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Climate Change and Sustainable Development within the Tourism Sector of Small Island Developing States: A Case Study for the Bahamas

by

Arsum Pathak

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Geography and Environmental Science and Policy with a concentration in Environmental Science and Policy Department of Geosciences College of Arts and Sciences University of South Florida

Co-Major Professor: Philip van Beynen, Ph.D.
Co-Major Professor: Fenda Akiwumi, Ph.D.
Kamal Alsharif, Ph.D.
Kenyon Lindeman, Ph.D.
Christian Wells, Ph.D.

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Keywords: Sea level rise, storm surge, adaptation planning, resilience, mixed methods

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DEDICATION

To my grandmother who famously said, education first, everything else later. Thank you for instilling the value of education in me.

I also dedicate this work to my father and mother, Arvind and Suman, and my brother, Aseem, for their unwavering support and encouragement in the pursuit of my dreams.
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As I wrap up my dissertation, I am more than ever convinced that nothing happens in isolation and everything requires an integrative approach. I am indebted to so many people for making my dissertation a reality!
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ABSTRACT

The research literature suggests Small Island Developing States (SIDS) are vulnerable to climate change. Tourism in SIDS is sensitive to climate variations and dependence of the sector on natural resources (beaches, coral reefs) adds to their vulnerability. The purpose of this study is to assess climate impacts and adaptation within the tourism sector of a SIDS – The Bahamas that relies on tourism and faces climate vulnerabilities, as do other SIDS. Given the importance of tourism to their sustainable development by supporting economic growth and employment, this study identifies timely risks and adaptation planning for a tourism-based SIDS economy in the face of climate change. Three manuscripts in this dissertation examine impacts of climate change on tourism, assess businesses’ adaptive capacity, and evaluate climate adaptation in current plans and policies regarding tourism with a goal of evaluating the vulnerability and resilience of tourism-dependent SIDS.

A social-ecological systems (SES) approach is crucial for coastal tourism where ecosystems are tied to socio-economic development, thereby, requiring an integrated approach. This mixed-method research, suited for SES, utilizes quantitative and qualitative methods such as geospatial mapping, statistical analysis, surveys, interviews, and policy analysis. Findings estimated many tourism properties lie in the storm-surge zone and their extent increases with 1m SLR causing potential losses in occupancy and revenue for the Bahamas. Considering damages from Hurricanes Matthew, Dorian, this fits within climate change literature that the damage potential of such hurricanes will be more consequential in the future. Survey findings revealed a disconnect between perceived impacts on their businesses, and existing adaptation measures
limited to hurricanes and lacking priority for long-term climatic changes. Finally, a look into current adaptation planning through interviews revealed that there are currently no explicit policies for tourism and climate change in the Bahamas. While key policy actors demonstrated a good understanding of climate change and its impacts, policy implementation is hindered due to funding and human capacity.

Through focusing on country-level analysis in SIDS, an underrepresented group treated homogeneously in literature, the study exemplifies its contribution to research in SIDS geographies. The subfield of environmental policy further benefits from adaptation planning to create a concerted response. Findings are vital for developing adaptation actions and policies for sensitive tourism-dependent economies.
CHAPTER ONE:
INTRODUCTION

1.1. Research Setting: Small Island Developing States

Small Island Developing States (SIDS) are recognized by the United Nations as a group of countries facing similar constraints to their sustainable development (UN-OHRLLS, 2020). These group of countries are spread over three geographic locations – the Caribbean, the Pacific and the Atlantic, Indian Ocean, Mediterranean and South China Sea (AIMS). There are currently 57 SIDS out of which 37 are United Nations (UN) members while 20 are non-UN members or associate members of regional commissions. Over the course of the last three decades, three global conferences supplemented by periodic reviews are held to address the sustainable development in SIDS. In addition, Johannesburg Plan of Implementation based on World Summit on Sustainable Development also highlighted SIDS’ vulnerability among the member nations. Furthermore, Sustainable Development Goals (SDGs), as a part of 2030 Agenda for Sustainable Development, has specific goals and targets that aim toward SIDS. Target 13.b of SDGs deals with building capacity for climate change planning and socially disadvantaged groups, Target 14.a to enhance the scientific and research capacity in SIDS, and Target 14.b highlighting the importance of sustainable management of fisheries, tourism, and aquaculture in SIDS.

Climate change induced sea level rise (SLR) poses one of the biggest threats to sustainability of SIDS with their low-lying and often densely populated coastal areas. Sea level
rose at a rate between 2.8 and 3.6 mm/year since 1993 and 2010 in terms of the global average (Nurse et al., 2014). There are also regional and global differences in the rates of sea level rise. For example, some SIDS in the Western Pacific Ocean experienced SLR up to four times the global average between 1993 and 2009 while the mean SLR in Caribbean was more similar to the global average over the last 60 years (Oppenheimer et al., 2014). Nurse et al. (2014) projected an increase in SLR with high confidence that may result in coastal inundation and erosion in many SIDS. However, geomorphological changes need to be considered before assuming complete inundation. Nevertheless, the low-relief topography of most SIDS (an average elevation of 3-4 m above mean sea level), with most of the infrastructure, services, and settlements located in coastal areas, even for higher mountainous islands (Betzold, 2015), makes climate change and its induced effects such as SLR has serious socio-economic consequences for these countries.

The colonial past of the SIDS influences their current vulnerabilities and sustainable development challenges. One example is the expansion of international trade during the colonial period that contributed to the coastal settlements in the SIDS (McGranahan, Balk, & Anderson, 2007). Furthermore, colonialism was more influential in SIDS due to constant changes in island population dynamics where island populations were “either rapidly assimilated or annihilated” (Baldacchino, 1993). For SIDS, this meant that the effects of westernization and globalization were more penetrated in the island colonies than other colonies (Corbett & Veenendaal, 2016). While all SIDS faces certain after-effects of colonization that are more prominent than other countries, these effects differ in the post-colonial era within the different SIDS. These differences among SIDS can be attributed to different levels of colonialism for different SIDS, and difference among Spanish and British colonies (Lange, Mahoney, & Vom Hau, 2006). In
their work, Lange et al. (2006) noticed that Spanish and British colonial powers had opposing modes of institutional establishment that impacted the post-colonial development of their respective colonies. The areas where the degree of British colonialism was low i.e. British did not heavily settle, for example, the Bahamas, encountered negative consequences for post-colonial development (Lange et al., 2006).

1.2. Problem Statement

Even in the face of these challenges, with their warm climates, beaches, coral reefs, and tropical vegetation, many SIDS have developed specialized internal service sectors primarily based on tourism. Tourism contributes to the national economy through its contribution to the GDP and exports. Therefore, ensuring sustainability of the sector is vital to long-term development of the SIDS. For example, international tourism in the Maldives and the Bahamas generated 91% and 77.9% of the total exports in 2016 respectively. It plays a key role in developing a robust economy of these islands while utilizing the coastal and terrestrial resources they offer for visitor attractions (Nurse et al., 2014). The sector also provides an opportunity for expanding the job market for the youth and females. In 2018, tourism contributed to more than 50,000 jobs directly related to the Bahamian economy and indirectly supported more than 55% of the total employment (WTTC, 2018). By 2028, World Travel and Tourism Council (WTTC) predicted a further 2.8% increase in the tourism’s contribution to total employment for the Bahamas.

However, tourism in SIDS will become increasingly susceptible to SLR in the coming decades and climate change driven extreme events directly threaten its infrastructure and natural resources that are vital for tourism. In addition, indirect effects may include tourists choosing locations other than SIDS due to global changes or weather conditions making these countries
hotter, drier, and less appealing for them. Changing temperatures can also increase the attractiveness of other destinations closer to home for European tourists as compared to island nations. Therefore, global temperature changes can potentially lower the number of visitors to SIDS. Climate change can also affect visitors’ preference through changing local environmental resources. Alterations in the availability of natural resources such as coral reefs and beaches can potentially affect the visitor’s preference.

Although challenged by climate change, tourism can be a highly adaptive and dynamic sector and has the potential to support climate change adaptation. According to Honey and Hogenson (2017), climate change also offers an opportunity for Caribbean tourism businesses to value their resources and stimulate creative adaptation options. Similarly, a recent study conducted across different stakeholders in some SIDS located in the Caribbean and Pacific region found an overall high potential and willingness of the tourism industry to support climate change adaptation in their base countries (Hess & Kelman, 2017).

1.3. Conceptual Overview

Climate change lends itself to a range of theoretical and conceptual frameworks. This section provides a brief description of the concepts used in this dissertation. The other chapters will utilize these concepts and discuss them in detail.

The World Commission on Environment and Development (WCED) published ‘Our common future’ (also known as Brundtland Report) in 1987 that formed the basis of content and structure for sustainable development. The report provided the key definition of sustainable development as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). The UN Conference on Environment and Development (UNCED), also known as, Earth Summit was held in 1992. This
summit had a vital role in recognizing the economic, social, and environmental dimensions of sustainable development. However, it was ten years later, in the 2002 World Summit on Sustainable Development, that Johannesburg Declaration officially announced economic development, social development and environmental protection as fundamental components of sustainable development. This balance and interdependence of society, economy and environment is relevant in resource-dependent economies like SIDS where environmental degradation is interlinked with other societal and economic problems. Because of their high dependence on coastal and marine ecosystems for their livelihood and well-being (Ali et al., 2018), SIDS rely on ecosystems to supply a range of ecosystem services, and therefore, environment dimension is practically impossible to substitute, and requires to be complemented with social and economic dimension.

While some literature considers sustainable development and sustainability as interchangeable, we use Sartori, Latrônico and Campos (2014) definition that defined sustainability as a process to achieve sustainable development. The concept of sustainability is further classified into strong and weak sustainability based on the extent of substitutability between the three dimensions of sustainable development. Advocates of weak sustainability believed that the different types of capital (social, environmental, and economic) are substitutable (Turner, 1993). According to this view, a region can still be sustainable if it has rapid economic growth at the expense of its environmental quality as long as the total capital does not decrease (Wilson & Wu, 2017; Wu, 2013). The roots of this approach can be traced to neoclassical economics based on economic growth and capital accumulation (Hediger, 2006). This view, however, was countered by social and natural scientists shortly after its conception who believed that a healthy environment is a necessity for maintaining economic and social
development (Daly, 1997). This view was known as strong sustainability which recognized that environment (or natural capital), while complementing to society and economy, cannot be substituted unless necessary (Daly, 1995).

