [LS]

	Options	VS	SS	MS	FS	LS
12.1	Climate and Weather Conditions					
12.2	Food Quality and Price					
12.3	Quality and the Price of Accommodation					
12.4	Cleanliness of Destination					
12.5	Safety and Security					
12.6	Easy Accessibility of a Destination					
12.7	Beautiful Scenery					
12.8	Quality of the Area's Natural Setting					
12.9	Cultural and historical attractions					
12.10	Beach Facilities/amenities					
12.11	The Physical Images and Presentation of the Location					

13. Please respond to the following questions by Placing a cross (x) in the appropriate box

strongly agree [SA] – agree [A]– neutral[N] – disagree[D] – strongly disagree [SD]

	Options	SA	A	N	D	SD
13.1	I would choose a destination for the reason that they are actively involved in climate change combat initiatives					
13.2	I am pleased to spend my money in a destination that is environmentally friendly					
13.3	I would be willing to pay higher accommodation prices to assist with the costs associated with adapting to climate change					
13.4	climate change does impact the visitor's spending pattern and behaviour					
13.5	I would cancel my vacation if the conditions are unstable due to climatic conditions					
13.6	I would still visit the destination even if the weather conditions are unfavourable					

14. Are you willing to do anything to fight or/and reduce the implications of Climate Change impacts particularly to the tourism industry?

14.1	I am willing to do everything I can	
14.2	I do not know what I can do to reduce impacts	
14.3	If everyone does, I will also do something	
14.4	I am not willing to do anything	
14.5	I have already made efforts to adopt my lifestyle to a changing climate	

Part C: Environmental Impacts

15. Please rate the following list of environmental conditions in order of what you feel to be MOST critical to LEAST critical: 1 = least important; 10 = most important.

15.1	Decrease in Snow	
15.2	Veld Fires	
15.3	Deforestation	
15.4	Water Scarcity	
15.5	Water Contamination	
15.6	Drought	
15.7	Flooding	
15.8	Rise in Sea Levels	
15.9	High Temperatures/Heat Waves	
15.10	Accumulation of GHG	

16. Do you consider the climatic conditions of a holiday destination before choosing to go?

16.1	Yes	
16.2	No	
16.3	Sometimes	

17. Would you select a particular tourism destination based upon whether they are actively involved in adjusting to climate change?

17.1	Yes	
17.2	No	
17.3	Sometimes	

18. Under which of the following climatic conditions would you cancel your visit to THE Drakensberg region?

18.1	Decrease in Snow	
18.2	Veld Fires	
18.3	Low Temperatures	
18.4	Poor Ecosystem	
18.5	Water Contamination	
18.6	Drought	
18.7	Flooding/Heavy Rains	
18.8	High Temperatures/Heat Waves	
18.9	Strong Winds	
18.10	Other…….	

19. Why did you choose this particular destination?

19.1	Consistency in the outlook of tourist attractions	
19.2	Friendly weather conditions	
19.3	Suitable environmental factors	
19.4	Ecosystem	
19.5	Awareness of the destination's commitment to climatic and environmental factors	
19.6	Others, please specify:	

20. If this is your first visit, what are some of the impact that you have noticed which might be due to climatic changes in the area?

20.1	Low occupancy rates	
20.2	Changes in tourism behaviour	
20.3	Low day visitor's influx	
20.4	Changing weather patterns	
20.5	Decrease in snow reliability	
20.6	Limited number of animal species	

21. Would you have changed your destination had it been that the climate conditions were unfavorable in central Drakensberg REGION?

21.1	Yes	
21.2	No	
21.3	Maybe	

22. Do you check the climate conditions of a destination prior to making a booking?

22.1	Yes	
22.2	No	
22.3	Maybe	

23. What level of influence would be changing climatic conditions have on your decision to travel to Central Drakensberg Region?

	Options	Major influence	Rational influence	Moderate influence	small influence	least influence
		5	4	3	2	1
23.1	Minimum snow cover in the region					
23.2	Degraded landscapes					
23.3	Increased rainwater					
23.4	More storms and lightning					
23.5	High & strong winds					
23.6	Poor air quality & visibility					
23.7	Veld fires					
23.8	Poor water quality					
23.9	Flooding					

Part D: Supplementary Questions

24. Do you think the impact of climate change plays a specific role in the tourist's inflow to the destination?

24.1	Yes	
24.2	No	
24.3	Maybe	

25. Which role player/tourism authority do you think is best suited to deal with the economic and environmental impacts of climate change on tourism?

25.1	South African Tourism	
25.2	Local government	
25.3	Provincial government	
25.4	Local tourism authority	
25.5	National government	
25.6	Private sector	
25.7	Local community/visitors	
25.8	International community	

25. What are some of the strategies that tourism stakeholders can do to minimise the impacts of climate change to tourism?