The focus on sustainable development through a strong sustainability view requires a holistic and integrative lens. The social-ecological systems (SES) approach highlights these systems as coupled, interdependent and integrative (Folke, Colding, & Berkes, 2003). Charles (2012, p. 351) defined SES as complex systems that “integrate ecosystems, human systems (e.g. marine economic sectors, and communities and coastal regions dependent on the ocean) and governance systems (e.g. the values held by people in relation to the sea, and the various decision-making processes).” This integrative nature of SES combines human well-being without compromising ecosystem integrity and, thus, can help to guide sustainable development (Fischer et al., 2015).

More recently, tourism has been recognized as a holistic SES in the literature. Farrell and Twining-Ward (2005) were pivotal in promoting systems approaches for tourism. The authors considered tourism “as an ecosystem … in which tourism is merged with life support systems and related social systems which are likely to extend well beyond the recognized destination (p. 115).” Cochrane (2010) also considered tourism to be an excellent example of SES because of its dependence on natural resources, its cross-cultural characteristics, and international linkages. Applied research tourism as an SES has been growing in the last decade, for example, Biggs (2011) conducted a study to evaluate resilience for the coral reef tourism sector as an SES, and Cole and Browne (2015) used a SES model for analyzing tourism and water inequality issues in Bali. It was evident from the studies that the concept of SES provides a holistic view for exploring tourism. This SES approach is particularly crucial for resource-dependent economies.
such as SIDS that rely on ecosystems to supply a range of ecosystem services, and therefore, ecological and societal systems are inseparable and synergistic in nature.

Vulnerability is defined as the degree to which SESs are exposed to hazardous climatic or non-climatic events (Oppenheimer et al., 2014). Calgaro, Lloyd, and Dominey-Howes, (2014) stressed the importance of placing vulnerability and resilience discussions together as both are co-constituted and co-exist in the same system. A system can be simultaneously vulnerable and resilient depending upon the extent of climate-related shock experienced at a given time and the resources they have to counter their vulnerability (Calgaro et al., 2014). The concept of resilience has its roots in ecology where it has been defined as the ability of a system to persist in the presence of change and disturbance (Holling, 1973). Today, the concept of resilience has expanded to a range of disciplines. Resilience also serves as a central concept in the SES. It determines the ability of a SES to adapt to and benefit from change (Walker, Holling, Carpenter, & Kinzig, 2004). Resilient SES are better able to withstand external shocks, for example, climate change. Therefore, building resilience is crucial for addressing uncertainties of climate change and dealing with vulnerable systems.

1.4. Research Goal and Objectives

The fundamental goal of this research is to evaluate the vulnerability and resilience of a tourism-dependent SIDS – the Bahamas – that faces similar climate change and sustainability challenges as other SIDS. To achieve this, the research has three main objectives:

1. To examine the direct and indirect impacts of climate change to the Bahamas tourism sector and spillover socio-economic losses to the country from these projected impacts.

2. To explore the resilience of the tourism sector by identifying its contribution to sustainable development and climate change adaptation.
3. To evaluate the extent to which climate change is considered in current plans and policies related to tourism and existing policy gaps.

1.5. Research Approach

This research uses a combination of quantitative and qualitative research methods. The use of multiple methods – quantitative and qualitative – helps to facilitate a thorough understanding of research questions in context (Creswell, 2013). Using mixed methods is also characteristic of SES that require multiple approaches to explain complex systems (Berkes, 2011).

Objective 1: To examine the direct and indirect impacts of climate change to the Bahamas tourism sector and spillover socio-economic losses to the country from these projected impacts.

This objective was accomplished through quantitatively assessment of the 1) inundation and coastal flooding related impacts on coastal tourism by a 1m SLR and storm surge, 2) impacts on tourism due to flooding and erosion exacerbated by a future SLR scenario and, 3) major social-economic and environmental losses stemming from these projected impacts. The analytical framework of climate change impacts pathway was inspired by Scott et al., 2012, and Scott and Verkoeyen, 2017. I conducted geospatial analysis integrating elevation data, SLOSH (Sea, Lake and Overland Surges from Hurricanes) storm surge model, digitized tourism properties to identify infrastructure at risk. Based on the suitability to the study area, literature review and availability of data, key indicators were developed to assess integrated climate impacts and ArcGIS was used to perform the geospatial analysis.

Objective 2: To explore the resilience of the tourism sector by identifying its contribution to sustainable development and climate change adaptation.
This objective was addressed through investigating 1) tourism businesses contribution to sustainable development measures in the Bahamas, 2) adaptation strategies in place to deal with climate change and, 3) key factors that affect their adaptive capacity. This was accomplished by conducting surveys administered through face-to-face interviews with the coastal tourism businesses in the New Providence and Paradise Island of the Bahamas. The survey design focused on contextualized questions based on a comprehensive review of literature and indicators chosen through capitals approach. Data was transferred to SPSS and descriptive statistics were used to analyze the survey questions.

**Objective 3:** To evaluate the extent to which climate change is considered in current plans and policies related to tourism and existing policy gaps.

To achieve this objective, I examined 1) the perception of climate change among policy actors, 2) the existing climate policy environment for the tourism sector and gaps in implementation, and 3) barriers that inhibit implementation and, 4) planning for future of the tourism sector in the face of severe impacts of climate change. These objectives were addressed using a policy cycle framework to understand the policy process (Jann & Wegrich, 2007). I conducted semi-structured in-depth interviews with key policy actors from the government, tourism associations, and other non-governmental organizations. The interviews were supplemented with key policy and planning document to get a thorough understanding on the existing policy environment. Otter.ai and NVivo 10 were used for transcribing and coding the interviews respectively.

The questionnaire for survey and interview guidebook used in this dissertation were reviewed by the Institutional Review Board (IRB) at the University of South Florida and deemed exempt. With the logistical support provided by the Bahamas Ministry of Tourism, fieldwork for
this work took place in July 2019 on the New Providence and adjacent Paradise Island in the Bahamas.

1.6. Structure of the Dissertation

Three manuscripts in this dissertation examine impacts of climate change on tourism, assess businesses’ adaptive capacity and evaluate climate adaptation in current plans and policies regarding tourism. These manuscripts form a cohesive body of work that supports the larger narrative of this dissertation.

Chapter 1 presents the background information and helps set the stage for the remainder of this dissertation. This chapter provides a description of problem statement, research objectives, conceptual overview and briefly describes the research approach.

Chapter 2, Impacts of sea level rise and storm surge on the tourism sector of a Small Island Developing State: A case study for the Bahamas, is the first manuscript of this dissertation. It assesses the first objective of identifying multiple direct and indirect impacts of climate change on tourism in detail. This is an important first step to timely identify the climate risks and provides a clear rationale for adaptation planning to ensure sustainable development of the entire country.

Chapter 3, Climate Adaptation, Sustainable Development, and SIDS tourism: A Case Study from the Coastal Accommodations Subsector in the Bahamas, is based on the second research objective. It is the second manuscript in this dissertation and delves deeper into the adaptation planning of the private tourism sector to deal with the impacts of climate change. This chapter establishes links between tourism and sustainable development and highlights the importance of climate adaptation and building adaptive capacity of the sector.
Chapter 4, *Climate change policies in practice for Bahamas tourism planning: A Small Island Developing State perspective*, addresses the third research objective of this dissertation. As the final manuscript, this chapter explores the current policy environment and the future of tourism in the face of climate change threats. Through incorporating a public sector perspective, the chapter tackles the research objective through identifying the current tourism and climate change related policy and gaps in the formulation and implementation of such policies.

Chapter 5 concludes my dissertation by summarizing the research findings. The chapter also highlights the research contributions and limitations and future work stemming from this doctoral work.

1.7. References


II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.

Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1613-1654.


CHAPTER TWO:

IMPACTS OF SEA LEVEL RISE AND STORM SURGE ON THE TOURISM SECTOR OF A SMALL ISLAND DEVELOPING STATE: A CASE STUDY FOR THE BAHAMAS

Abstract

This study examines the direct and indirect impacts of climate change, particularly sea level rise and storm surge, to the tourism sector on the islands of New Providence and adjacent Paradise Island in the Bahamas. The assessment was carried out by conducting a geospatial analysis of tourism establishments at risk using Geographic Information Systems. I combined the geospatial analysis with publicly available databases to assess the integrated climate-related impacts pertaining to a Small Island Developing State (SIDS) economy. My study estimated that many tourism properties currently lie in a storm surge zone and the extent of properties at risk increases with a future scenario of a 1 m rise in sea level. While sea level rise (SLR) by itself only threatens a small number of properties, when combined with weak (Category 1), moderate (Category 3) and strong (Category 5) storms the resulting coastal flooding impacts 34%, 69%, and 83% of the tourism infrastructure (hotels and resorts), respectively. In addition to flooding, properties are also susceptible to coastal erosion with 28% of the total hotels and resorts on the two islands being situated within 0-50 m and 60% of the tourism infrastructure within 0-100 m of the coastline. Considering the economic importance of the sector, the potential impacts on the tourism infrastructure will cause significant losses in revenue and employment for the two islands. Furthermore, the majority of the tourism on these islands is beach-based and visitor
expenditures will decline due to their vulnerability. These losses will have far-reaching social-economic consequences for the Bahamas. My findings reveal a need for integrated coastal zone management that incorporates tourism management strategies with adaptation measures to deal with climate change.

*Keywords:* climate change impact; hurricanes; tourism; sea level rise; small island developing states (SIDS)

*Publication:* This article has been accepted for publication at the *Environmental Development* Journal on August 19, 2020.


### 2.1. Introduction

While many recent studies have identified the impacts of climate change on coastal tourism (Becken, 2013; Fang, Yin, & Wu, 2018), there has been a lack of focus on integrated assessments that analyze the full range of potential climate-induced impacts on a specific destination (Nurse et al., 2014; Scott, Hall, & Gössling, 2016; Scott & Verkoeyen, 2017). In particular, there is a dearth of research on the cumulative effects of these complex impacts on the tourism sector of Small Island Developing States (SIDS), on which many are economically dependent (Scott et al., 2016; Scott & Verkoeyen, 2017). My paper examines the multiple direct and indirect climate-induced impacts on one of the tourism-reliant SIDS – the Bahamas. I will evaluate the implications of these impacts at the national level. Taking into consideration the multi-dimensionality of climate change impacts on the prospects of tourism for SIDS sets the
foundation for both an integrated vulnerability assessment and potential adaptation measures (Scott & Verkoeyen, 2017).

Agenda 21 of the Earth Summit held in Rio De Janeiro, Brazil, June 1992 recognized SIDS as a group of countries with special environment and development challenges. At present, there are fifty-eight SIDS designated by the United Nations (UN), out of which 38 are UN members while 20 are non-UN members or associate members of regional commissions. These SIDS are spread over three regions – the Caribbean, the Pacific, and AIMS (Atlantic, Indian Ocean, Mediterranean, and the South China Sea) (UN-OHRLLS, 2020). The countries vary in terms of their physical size as well as economic, social, and environmental conditions. Most, however, share a common vulnerability to climate change-induced SLR, changes in sea surface temperature, precipitation, and extreme events (Church et al., 2013; Nurse et al., 2014; Oppenheimer et al., 2019). This vulnerability mostly stems from their low elevation and densely populated coastal areas.

Climate change manifests itself in many ways such as changes in sea levels, storm surges, and sea surface temperatures (Church et al., 2013). A growing number of studies focus on the combined impacts of SLR and storm surge in coastal areas (Frazier, Wood, Yarnal, & Bauer, 2010; Kleinosky, Yarnal, & Fisher, 2007; Neumann et al., 2015; Silver et al., 2019). In the Bahamas, Silver et al. (2019) found an increase in shoreline exposure and population to coastal hazards with an increase in SLR. However, concerning coastal tourism, relatively few studies have attempted to investigate such combined effects of SLR and storm surge for SIDS. To the best of my knowledge, the only quantitative analysis of the combined impacts of SLR and storm surge in the coastal tourism sector have been conducted in China (see Fang, Yin, & Wu, 2016). Considering the recent catastrophic damages from the Atlantic Ocean hurricanes Irma and
Dorian on several Caribbean SIDS, assessing the risk posed by storm surge coupled with the projected SLR to tourism infrastructure is essential for these developing nations.

During the Atlantic hurricane season in 2016, Hurricane Matthew hit the South coast of New Providence Island with a storm surge height of more than 2 m causing estimated damages of USD 600 million in the Bahamas (Stewart & Berg, 2017). Tourism-related infrastructure such as Nassau airport and surrounding roads were flooded or damaged (Stewart & Berg, 2017). Researchers predict an increase in the frequency of such severe Category (Cat) 4 and 5 storms like Matthew and more recent Dorian in the 21st century (Bender et al., 2010; Walsh et al., 2016). From the point of view of this study, Hurricane Dorian is the most recent and prominent example of extreme events and their impacts on the wider social-economic and environmental conditions of the Bahamas (IDB, 2019). Pacific SIDS that rely on tourism have also been severely impacted during the South Pacific cyclone season. One recent example from 2018 is Cyclone Gita, a Cat 4 storm, that made landfall in Tonga causing widespread infrastructural damages. With an increase in the frequency of more severe storms, worldwide over the coming years combined with SLR, potential damages could be exacerbated.

Many SIDS are dependent on single economic sectors such as tourism that provide the main source of employment and economic growth. In the Caribbean region, tourism created one in four new jobs and contributed to 20% of the total visitor exports in 2019 (WTTC, 2020). The tourism sector generated USD 3,678 million accounting for 81.6% of the Bahamas visitor exports. In addition to foreign exchange, this sector, in particular hotels and restaurants, is a significant area of interest for foreign direct investments in the Caribbean SIDS. A well-managed tourism sector can also provide opportunities for the growth of other sectors such as fisheries (UNCTAD, 2014). It is worth noting that not all tourism generated profits flow to their host
SIDS leading to economic leakages to international businesses. This is especially true for cruise tourism where MacNeill and Wozniak (2018) found that the funds paid by cruise visitors in the Honduras never enter the local economy due to high commissions by the cruise-ship company and low local taxation of tourism. Nevertheless, research suggests that tourism has a significant and positive effect on the real GDP growth and overall economic growth in the Caribbean (Cannonier & Burke, 2019).

While the tourism sector constitutes part of regional assessments in the literature, specific destination-focused research is essential to understand the multifaceted nature of climate change impacts on tourism. The Environmental Vulnerability Indicator (EVI) developed by the South Pacific Applied Geoscience Commission (SOPAC) and the United Nations Environment Program (UNEP) utilizes 50 indicators to assess SIDS vulnerability to external shocks. While climate change and tourism constitute a part of these indicators, a focus on specific tourism and climate change indicators is lacking. The Economic Commission for Latin America and the Caribbean (ECLAC) has produced some country-level assessments of climate change impacts on tourism for several Caribbean SIDS (ECLAC, 2011). However, the assessments lack consideration of multiple impacts. For example, the ECLAC report for the Bahamas “An Assessment of the Economic Impact of Climate Change on the Tourism Sector in the Bahamas” used a Tourism Climate Index (TCI) to model changes in tourist demand but lacked a clear focus of the direct changes on the source market due to climate change.

For this study, I examine the risks posed by climate change to the Bahamas tourism sector. I consider different direct and indirect impacts that may affect the tourism sector in particular and the Bahamas, in general. Specifically, I used integrated impact pathways adapted from the conceptual framework of Scott et al. (2008), Scott, Hall, and Stefan (2012a), and Scott
and Verkoeyen (2017) that may affect the tourism sector in the SIDS. My main research objectives are to 1) assess the inundation and coastal flooding related impacts on coastal tourism by a 1m SLR and storm surge, 2) assess the impacts on tourism due to flooding and erosion exacerbated by a future SLR scenario and, 3) quantitatively assess the major social-economic and environmental losses stemming from these projected impacts. The overall goal is to timely identify climate risks which can then support decision-making and adaptation planning for tourism stakeholders subjected to these changing climatic conditions.

Many SIDS have developed national strategies in the form of National Adaptation Programmes of Action (NAPAs) and National Communications (NCs) to plan for future climatic changes. While the tourism sector constitutes a part of these reports, most SIDS lack specific planning for climate change while ensuring the growth and management of their main economic sector, tourism. A few exceptions such as the Barbados and Belize have developed dedicated departments for coastal zone management and devised Integrated Coastal Zone Management (ICZM) plans and policies. However, the examples of such integrated responses are relatively limited in most SIDS.

My selection of the Bahamas is based on the following: a) it faces similar vulnerabilities to climate change as other SIDS, b) it is a heavily tourism-reliant economy that provides an avenue for understanding the spillover effects of climate change at the country-level, and c) the recent encounters of high-intensity hurricane events in the country. The Bahamas is a large archipelago with a land area of 10,010 km² comprising of 700 islands of which 30 are inhabited (CIA, 2018). The islands are dominated by two carbonate platforms with less than 10 m depth (Buchan, 2000). In the SIDS, the Bahamas has the highest share of the population, 82.8%, living in the Low Elevation Coastal Zones (LECZ), the contiguous area along the coast that is less than
10 m above sea level (Mycoo & Donovan, 2017). One hundred percent of the population in the country lives within 25 km of coastline (Mycoo & Donovan, 2017). In 2019, tourism in the Bahamas contributed to 43.3% of the GDP (WTTC, 2020). A total of 52.2% of the jobs are supported by tourism and the sector generated 81.6% of the total visitor export-related revenue in 2019 (WTTC, 2020). The Bahamas have experienced five major hurricanes over the past five years. These include a Cat 5 hurricane in 2019, Dorian, after facing a Cat 4 hurricane Matthew in 2016. Other major hurricanes such as Maria and Irma caused damages to some smaller islands in the Bahamas. Nevertheless, all hurricane events, regardless of their magnitude, disrupt the national government, alter visitor’s perception, and decrease tourism-related revenue. The Bahamas, therefore, is a good example of a SIDS to achieve my research objectives. The paper is structured as follows. In Section 2.2, I describe the methodology of my study beginning with a thorough description of my study area. This is followed by the explanation of my findings in Section 2.3. I discuss my most important findings in Section 2.4 and finally, Section 2.5 concludes this study. The analysis for this chapter took place between the period of September to November 2019 and the chapter was completed in December 2019 when the impacts of the Covid-19 pandemic were still unknown.

2.2. Methods

2.2.1. Study Area

Two islands of the Bahamas – New Providence (NP) and the adjacent Paradise Island (PI), hereafter NP and PI (Figure 2.1) were chosen for this study because they have the highest room count of tourism accommodations (62.04%), and a large number of employees, visitors and related expenditures in the sector. The Bahamas’ Ministry of Tourism (MOT) lists NP as generating more than 90% of the jobs in the accommodation and food service sector from 1999-
2012 (MOT, 2019). Out of the 1.63 million visitors in the Bahamas in 2018, 67.2% (1.09 million) stayed on these two islands. The islands have consistently contributed the most to the visitor expenditure since 1989 (the earliest data available at the MOT). Based on the visitor expenditure data provided by the MOT, 67-68% of the visitor expenditures in 2015-16 came from NP and PI (MOT, 2016). Out of this total expenditure on the islands, stopover visitors (who stay at least one night) contributed as high as 86.8% to the total visitor expenditure while cruise visitors and day visitors who do not stay overnight contributed to 13.08% and 0.09% respectively. Many family islands in the Bahamas Archipelago such as Abaco and Eleuthera as well as Grand Bahama Island are growing as tourism destinations, but NP/PI combined dominate the sector (see Figure 2.2 for comparative statistics).

**Figure 2.1.** Location of the study area (left); digital elevation model (DEM) of study area showing the location of tourism infrastructure (bottom right); close up view of the populated northern coast and the adjacent Paradise Island (top right).
NP and PI of the Bahamas Archipelago have the highest contribution to the tourism sector. These islands contributed 47.8% of the total revenue to the Bahamas GDP (USD 4.3 billion) in 2017 (WTTC, 2018). As much as 72.8% of the total exports in the Bahamas are generated as spending by international visitors (WTTC, 2018). The sector is also the largest contributor to employment in NP with 53.1% females and 46.9% males employed in the sector (MOF, 2018). Thus, tourism provides important job opportunities for the local population. Considering the importance of the tourism industry in the Bahamas, any potential climate-induced losses to its two main tourism-generating islands will likely have far-reaching social-economic implications. Therefore, these islands together provide an avenue for understanding the potential impacts of climate change and its spillover effects on the entire country.

**Figure 2.2.** Percentage of contribution to the selected tourism-related indicators from three main island groups in the Bahamas in 2018.

### 2.2.3. Climate Impact Pathways

The four impact pathways through which climate change may affect tourism are – a) direct impacts from changing climate, b) indirect environmental change and cultural heritage impacts, c) indirect impacts associated with societal change and, d) impacts induced by climate
change mitigation and adaptation in other sectors (Scott et al., 2008; Scott et al., 2012a; Scott & Verkoeyen, 2017). I operationalized three of these impact pathways by developing specific indicators for the quantification of impacts and potential losses (Figure 2.3).