Please rate how important you feel each of the following would be to minimise the impacts:
NI: Not important | LI: least important | MI: Moderately important | VI: Very important | SI: Strongly important

	Options	NI	LI	MI	VI	SI
25.1	Educate local community about CC					
25.2	Invest more resources in CC research					
25.3	Turn off lights/electrical appliances when not used					
25.4	Use energy wisely					
25.5	Minimise pollution					
25.6	Recycle as much as possible					
25.7	Invest in renewable resources					
25.8	Eat less meat					

26. Please rate how vulnerable you feel each of the following sectors would be to climate change in the region?

NV: least Vulnerable | LV: fairly Vulnerable | MV: Moderately Vulnerable | VV: Very Vulnerable | SV: Strongly Vulnerable

	Options	lv	FV	MV	VV	SV
26.1	Tourism					
26.2	Landscape					
26.3	Local community					
26.4	Snow					
26.5	Economy					
26.6	Plants and animals					
26.7	Infrastructure					
26.8	Water and sea level					
26.9	Sustainable development					

Again, your assistance in this project is greatly appreciated!!

Questionnaire [Tourism Authorities / Businesses / Local Municipality]

Instructions

e) This questionnaire comprises of four (4) sections.
f) You are kindly requested to answer alI statements.
g) Please mark (X) to the relevant pre-coded response.
h) Please mark (X) for one response only.

Part A: Personal Information

1. Name of tourism organisation/department and or municipality:

……

2. What is your current occupation?

……

3. Gender

3.1	Male	
3.2	Female	

4. Highest Level of Education

4.1	No Formal Education	
4.2	Grade 12	
4.3	National Certificate	
4.4	National Diploma	
4.5	Postgraduate Degree	
4.6	Other/Cannot Disclose	

5. How much are you involved in projects that are dealing with tourism and climate change in the region?

5.1	Minimum Involvement	
5.2	Moderate Involvement	
5.3	Maximum Involvement	

6. Age category

6.1	18-30 years	
6.2	31-40 years	
6.3	41-50 years	
6.4	51-60 years	
6.5	61-70 years	
6.6	Cannot Disclose	

7. What is the peak period of occupancy at your establishment?

7.1	Jan to March	
7.2	April to June	
7.3	July September	
7.4	October to December	
7.5	Other please specify……	

8. Where are the majority of your guests from?

8.1	South Africa	
8.2	African Continent	
8.3	International	

Part B: Climate Change Impacts

Please feel free to provide additional information to buttress your choices.

9. What is your understanding of climate change? Please tick which one of these explains climate change?

		SD	D	N	A	SA
9.1	Climate change is caused by human activities					
9.2	Climate change affects human life					
9.3	Climate change is a natural phenomenon					
9.4	Climate change is caused by human activities					
9.5	I am aware of climate change					
9.6	I am aware of climate change impacts on the tourism sector					
9.7	Climate change impacts are insignificant to the tourism sector					
9.8	I understand the future implications of CC on the tourism sector					
9.9	Climate change affects natural environment					
9.10	Climate change has some negative impacts on the economic sustainability of a destination					

10. In the region, what would you say are the effects of climate change?

10.1	Drought	
10.2	reduction in snow ice level over the years	
10.3	loss of forest trees	
10.4	loss of aquatic lives	
10.5	reduction in mountain altitudes	
10.6	all of the above	
10.7	None of the above	

11. How do you think climate change is affecting tourism in this destination?

11.1	adversely affects the outlook of tourist attractions	
11.2	Reduce the number of tourists visiting the region	
11.3	Affect the perception of tourists about the region	
11.4	Make tourists' stay very uncomfortable	
11.5	all of the above	
11.6	None of the above	

12. When do you think the region will start experiencing the effects of climate change?

12.1	already experiencing the effects	
12.2	after 10 years from now	
12.3	after 20 years from now	
12.4	after 100 years from now	
12.5	Will never experience the effects	

13. Climatic conditions in the central Drakensberg region will adversely impacts;

Please respond to the following questions by Placing a cross (x) in the appropriate box
strongly agree [SA] – agree [A]– neutral[N] – disagree[D] – strongly disagree [SD]

		SA	A	N	D	SD
13.1	Tourism destinations in the region					
13.2	Tourism flow in the region					
13.3	Financial performance of tourism industry					
13.4	Tourism employment					
13.5	The ecosystem in the CDB					
13.6	Natural landscapes in the region					
13.7	The level of community participation in tourism					
13.8	The role of major tourism role players					
13.9	Investments prospects					
13.10	Tourism infrastructure					
13.11	The future of tourism					

14. In the last 5 years, has your protected area/business experienced any of the following form of weather caused damages;

		Yes	No
14.1	Building structural damages		
14.2	Landscape degradation		
14.3	Vehicles damages		
14.4	Veld and forest fires		
14.5	Decline in animal and plant species		
14.6	Decline in the quality of water		

15. What kind of impacts, if any, do you think climate change is having on the long-term sustainability of the protected area/business?