**Figure 2.3.** Selected climate change impact pathways for tourism in SIDS.

The indicators for different types of impacts were selected based on suitability to the study area, literature review, and the availability of data. A detailed description of the chosen indicators is provided below (Table 2.1).
Table 2.1. Indicators used to examine three impact pathways.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Metric</th>
<th>Data Source and Analysis</th>
<th>Rationale for Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure losses and damages</td>
<td>Property count (number of hotels and resorts)</td>
<td>Elevation data (ALOS GDEM)</td>
<td>Coastal resort properties in the Caribbean are vulnerable to 1m SLR (Isaac, 2013; Scott, Simpson, &amp; Sim, 2012b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Major tourism properties point shapefile (hotels and resorts)</td>
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<td></td>
<td></td>
<td>Island boundaries shapefile (Humanitarian Data Exchange)</td>
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<tr>
<td></td>
<td></td>
<td>SLOSH gridded shapefiles</td>
<td></td>
</tr>
<tr>
<td>Loss of revenue</td>
<td>Loss in occupancy</td>
<td>Geospatial analysis Room count (MOT, 2018)</td>
<td>Tourism sector contributed to 47.8% of total GDP in the Bahamas (WTTC, 2018)</td>
</tr>
<tr>
<td>Loss of beaches and coral reefs</td>
<td>Properties susceptible to erosion</td>
<td>Beach width</td>
<td>Beaches and coral reefs are important factors for tourism destinations (Uyarra et al., 2005)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distance from the coast, meters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss reef area</td>
<td>Coral reef cover, sq. km (Arkema, Fisher, &amp; Wyatt, 2017; Simpson et al., 2012)</td>
<td></td>
</tr>
<tr>
<td>Cultural heritage sites</td>
<td>Number of sites susceptible to SLR, storm surge</td>
<td>Heritage site point shapefiles</td>
<td>Heritage tourism is growing as a tourism market in the Caribbean (Jordan &amp; Jolliffe, 2013)</td>
</tr>
<tr>
<td>Loss of employment</td>
<td>Ratio of bed capacity to staff</td>
<td>Geospatial analysis Occupational and wages data (MOF, 2018)</td>
<td>Tourism generated &gt; 3 million jobs in SIDS and supported 55.7% of employment in the Bahamas in 2017 (WTTC, 2018)</td>
</tr>
<tr>
<td>Loss of visitor expenditure</td>
<td>Loss of tourists due to losses in recreational services provided by beaches and coral reefs</td>
<td>Average expenditure per number of tourists (MOT, 2017)</td>
<td>International visitors spent more than USD 2 billion (72.8% of total exports) in the Bahamas in 2017 (WTTC, 2018)</td>
</tr>
</tbody>
</table>
2.2.4. Data Sources

**Sea level rise and storm surge:** In a recent report published by the IPCC, Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), the rate of Global Mean Sea Level (GMSL) can reach 15 mm/year if the Antarctic contributions to GHGs are taken into account (IPCC, 2019). According to the report, SLR projections vary from a lower bound of 0.43 m (Slagen et al., 2014) to as high as 2.46 m (Le Bars, Drijfhout, & de Vries, 2017) depending upon the baseline period and the choice of probabilistic or semi-empirical models (IPCC, 2019).

Local sea level data is not available for the study area. The nearest tide gauge data is available for the Settlement Point in the Bahamas maintained by the Permanent Service for Mean Sea Level (PSMSL, 2020). A time-series analysis of the tide gauge SLR data available from 1986-2000 and 2005-2016 shows an upward trend in sea level. However, the discontinuity and gaps in the available measurements make the available GMSL projections a more reliable choice of SLR. Considering the variability in global projections and gaps in the regional dataset, this study uses a conservative 1 m SLR scenario by 2100 that has been commonly used in similar studies that evaluated impacts of SLR on tourism infrastructure (e.g., Fang et al., 2016; Isaac, 2013; Scott et al., 2012b; Simpson et al., 2010). The Second National Communication document recognizes that the rate of SLR in the Bahamas is slower than vertical land movement. It also suggests that “sea level is rising at a rate of 0.2 mm/yr (the difference between vertical land movement and thermal expansion) (p.33)” and the future SLR will be in line with the global trends (The Commonwealth of the Bahamas, 2014).

I used the SLOSH (Sea, Lake and Overland Surges from Hurricanes) model to calculate potential surge for an area by using a series of historical or hypothetical hurricanes of various Saffir-Simpson categories, speed, landfall location, and direction (e.g., Frazier et al., 2010; Sealy
& Strobl, 2017). Each model run reflects the maximum surge height for a particular grid cell.

The outputs from each model run are combined to form a composite Maximum Envelope of Water (MEOWs) for each hurricane category, speed, and direction on the Saffir-Simpson scale (National Hurricane Center, 2003). A further composite called Maximum of MEOWS (MOM) is generated for all simulated hurricanes for a given Saffir-Simpson scale category regardless of landfall direction and speed (Glahn, Taylor, Kurkowski, & Shaffer, 2009). Here I use the MOM outputs generated from the SLOSH display in the Bahamas Basin that encompasses the entire study area. Gridded layers as shapefiles were downloaded for three hurricane categories: weak (Cat 1), moderate (Cat 3), and strong (Cat 5). The MOM outputs provide a conservative estimate of surge height as it does not account for wind-driven waves that increase the storm surge height (Frazier et al., 2010). Since storm surge is the most significant concern for the coastal Bahamas, the product is useful for making early decisions by planners and fits the purpose of my study.

**Tourism infrastructure and cultural heritage sites:** I used the tourism infrastructure on the islands of NP and PI for the above analysis. Only formal accommodation providers such as hotels and resorts are included in my analysis as they generate the highest revenue for the entire sector. An initial list of tourism hotels and resorts (n=57) was obtained from the Directory of Hotels – June 2018 published by the Bahamas MOT, 2018. This document provides a comprehensive account of tourism type, location, address, and room count. These properties were identified in Google Earth to verify their geographic location. During this step, two properties were eliminated due to missing geographic information on Google Earth or lacking any online records for identification (such as an address, website, etc.). Two more properties were eliminated due to a practically insignificant room count of five or less. A geospatial dataset of the final tourism properties (hotels and resorts; n=53) was prepared for the analysis. Out of
these properties, 40 hotels/resorts were located on the island on NP while 15 properties were located on PI. The properties were further categorized based on their location: beachfront (n=27) and inland (n=26); and type: budget (n=24), economy (n=13) and luxury (n=16). The geospatial database also contained the following information: geographic coordinates of the property, elevation, and distance from the coast. A point shapefile containing the central point of each resort/hotel was created in ArcGIS version 10.4. A 100 m property buffer was applied to the point feature before conducting geospatial analysis to account for the total area of the properties.

In addition to tourism infrastructure, I also considered several cultural heritage sites on the two islands in my analysis. The official website of the Bahamas lists 17 cultural heritage sites in the Bahamas, nine of which are located on NP and PI. Of these, three cultural sites were historical villages and geographically dispersed over the islands. These villages do not have delineated boundaries and are spread out in a manner that made it difficult for mapping and conducting geospatial analysis, which excluded them from the study. Therefore, five cultural heritage sites were chosen for analysis: three forts, one national park, and one historic tourist attraction.

There are other critical infrastructures such as road networks and airports that are relevant to tourism management. A detailed impact analysis of key infrastructures for climate-induced SLR and storm surge in the Caribbean SIDS has already been conducted by Simpson et al. (2010) and therefore, I focused my analysis on the accommodation infrastructure most closely and directly related to generating tourism-related revenues.

2.2.5. Data Analysis

Coastal flooding scenarios - current and future hazard assessment: The first step in this analysis was the delineation of the flood risk zones due to storm surge in the study area. A
methodology similar to Frazier et al. (2010) was adopted. Current exposure of the tourism infrastructure to storm surge flooding was estimated using SLOSH. The MOM outputs for each hurricane category were compared with a 30-m DEM of the study area. The DEM, also known as ALOS (Advanced Land Observing Satellite) DEM, was downloaded from the Japan Aerospace Exploration Agency (JAXA).

ALOS DEM is one of the most recent global DEM’s available and has better vertical accuracy when compared with other comparable DEMs such as SRTM and ASTER GDEM (Grohmann, 2018; Santillan & Makinano-Santillan, 2016). An accuracy assessment is regarded as best practice for elevation centered geospatial analysis such as inundation and flooding (Gesch, 2018). I used the Trimble TSC3 handheld device based on Real-time Kinematic (RTK) surveying to collect ground truth GPS points. The values of elevation at the ground GPS points were compared with different global DEM elevations. I found that ALOS and SRTM GDEM had lower mean differences in the elevation than ASTER GDEM when compared to the GPS points. However, due to more missing values in the SRTM DEM, I chose to use ALOS DEM for my analysis.

ArcGIS was used for creating the flood risk maps and conducting the analysis. The first step was to convert the MOM shapefiles into raster grids using inverse distance weighted interpolation. Raster calculator in the spatial analyst toolbox was then used to identify the areas where storm surge height exceeded the DEM elevation. This method generated a binary raster with the flooded and non-flooded cells. This raster was reclassified to create a final storm surge raster i.e. flood risk map containing only the flooded cells for each hurricane category. The cells that were surrounded by higher, non-flooded land and not hydrologically connected to the coastline were manually removed from the risk zones.
To compute future hazard zones enhanced by SLR, the DEM was modulated to represent a future scenario of 1 m SLR by lowering the elevation of the DEM by a meter through a raster calculator. The mapping process, described above, was used for newly created DEM to delineate enhanced areas with SLR and storm surge.

**Calculating impact assessments:** These flood risk maps were overlaid with the point shapefile of tourism infrastructure to assess properties at risk. To further quantify major social-economic and environmental losses associated with tourism, the following secondary datasets were used:

*Inundation related losses* - calculated by considering the total loss of revenue in terms of room count and average room rate in USD. The data on room count was obtained from the Bahamas MOT. While inundation may result in a total loss, a property affected by storm surge may not be completely destroyed. Consistent with other studies in the Caribbean (Moore, Harewood, & Grosvenor, 2010) and more specifically in the Bahamas (ECLAC, 2011), this study uses a hurricane damage estimate of 10%, 35% and 75% for a Cat 1, 3 and 5 storms respectively. The total loss in room count was adjusted to account for these damage percentages. The most recent average daily rate (USD) of the rooms (ADR=Room Revenues/Rooms Sold), $303 for the Bahamas (STR, 2019), was used for calculating revenue losses. The revenue was calculated at a present-day ADR value i.e. it does not take into account future increases in the hotel prices and new constructions.

*Coastal erosion* - calculated using Bruun Rule, a two-dimensional conceptual model for predicting SLR induced erosion, which assumes that the coast retreats 50-100 times the vertical increase in sea level (Bruun, 1962). This rule has been criticized for being too simplistic and omitting important variables such as slope and lithology of the coast (Cooper & Pilkey, 2004). However, Atkinson et al. (2018) found shoreline recession relative to rising water levels falling
within 25% of the prediction within the Bruun Rule. The rule has also been used recently in coastal destinations such as Thailand (Ritphring, Somphong, Udo, & Kazama, 2018), Gambia (Amuzu, Jallow, Kabo-Bah, & Yaffa, 2018) and many SIDS where data on the physical parameters of the coast are still lacking (Mueller & Meindl, 2017; Scott et al., 2012b). It was evident during field observations that the islands have a consistent beach profile with mostly sandy beaches and shallow slopes. Therefore, Bruun Rule was used for an approximate estimation of the coastal properties at risk of erosion.

To determine erosion through the Bruun Rule, beach width in the two islands were initially evaluated from Google Earth images, however, it was evident that the width does not exceed 50 m for the two islands. Consequently, property distance from the coast was used as an indicator of beach loss. If the properties were impacted by coastal erosion, this means that there is essentially no beach remaining after the storm, and the hotel is exposed to erosion related damages.

*Coral bleaching* - used as an indicator of loss of coral reefs. Global mean sea surface temperature can rise from 0.73°C (RCP 2.6) up to 2.58°C (RCP 8.5) by 2100 placing coral reefs from moderate to very high risks from climate change (Oppenheimer et al., 2019). IPCC’s SR1.5 estimated a decline of 70-90% of coral reefs even with RCP2.6 and more than 99% coral reefs lost beyond a global temperature increase of 2°C (Hoegh-Guldberg et al., 2018). Further, Burke, Reytar, Spalding, and Perry (2011) estimated 79% of the coral reefs in the Bahamas are threatened due to local and thermal stress. In the absence of more local studies that consider the site-specific risks to coral reefs based on their type, depth, etc., I used a conservative estimate of 70% decline in the coral reefs by the end of the century. Data on the total coral reef area for the
Bahamas and reef area in NP is taken from the CARIBSAVE “Climate Change Risk Profile for The Bahamas” report (Simpson et al., 2012).

*Loss of employment* - computed by considering the average employee per room. Data on the average employee per room for the three different classes of accommodations as adjusted from the Caribbean Hotel and Tourism Association (CHTA): 2.8 for luxury hotels, 1.5 for moderate hotels, and 0.7 for a budget property. The most recent data on hotel employment (MOF, 2018) is only available for NP and shows 13,863 persons employed in the sector. The average employee to room ratio was extended to PI to estimate the total number of hotel employees on the two islands (n=23,864).

*Loss of tourists and related expenditures* - quantified through the loss of natural resources (beaches and coral reefs) vital for tourism. The following data sources were used: an Exit Survey conducted by Research and Statistics Department of the Bahamas MOT (2017) that provides data on the visitor’s preference for beaches and coral reef-related activities (snorkeling and scuba diving) in the Bahamas. The Exit Survey provided the percent of visitors who primarily visited the islands of NP and PI for their beaches. I then used the data from MOT on total stopover visitors to assess the number of beach visitors. These numbers were compared with the total visitors in the Bahamas to calculate the total visitor losses in the country due to lost beaches on the two islands. Similarly, the average expenditure per tourist (USD 1,212.098) was calculated using MOT data on stopover visitors and visitor expenditure from 1990-2016 (MOT, 2016). Total visitor expenditure in the Bahamas was USD 2,663.8 million (WTTC, 2018).

I limited my analysis to stopover visitors (who stay at least one night), deliberately excluded cruise and day visitors who do not stay overnight, and thus, do not contribute to the accommodation sector.


2.3. Results

Final flood risk maps for Cat 1, Cat 3, and Cat 5 storm at a present SLR scenario showed the changes in storm surge with a future increase of 1 m SLR (Figure 2.4, Figure 2.5, Figure 2.6). The following section details various climate-related impacts relevant to the study area.

2.3.1. Direct Climatic Changes

**Tourism properties at risk of SLR induced inundation:** Results indicate that six properties (11%) are at risk of permanent inundation i.e. complete loss of occupancy due to a 1 m rise in sea level. These include one budget, one luxury, and four economy hotels and resorts. As expected, all of these are coastal beachfront properties. A total room capacity of 756 rooms will be impacted under this scenario.

**Tourism properties at risk due to coastal flooding:** Sea level rise considerably increases the extent of storm surge caused by various categories of storms (Figure 2.4, Figure 2.5, Figure 2.6). Considerably more properties are impacted by storm surge hazards as compared to permanent inundation. At present, coastal flooding caused by a weak (Cat 1), moderate (Cat 3) and strong (Cat 5) storm can potentially affect 34% (n=18), 69% (n=37), 83% (n=44) of the tourism infrastructure (hotels and resorts), respectively. The percentage of infrastructure at risk increases considerably with the addition of a SLR scenario. For example, the number of properties increases from 18 to 27 when a Cat 1 storm is amplified by a 1 m SLR, resulting in a more than 18% increase of risk (Figure 2.4). Similarly, a Cat 3 and Cat 5 poses risk from 75% (n=40) to as much as 90% (n=48) of the tourism properties when enhanced by a meter rise in SLR by 2100 (Figure 2.5, Figure 2.6).
Figure 2.4. Coastal flooding caused by storm surge and 1 m of sea level rise for weak storm (Cat 1).

Figure 2.5. Coastal flooding caused by storm surge and 1 m of sea level rise for moderate storm (Cat 3).
Figure 2.6. Coastal flooding caused by storm surge and 1 m of sea level rise for strong storm (Cat 5).

**Tourism properties at risk due to sea level rise induced coastal erosion:** 96% of the beachfront tourism properties (n=27) are located within 100 m of the coast. Of these 27 properties, 12 are within 0-50 m of the coastline. For the inland properties (n=26), six properties lie within 100 m of the coastline and three are within 50 m of the coastline. In summary, 28% of the total properties on the two islands were within 0-50 m while 60% of the tourism infrastructure resides within 0-100 m of the coastline.

**Loss of occupancy and revenue:** Assuming total losses by a 1 m SLR, 7% (756 rooms) of the total room count will be uninhabitable for accommodating visitors on the two islands. In addition, storm surge will also cause potential damage to the tourism infrastructure. A Cat 1 storm coupled with SLR will pose losses of occupancy to around 579 rooms (10% of a total
5,795 rooms) whereas a Cat 5 storm surge will damage more than 7777 rooms on the two islands.

Figure 2.7 presents the relative losses in room count based on the property type. More economy properties are impacted in the future 1 m SLR and all associated storm surge scenarios as compared to budget and luxury accommodations. Only 3% of luxury properties are at risk of potential SLR induced inundation. For these properties, the occupancy related losses increase from 5.9% to 29.2% when the storm category changes from Cat 1 to Cat 3. Comparatively, 14.4% and 19.8% of the budget and economic properties are at risk from the SLR and these risks increase to 31% to 34.9% for Cat 1 and Cat 3 storm categories respectively. In the event of a strong storm, most properties will face a similar level of risks: 71.4% for budget, 75.4% for the economy, and 74.3% for luxury properties.

![Figure 2.7. Loss of occupancy in the tourism sector based on the property type due to sea level rise and storm surge.](image)

The decrease in revenues (Figure 2.8) was estimated as follows: 7% for SLR, 5.5% for a weak storm (Cat 1), 30% for a moderate storm (Cat 3), and 74% for a strong storm (Cat 5) by
Among other business interruptions due to flooding and inundation, the potential losses in occupancy will decrease revenues significantly.

![Figure 2.8. Losses from SLR and SLR plus differing storm categories as a percent of total revenue and employment opportunities generated by the tourism sector in NP and PI.](image)

### 2.3.2. Indirect Climate-induced Environmental Changes and Cultural Heritage Impacts

**Loss of beaches:** At present, the beach width for all the beaches on the two islands do not exceed 50 m putting them at risk of potential erosion caused by rising sea level. The erosion of coastal properties indicates that the beaches will be lost much earlier than the properties themselves. Potentially 60% of the coastal properties are susceptible to damages from erosion in the study area. In terms of occupancy, this damage translates into a room count of more than 92% (9,727 rooms) in the two islands.

**Loss of coral reefs:** The Bahamas could possibly lose as much as 1390 sq. km of its coral reefs due to rising ocean temperature. NP consists of 30 sq. km (approx. 1.5%) of the total reef region in the Bahamas. Assuming a 70% decline in coral reef cover, NP could lose 21 sq. km of its coral reef cover. These losses will be exacerbated if the local threats such as overfishing, pollution, and coastal development are also taken into account (Burke et al., 2011). The coral reefs in NP
are at high risk of coastal development and dredging while human activities such as pressure from fishing and invasive lionfish add to this risk (Arkema et al., 2017). The losses in the fringing coral reefs, mostly present on the northern side of the island, will alter many ecosystem services such as storm protection, local finfish fisheries, habitat for spiny lobster (main export of the Bahamas), and visitor expenditure (Arkema et al., 2017). It is worth noting that there is some evidence that suggests several reef species demonstrate higher resilience through adaptation and acclimatization to changing climate than others (Palumbi, Barshis, Traylor-Knowles, & Bay, 2014). However, for this study, I assume a total loss of coral reefs because such a fine level analysis is beyond the scope of my study.

**Cultural heritage sites:** Only one of the five cultural heritage sites face risks of inundation due to a meter SLR. This site, Fort Montagu, is also susceptible to all three storm surges and lies within less than 50 m of the coastline. In addition, the Clifton Heritage National Park on NP Island is at risk of flooding by a moderate (Cat 3) and strong (Cat 5) storm at the present SLR levels which obviously increases with the 1 m rise in sea level. The other three sites, due to their high elevation, are not at current or future risks of storm surge and SLR.