15.1	Negative		
15.2	Positive		
15.3	I don't know		

16. Have you provided any form of support to local business in the area as an effort to address the negative impacts of climate change to tourism?

16.1	Yes	
16.2	No	
16.3	I don't know	

17. What priorities rank higher to your protected area/business than climate change adaptation? [you can tick more than one answer]

17.1	Profits	
17.2	Conservation	
17.3	Tourism development	
17.4	Local community empowerment	
17.5	Poaching and illegal hunting	
17.6	Lesotho border protection	
17.7	Investors and sponsors	

17.8	Employee wellbeing	
17.9	None	

18. Are there any measures that are in place to deal with all possible threats of climate change?

18.1	Yes		
18.2	No		
18.3	I don't know		

19. Please rate the following list of environmental conditions in order of what you feel to be MOST critical to LEAST critical: 1 = least important; 10 = most important.

19.1	Decrease in Snow	
19.2	Veld Fires	
19.3	Deforestation	
19.4	Water Scarcity	
19.5	Water Contamination	
19.6	Drought	
19.7	Flooding	
19.8	Rise in Sea Levels	
19.9	High Temperatures/Heat Waves	
19.10	Accumulation of GHG	

20. What are some of the major weather-related damages that have occurred in the region as a result of climate change?

20.1	Extreme temperatures (hot or cold)	
20.2	Dryness of the atmosphere (low relative humidity)	
20.3	Excessive wind	
20.4	Decline in winter snow	
20.5	Veld fires	
20.6	Disproportion in ecosystem	
20.7	Decline in Water Quality	
20.8	Others, please specify	

Part C: Management of Climate Change Impacts

21. Have you provided any form of support to local business in the area as an effort to address the negative impacts of climate change to tourism?

21.1	Yes	
21.2	No	
21.3	I don't know	

22. Has there been any policies/strategies introduced to address climate change impacts?

22.1	Yes	
22.2	No	
22.3	I don't know	

23. If the answer is yes, how effective are these policies in addressing the issue?

23.1	Very Effective	
23.2	Moderately effective	
23.3	Less effective	
23.4	Useless	
23.5	I don't know	

24. Does the region require any form of model/theoretical framework that can assist in assessing, and management of negative impact of climate change in tourism?

24.1	Yes	
24.2	No	
24.3	I don't know	

25. What do you think the industry authorities should do to deal with the impacts that climate change may have on tourism in the region?

25.1	Support the invest in climate monitoring and forecasting	
25.2	Train their personnel on the impact of climate change	
25.3	Engage in activities that prevent the accumulation of carbon in the atmosphere	
25.4	Sensitize tourists on the impacts of climate change	
25.5	Others, please specify……..	

26. Which role player/tourism authority do you think is best suited to deal with the economic and environmental impacts of climate change on tourism?

26.1	South African Tourism	
26.2	Local government	
26.3	Provincial government	
26.4	Local tourism authority	
26.5	National government	
26.6	Private sector	
26.7	International community	

Part D: Supplementary Questions

27. Do you think the impact of climate change has played a particular role in the tourist's influx into the region?

27.1	Yes	
27.2	No	
27.3	I don't know	

28. What are the latest trends in term of tourist's inflow into the region?

28.1	Booming	
28.2	Encouraging	
28.3	Declining	
28.4	Poor	

29. Would climate change by any chance be the cause of those trends?

29.1	Yes	
29.2	No	
29.3	I don't know	

30. What influence does climate change have on environmental characteristics of the area?

30.1	Positive	
30.2	Negative	
30.3	I don't know	

31. In terms of economic assessment, how much would you say your business has lost in the past 5 years due to climate change impacts in the region?

31.1	No loss, rather gains	
31.2	Moderately loss	
31.3	Negligible loss	
31.4	Huge loss	
31.5	I don't know	

32. What impacts does climate change inflict to the local community of the region in relation to tourism development?

32.1	Loss and/or decline in business opportunities	
32.2	More tedious community development efforts	
32.3	Emigration of residents	
32.4	Decline in participation	
32.5	I don't know	

33. Please rate how vulnerable you feel each of the following divisions would be to climate change in the region?

NV: None Vulnerable | LV: Least Vulnerable | MV: Moderately Vulnerable | VV: Very Vulnerable | SV: Strongly Vulnerable

	Options	**NV**	**LV**	**MV**	**VV**	**SV**
33.1	Tourism					
33.2	Landscape					
33.3	Local community					
33.4	Snow					
33.5	Economy					
33.6	Plants and animals					
33.7	Infrastructure					
33.8	Water and sea level					
33.9	Sustainable development					

Again, your assistance in this project is greatly appreciated!!