### 2.3.3. Indirect Climate-induced Social-Economic Changes

**Loss of employment:** Sea level rise will directly affect only a small percentage (5.14%) of the total employment in the travel and tourism sector (Figure 2.8). However, the number of employees will be significantly impacted due to storm surge with more than 74% of the total employment at risk due to a strong Cat 5 storm by 2100. These values are conservative estimates, as they do not account for future employment growth in the tourism sector.

**Loss of tourist expenditures:** The highest loss of tourism expenditure will result from the loss of beaches. The beaches of NP and PI are listed by 86% of tourists as the main reason why they
come to the islands (Exit Survey, Bahamas MOT, 2017). Considering a total loss of beaches by 2100, this will result in a 56.17% decline of the total visitors in the Bahamas and a decrease in visitor expenditure by USD 981.75 million (36.8% of total visitor expenditure).

The 2017 Exit Survey conducted by the MOT found that coral reef-related activities such as snorkeling, and scuba diving are less preferred by visitors to NP and PI (39% and 7% respectively). The loss of coral reefs described above may induce losses up to 30.04% and 19.71% (USD 525.13 million) in terms of visitors and expenditure lost to the national Bahamas economy.

2.4. Discussion and Recommendations

My findings show that the tourism sector on the islands of NP and PI is threatened by SLR and storm surge. Six properties (11%) are located within 1 m SLR and face the risk of inundation. Thirty-four percent (34%) of the coastal tourism businesses on the islands of NP and PI are currently located in a Cat 1 storm surge zone and more than 83% are located in a Cat 5 storm surge zone. With the future projected increase in SLR, the exposure from these storms can significantly increase to as much as 90% of the properties vulnerable if a Cat 5 storm makes landfall on these two islands. Even in a conservative scenario of Cat 1 storm surge, up to 51% of the properties would be vulnerable with a 1 m SLR scenario. It is worth noting that many recent studies have even considered an increase in sea level to as much as 2 m and beyond (Le Bars, Drijfhout, & de Vries, 2017; Compact, 2015). This will be highly consequential to the tourism sector as well as the Bahamas as a whole. Any adaptation planning needs to consider these higher-end scenarios.

While SLR may pose direct inundation threats to only a small number of properties, the findings from storm surge exposure are pertinent to the Bahamas taking into consideration past
hurricane devastation in the country. The Bahamas lost 10% of its GDP (estimated up to USD 551 million) due to hurricanes Frances and Jeanne in 2014 (The Commonwealth of the Bahamas, 2014). Hurricane Matthew in 2016 caused USD 129 million in damages to the tourism sector in the Bahamas (ECLAC, 2019). Even though it caused mild damage to the tourism infrastructure in NP, the island accounted for more than 40 percent of the total losses in the tourism sector of the Bahamas (ECLAC, 2019). The recent catastrophe from Hurricane Dorian, a Cat 5 storm, demonstrated the country’s vulnerability to extreme weather events. Dorian’s impacts were not on NP and PI but the Abaco and Grand Bahama Island to the north which differ in their geology from NP/PI. However, the tourism in NP/PI still suffered due to the consequences of Dorian due to potential tourists assuming that these two southern islands were also physically impacted by the storm. Notwithstanding potential changes in hurricane frequency and intensity of future Atlantic hurricanes (Bender et al., 2010; Walsh et al., 2016), this is a major threat as storm surge risks will be much greater for each hurricane category with rising sea levels. The Bahamas building code (2003) was mandated to provide standards on building design. These findings emphasize the need for further strengthening and updating the building codes to match the intensity of future events. This is a further step toward addressing Sustainable Development Goal (SDG) 13, particularly Target 13.1, which calls for strengthening resilience to climate disasters.

Inter-American Development Bank (IDB) estimated total costs of the impacts of the Hurricane Dorian at USD 3.4 billion, accounting for a quarter of the country’s GDP with the tourism sector bearing the highest losses (IDB, 2019). These losses are forecasted to be USD 325 million due to decreases in visitor arrivals and changes in tourist preference due to damaged structures (IDB, 2019). The sector faced damages up to USD 530 million (IDB, 2019). These impacts will be exacerbated by post disasters issues such as disaster debris, contaminated
freshwater lenses, and declines in fishery production (EDM, 2019) that further magnify the losses to the tourism industry on the affected islands, as well as the broader social-economic situation in the country.

With regard to property type and increased storm surge, low budget and economy class properties are at greater risk compared to large luxury accommodations. Such properties with limited capital will have greater difficulty recovering from storm damage. Less than half of the small hotels interviewed on the islands of NP and PI could afford hurricane insurance coverage due to low occupancy, high operating costs, and high insurance premiums (Thomas, 2012). An Australian study presented similar findings where small-scale businesses lacked coverage compared to larger tourism enterprises (Cioccio & Michael, 2007). In the Bahamas, insurance premiums are likely to increase further following Hurricane Dorian, thus, adding to the vulnerability of smaller tourism businesses.

Natural resources such as beaches and coral reefs are vital to the tourism sector. The vulnerability of beaches is most pertinent to NP and PI as these coastal features buffer hotels and resorts on the southern side of the islands from the full extent of damage that can be wrought by the hurricanes. They also attract the highest number of tourists and therefore revenue. While coral reef-based activities such as snorkeling and diving are comparatively less preferred by tourists, the reefs remain a substantial draw and provide many ecosystem services such as storm protection and fisheries’ habitat. Silver et al. (2019) modeled the coastal protection benefits of ecosystems in the Bahamas and found that these ecosystems were vital in reducing shoreline exposure to coastal hazards for all Bahamian islands. This was also evident in my study where the northern side of the NP Island, where the majority of the tourism infrastructure located, benefits from wave attenuation and storm protection provided by the nearby Cays and the
fringing reef. In contrast, the southern side of the island is more exposed due to its lack of physical barriers and the shallow waters of this region of the Great Bahama Bank.

The reefs are also an important habitat for spiny lobster, which is one the main export fisheries of the Bahamas and contributes to more than 90% of the exports from the country (FAO, Bahamas, 2018). In addition to overexploitation and coastal zone development, lobster and finfish fisheries are sensitive to damages to coral reefs (FAO, Bahamas, 2018). Caribbean Challenge Initiative and the Bahamas Protected are involved in the effective management of Marine Protected Areas (MPAs) in the country. In the NP, two MPAs – Southwest NP Marine Managed Area (SWMMA) and Bonefish Pond National Park generate ecosystem services in terms of recreation, tourism, fisheries habitat, and storm protection values (Arkema et al., 2017). However, these areas are threatened by human activities such as dredging, oil leaks, extensive fishing, and tourist pressure (Arkema et al., 2017).

In the Bahamas, coastal ecosystems are tied to the economic development that requires an integrated management approach (Arkema & Ruckelshaus, 2017). Such planning goes toward meeting SDG 14.2 for sustainable management of marine and coastal ecosystems, as well as SDG 14.7 for increasing the economic benefits of tourism to SIDS. In 2002, a preliminary document for the national ICZM planning process for the Bahamas was introduced with the cooperation of the IDB. This document assessed the current coastal zone management issues in the country and proposed guidelines such as zoning ordinances and marine protected areas to safeguard the coastal ecosystems and promote sustainable use of resources. More recently, IDB has provided a USD 35 million loan to the Bahamas for Climate-resilient Coastal Management and Infrastructure Program, out of which USD 23.5 million are dedicated toward shoreline stabilization and coastal flood control measures on NP Island (IDB, 2017). The program also
calls for natural infrastructure based coastal protection strategies and building national capacity for ICZM. Similarly, Vision 2040, National Development Plan of the Bahamas, highlights researching and implementing climate change adaptation and mitigation measures and integrating disaster risk reduction into development policies as important goals. While ICZM has been in the Bahamas planning process for more than a decade now, there is still no national framework or dedicated unit for ICZM in the country.

In my paper, I evaluated the effects of climate change on two main tourism islands in the Bahamas. It is evident from the findings that a multitude of the impacts that the sector may face will have spillover effects on the whole country. Nonetheless, tourism’s contribution to the social-economic conditions of the Bahamas cannot be neglected. Therefore, integrated management is required to manage sector sustainably while dealing with climate change. Many recent plans and programs in the country have focused on such integrated planning. With a few exceptions such as Barbados and Belize, the scope of ICZM remains a challenge for most SIDS and requires further research. My findings present the first step to understand the different climate-induced risks and the ways that climate change can affect a specific tourism-based economy. Taking into account the magnitude of these impacts and the increasing storm frequencies in the Bahamas by each passing year, I further emphasize the urgent need for integrated planning. This comes at a time when travel-based revenues for SIDS will be further reduced for at least 1-2 years with other scenarios depending on how the still-developing COVID-19 pandemic disrupts travel and other tourism sectors, which will vary geographically. Currently, the Bahamas is coping with the aftermath of Hurricane Dorian (a Cat 5 storm), and combined with the pandemic, the impacts are particularly unprecedented and challenging. The pandemic provides a snapshot of the fragility of the tourism sector due to its dependence on
international markets in SIDS. At the same time, it also focuses attention on the need for integrated planning that pro-actively accounts for external shocks and disruptions.

Even in the face of shocks and challenges discussed in this study and beyond, the tourism industry is no less resilient with the ability to bounce back and continuing to grow. Just from 2017 to 2018, there was a 10.5% increase in tourist arrivals in the Bahamas (Caribbean Tourism Organization, 2019) and WTTC (2018) predicted an increase of more than 3% per annum in tourism’s contribution to the Bahamas’ GDP and employment sector over the next decade, although this was before Hurricane Dorian and COVID-19. Currently, the tourism industry is concentrated on the islands of NP/PI with heavy dependence on direct foreign investments. The country is aiming to develop tourism on family islands and new destinations through strengthening their intra-island airlift and transportation linkages to increase visitation beyond the NP/PI islands (National Development Plan, 2017). Some islands such as San Salvador, Great and Little Inagua, Mayaguana and the Ragged Island Chains have less exposed shorelines due to their higher elevations, rocky shorelines and lower exposure to storm surge as compared to the more vulnerable Abaco, Andros and NP/PI islands (Silver et al., 2019). The potential of extending tourism to these islands needs to be explored to effectively manage the growing industry. In order to do so, the sector needs to improve its value chain by building domestic capacity and improving linkages between foreign and domestic firms. However, the ideal strategies would be those that support climate change adaptation. This will require an integration of public and private stakeholders involved in the tourism sector of the country. Hess and Kelman (2017) suggested mechanisms such as public-private partnerships, building standards and regulations, adaptation taxes and funds, and risk transfer mechanisms for the tourism industry to support adaptation for climate change in SIDS. Specific case studies on the
adaptation potential of the SIDS’ tourism sector and their perception toward such measures will also help advance the sustainability of the sector as well as the whole country.

2.5. Conclusion

In the Bahamas, similar to many other SIDS, there is a clear need for diversification from a single economic base such as tourism that is very climate sensitive. However, the current importance of tourism to these countries with otherwise limited resources cannot be ignored. My study examines specific risks to tourism from climate change to support efforts for integrated climate risk management in the Bahamas. I find that the multiple and complex issues of many tourism-related impacts in the country warrant an ICZM planning process and associated updates of the Bahamas building codes to better prepare for future extreme weather events. However, it should be noted that other interacting factors may also shape the future of tourism in the Bahamas. These include changes in mitigation and adaptation planning of other sectors such as global aviation policies or the local construction sector, changes in the US economy (the largest visitor expenditure in the Bahamas), and other non-climate stressors. Limiting my study to stopover visitors also excludes other types of tourism such as cruise visitors and day tourists. I also acknowledge that there are factors such as rising groundwater levels and precipitation changes that can induce inland flooding in the country and impact the tourism infrastructure. However, including all these factors and their implications to the tourism sector is beyond the scope of my research.

To improve my understanding of the multitude of the climate-related impacts faced by many SIDS, more country and island-specific studies are needed to draw out comparisons among SIDS. Thus, continuing such analysis on a case-by-case basis in the future will provide
opportunities for better coastal management while supporting the growth of tourism for many other SIDS that are economically and socially dependent on the tourism sector.

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CHAPTER THREE:
CLIMATE ADAPTATION, SUSTAINABLE DEVELOPMENT, AND SIDS TOURISM: A CASE STUDY FROM THE COASTAL ACCOMMODATIONS SUBSECTOR IN THE BAHAMAS

Abstract

Tourism in Small Island Developing States (SIDS) is vulnerable to climate change but the sector plays a critical role in the sustainable development of SIDS through its contributions to economic growth, employment, and environmental protection. Using the Bahamas as case study, this study presents findings from a survey administered with property managers from coastal accommodations sector to explore their businesses’ contribution toward sustainable development and identify adaptation strategies to deal with climate change. I also evaluate their adaptive capacity by developing SIDS specific indicators based on capitals approach. Findings indicate that majority of the accommodations demonstrated moderate to high levels of participation in activities corresponding to certain UN Sustainable Development Goals. Efforts toward adaptation were limited to disaster preparedness for hurricanes, reflecting a short-term focus in the face of climate change uncertainties. In addition to lack of finances and knowledge for incorporating adaptation measures, their capacity to adapt is diminished due to lack of access to climate information, skilled staff, and specific climate planning reflecting limited human and institutional capitals. Recommendations for strategies synergistic with sustainable development
such as ecosystem-based adaptation and green jobs are made. The study informs tourism resilience planning in the Bahamas with implications for other SIDS.

SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 8 (Decent Work, and Economic Growth), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action).

Keywords: tourism, climate adaptation; sustainable development; adaptive capacity; resilience; small island developing states (SIDS)

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3.1. Introduction

Small Island Developing States (SIDS) are a group of developing countries with their specific social, economic, and environmental vulnerabilities and sustainability challenges (UN-OHRLLS, 2020). Many SIDS have specialized service sectors such as tourism because of their warm climates, beaches, coral reefs, and tropical landscapes. According to the World Travel and Tourism Council (WTTC, 2018), tourism in forty SIDS contributed more than USD 100 billion to their GDP generating over 3 million jobs. SIDS such as Cuba, the Dominican Republic, and Singapore have the highest number of people employed in the sector (Figure 3.1). Tourism also provides work opportunities for females and youth thereby playing a crucial role in the sustainable development of these SIDS. In the Caribbean, women constitute 60% of the total workforce in the accommodation and food service sector and the sector provides an entry point for the young population (UNWTO, 2019). In Dominica, tourism provides an opportunity to young job seekers to diversify their income opportunities and contributes to their economic resilience (Weis, Chamber, & Holladay, 2018). The findings of a recent study conducted by the United Nations World Tourism Organization (UNWTO) indicated a positive contribution of the
private tourism sector toward achieving the 17 Sustainable Development Goals (SDGs).

However, such research is often limited on SIDS. Out of 60 tourism companies surveyed in the UNWTO report, only one tourism establishment (in Singapore) represented a SIDS country. (UNWTO, 2017).

![Figure 3.1](image)

**Figure 3.1.** SIDS with the highest total contribution of tourism in billion US$ to national GDP (left) and largest total employment in the sector (right).*

*Based on the WTTC reports (2018) of forty SIDS for which data were available.

Coastal tourism in many Caribbean SIDS is extremely vulnerable to climate change impacts such as sea level rise (Scott, Simpson, & Sim, 2012b) and storm surge (Moore, Harewood, & Grosvenor, 2010). This vulnerability not only poses a financial challenge to the industry but also threatens the wider sustainable development of these tourism-dependent SIDS. Given their vulnerability, a resilience discourse has been present in SIDS which has recently extended to their tourism sector as well (Becken, 2013; Holmes, 2017; Van Der Veeken et al., 2016). A resilience-based lens can potentially enlarge the scope of adaptation to broader societal goals by including livelihood diversification and community development in addition to the short-term impacts of climate change (Engle, de Bremond, Malone, & Moss, 2014).
In my study, I explore the resilience of the tourism sector in the Bahamas by identifying its important contribution to sustainable development and climate change adaptation. To achieve this, I first identify the extent of tourism’s contribution to the SDGs relevant to a tourism-reliant economy, the Bahamas, that faces challenges to sustainably develop its economy. Secondly, I specifically focus on climate adaptation, a part of SDG 13 on climate action that remains a continuous challenge for many SIDS. Thirdly, I assess the adaptive capacity of the tourism sector with respect to prominent climate risks. Through this research, I aim to add to the growing literature on empirical investigations of resilience within the tourism sectors of SIDS. My practical goal is to examine adaptation and resilience planning specifics that align with the broader sustainable development of the country and the SDGs.

3.1.1. Background: The Bahamas and Climate Change

The Bahamas is an archipelago situated in the northern Caribbean with a land area of approximately 10,010 km² and 700 islands (CIA, 2018). Similar to many SIDS, the Bahamas have a relatively flat terrain and tropical climate which makes tourism the key economic sector. In 2018, tourism businesses employed 50,000 workers and indirectly supported more than 55% of the total employment and contributed to 19.0% of the annual GDP (WTTC, 2018). In particular, the sector is also the largest contributor to employment in New Providence (NP), the main touristic island of the country, with 53.1% of females and 46.9% of males earning on average USD 417 per week in wages (MOF, 2018). However, tourism in the Bahamas is extremely vulnerable to natural and anthropogenic impacts due to its predominantly coastal location and dependence on associated resources (The Commonwealth of the Bahamas, 2014).

Previous research findings suggest that 48 out of 133 coastal resort properties in the Bahamas will be inundated partially or completely by 1 m sea level rise and 50% of properties
will be at risk under the scenario of 100 m of beach erosion (Scott et al., 2012b). Climate change also threatens the coral reefs vital for tourism. Some 79% of the coral reefs in the Bahamas are threatened by climate-induced thermal stress and other local threats such as coastal development, pollution, and overfishing (Burke, Reytar, Spalding, & Perry, 2011). Sandy beaches, the primary attraction for the visitors in the country, are also vulnerable to erosion due to sea level rise and hurricane-generated storm surge. For example, Hurricane Matthew in 2016 caused damages of more than one million USD due to the loss of sand and sand dunes on Grand Bahamas Island (ECLAC, 2019). Climate change is a major challenge to the tourism sector as well as the sustainability of the Bahamas (National Development Plan, 2017). In addition to climate change drivers, the country faces other challenges such as recycling (Sealey & Smith, 2014) that hampers progress toward challenging SDGs.

The tourism sector comprises many sub-sectors such as accommodation (hotels, resorts), transportation, cruise ships, food and beverage concessions, tour operators, etc. In UNWTO (2017), 33% of the tourism industries surveyed belonged to the accommodation sector making it important to make such establishments the focus of my analysis. In my study, I only focused on the accommodation sub-sector on the two islands, as it accounts for the largest number of visitors and generates the highest visitor expenditures in the Bahamas as compared to other tourism sub-sectors such as cruise ships (Hendrickson & Skerrette, 2020; MOT, 2016).

3.2. Conceptual Framework

The concept of resilience has its original roots in theoretical and empirical ecology where it has been defined as the ability of a system to persist in the presence of change and disturbance (Holling, 1973). Cochrane (2010) considered tourism to be an excellent example of opportunities to develop resilience principles within a social-ecological system (SES) because of the
interdependence among natural resources, cross-cultural characteristics, and international linkages. A linked SES perspective is particularly crucial for resource-dependent economies such as SIDS that rely on well-managed ecosystems to sustain a range of ecosystem services and, therefore, ecological and societal systems are co-dependent in terms of resilience (Walker, Holling, Carpenter, & Kinzig, 2004). A resilient SES is better able to withstand both long-term trends and acute shocks, such as can arise from diverse climate change drivers. The resilience approach combines coastal adaptation principles with long-term sustainable development objectives (Engle et al., 2014), relevant to the scope of this research. As suggested by Bahadur, Ibrahim, and Tanner (2013), I use features of sustainable development and climate adaptation, the components most pertinent to SIDS, as principles for measuring resilience rather than universal indicators.

Adaptation can be defined as the set of decision-making processes and actions undertaken to maintain the capacity to deal with external shocks, such as climate change, to a SES without undergoing significant changes in the system and maintaining its ability to develop (Nelson, Adger, & Brown, 2007). Within the tourism sector, six types of adaptation measures for climate change have been suggested: (1) technical, such as physical infrastructure; (2) managerial, such as water conservation plans and low season closures; (3) policy, such as hurricane waivers and building compliance; (4) research, such as risk analysis, (5) education, such as initiatives to educate staff and guests, and (6) behavioral, such as best practices and offsetting greenhouse emissions (Scott et al., 2008; Scott, Hall, & Stefan, 2012a). Within this context, Ecosystem-based adaptation (EbA) is recognized for its capacity to integrate ecosystem services in overall climate adaptation strategies and increase the system’s resilience in the face of climate change (CBD, 2009; Munang et al., 2013; Scarano, 2017). EbA has the potential to achieve climate
change adaptation, foster resilience while supporting environmental protection and sustainable growth in a SES (Munang et al., 2013). Adaptive capacity is a system’s characteristic that reveals how effectively adaptation options and measures can be implemented (Petzold & Ratter, 2015). In an SES, it refers to the collective capacity of humans to manage resilience (Walker et al., 2004). A higher adaptive capacity means a greater chance of the system being resilient in the event of climate stress (Engle, 2011).

The literature on climate change adaptation in SIDS is growing considerably (e.g., Klöck & Nunn, 2019; Mycoo, 2018; Robinson, 2017). While the tourism sector is included in these discussions to some extent, most adaptation research on tourism focuses on the developed countries. Coastal tourism destinations in SIDS receive considerably less attention (Becken, 2013; Becken, Mahon, Rennie, & Shakeela, 2014; Fang, Yin, & Wu, 2018; Kaján, 2013; Njoroge, 2015). A few SIDS case studies such as Samoa (Parsons, Brown, Nalau, & Fisher, 2018), Fiji (Becken, 2005), Grenada (Sander, 2015) and Maldives (Shakeela & Becken, 2015) have focused on the local adaptation options, policies and adaptive capacity in the tourism sector. Studies on Pacific SIDS (Becken, 2005; Parsons et al., 2018) have focused on identifying adaptation strategies within the tourism sector. In the Caribbean SIDS, Honey and Hogenson (2017) provided case studies from destinations such as the Dominican Republic and other examples from large resorts in SIDS for evaluating responses to climate change. Other studies undertook a more regional destination approach for evaluating adaptation within the tourism sector of the Caribbean and Pacific SIDS (Hinds, 2017; Warrick, Aalbersberg, Dumaru, McNaught, & Teperman, 2017). Evaluating such adaptation strategies also plays an important role in understanding the environmental attitudes of a population (Hayes, Peterson, Heinen-Kay,
& Langerhans, 2015) and helps in facilitating risk communication (Madsen, Mikkelsen, & Blok, 2019; van der Linden, 2014).

As stated earlier, my objective is to evaluate the resilience of the tourism sector. I achieve this through exploring the extent of tourism’s contribution to the SDGs of a tourism-reliant economy – the Bahamas – that faces special challenges to meeting SDG 13 on climate action, a dilemma for many SIDS. I focus on adaptation measures for climate change concerning physical infrastructure built for accommodation, for example, hotels and hostels. I address the following research questions based on my overall objective:

1. To what extent does the accommodations tourism sector contribute to sustainable development measures in the Bahamas?
2. What adaptation strategies do tourism accommodation providers take to deal with climate change impacts and potential challenges to adaptation?
3. What are the key factors that contribute to or limits the sector’s capacity to adapt to climate change?

3.3. Methods

The database of accommodations including hotels, resorts, and timeshares published by the Bahamas Ministry of Tourism (MOT) served as an initial, major source of information (MOT, 2018). All coastal accommodations operating as businesses and designated as “beachfront” by the MOT were contacted for participation in July 2019. Chain hotels and resorts under the same management were grouped together and one interview was solicited for the entire establishment.

I administered a survey through face-to-face interviews with the managers, owners, or, in some cases, an environmental specialist for coastal tourism businesses in the New Providence
and Paradise Island (NP-PI) section of the Bahamas. I chose these two islands due to their significant contribution to the Bahamian economy through their highest room count, visitor arrivals, and related expenditures (MOT, 2016). A previous study conducted with hotelier responses on climate change and sustainable tourism on the two islands (Thomas, 2012) also provided a good baseline for comparing general trends in the responses from my study.

Ten out of the 21 businesses agreed to participate in the interview for survey completion. These included two chain businesses that contribute more than 50% of the total rooms on the two islands as well as seven other medium-sized accommodations. In an attempt to improve the response rate, the survey was also distributed online through Qualtrics using the email addresses obtained from the MOT website. One out of the ten participants completed the survey electronically resulting in a final response rate of 47.6%. The basic characteristics of participating accommodations are provided in Table 3.1.

**Table 3.1. Characteristics of participating accommodations.**

<table>
<thead>
<tr>
<th></th>
<th>New Providence</th>
<th>Paradise Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of properties (room count, % of total*)</td>
<td>5 (2999, 28.3%)</td>
<td>5 (3912, 37%)</td>
</tr>
<tr>
<td>Property type (class)</td>
<td>NP #1 hotel (budget)</td>
<td>PI #1 all-inclusive hotel (economy)</td>
</tr>
<tr>
<td></td>
<td>NP #2 hotel (deluxe)</td>
<td>PI #2 hotel/timeshare (economy)</td>
</tr>
<tr>
<td></td>
<td>NP #3 chain resort (moderate, deluxe)</td>
<td>PI #3 hotel/timeshare (economy)</td>
</tr>
<tr>
<td></td>
<td>NP #4 hotel/timeshare (economy)</td>
<td>PI #4 chain property (moderate, deluxe)</td>
</tr>
<tr>
<td></td>
<td>NP #5 all-inclusive resortPI #5 condo hotel (deluxe)</td>
<td>(luxury)</td>
</tr>
<tr>
<td>Average years of operation</td>
<td>49</td>
<td>22</td>
</tr>
<tr>
<td>Location (average distance from the coast, in meters)</td>
<td>41.37</td>
<td>44.76</td>
</tr>
</tbody>
</table>

*total room count in NP/PI= 10,565
Some of the common reasons for non-participation were a) lack of time, b) unwillingness of the businesses to be interviewed, and c) unavailability of an employee in a managerial capacity during the study period.

3.3.1. Survey Design

The survey design focused on contextualized questions for achieving my three research objectives regarding sustainable development (RQ 1), adaptation strategies (RQ 2), and adaptive capacity (RQ 3) in the tourism accommodations sector. The final survey, containing 25 items, was deemed exempt after being successfully reviewed by the Institutional Review Board (IRB). The survey was divided into four sub-sections. The first section gathered information on the accommodation size, length of their business, and respondents’ knowledge of climate change and its observed impacts. The subsequent paragraphs describe the second, third, and fourth sections of the survey in detail.

For RQ1, the second section of the survey elicited participants’ responses regarding their accommodations’ level of participation in business practices that contribute toward SDGs outlined by the World Tourism Organization of the United Nations (UNWTO, 2017). While the private sector can contribute toward the achievement of all SDGs, I only considered the activities similar to those of the UNWTO with a focus on SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 8 (Decent Work, and Economic Growth), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action). Examining all the SDGs would require resources beyond the scope of this study. I also used eco-certification as a measure of an establishment’s commitment to sustainable development. A list of all the eco-certification available in the Bahamas was assembled in the survey responses from different sources (Hinds, 2017; MOT, 2018).
For RQ 2, measures for climate adaptation strategies were provided in the third section as survey choices. A total of 19 adaptation choices were included after a comprehensive review of the literature. Different structural, educational, behavioral, ecosystem-based, and policy adaptation options, and common barriers toward these, were identified from the tourism literature (e.g., Noble et al., 2014; Scott et al., 2008) in a SIDS context (Becken, 2005; Honey & Hogenson, 2017; Spencer, 2019). Responses were solicited for binary choices to the absence or presence of different adaptation options, and additional information was gathered for detailed adaptation responses. The binary response format places less burden on the respondents and is considered to perform better than other response options such as a seven-point multicategory response (Chan, 2014; Zins, Dolnicar, & Leisch, 2012). However, to overcome their drawback of losing any relevant information (Chan, 2014), and include responses outside of the pre-determined adaptation choices, an “other” option was included in the questions.

For RQ 3, the fourth section of the survey assessed adaptive capacity using a capitals approach based on the Sustainable Rural Livelihoods Framework (Ellis, 2000) that provide a basis to include a broad range of determinants of adaptive capacity. Recently, such a capitals approach has been favored in the tourism sector to assess resilience (Brown, Orchiston, Rovins, Feldmann-Jensen, & Johnston, 2018) with specific application to the disasters in New Zealand (Brown, Rovins, Feldmann-Jensen, Orchiston, & Johnston, 2019). To date, there are no studies that apply a capitals approach to the tourism sector in a SIDS in terms of long-term climate change. Similar to Brown et al. (2018), I analyzed the adaptive capacity of the tourism system by modifying the generic five capitals – human, natural, social, institutional, and financial – and measuring them by specific indicators that most closely fit the SIDS’ tourism context. Table 3.2 provides a list of indicators chosen that are most relevant to tourism in SIDS (Parsons et al.,
2018; Petzold & Ratter, 2015; Van Der Veeken et al., 2016) and were used to develop contextualized survey questions.

**Table 3.2.** Description and rationale for the capitals approach.

<table>
<thead>
<tr>
<th>Capitals and Measures</th>
<th>Description</th>
<th>Rationale for Choosing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Human Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthcare</td>
<td>Measured as the provision of healthcare mechanisms for employees</td>
<td>Access to healthcare indicates the general well-being of employees (Brown et al., 2018)</td>
</tr>
<tr>
<td>Access to information and knowledge</td>
<td>Measured as the status of current climate change assessment and discussion within an accommodation; access to external sources of communication; competent staff</td>
<td>Accommodations where information regarding climate change (Sander, 2015; Warrick et al., 2017), external communication of climate risks (Parsons et al., 2018) is provided, and highly skilled staff is present (Lee, Vargo, &amp; Seville, 2013) demonstrate higher adaptive capacity</td>
</tr>
<tr>
<td><strong>Cultural Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived risks</td>
<td>Perceived climate-related impacts on their businesses</td>
<td>The way business managers/owners perceive environmental risks such as climate change determines their pro-environmental attitudes and practices (Chen et al., 2013; Hayes et al., 2015)</td>
</tr>
<tr>
<td>Climate awareness</td>
<td>General climate change awareness of the interviewee</td>
<td>High awareness among the private sector contributes toward adaptive capacity (Van Der Veeken et al., 2016)</td>
</tr>
<tr>
<td><strong>Social Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social networks</td>
<td>Presence of formal clubs/societies/associations</td>
<td>Such associations bring different employees together, facilitate knowledge sharing and collective action in responding to climate change (Petzold &amp; Ratter, 2015; Van Der Veeken et al., 2016; Warrick et al., 2017)</td>
</tr>
<tr>
<td>Participation</td>
<td>Measured as the extent of group events in an accommodation</td>
<td>Accommodations that hold regular group events encourage collaborations of employees to draw upon during climate-related events (Barnett &amp; Waters, 2016; Warrick et al., 2017)</td>
</tr>
</tbody>
</table>
Table 3.2. (Continued)

<table>
<thead>
<tr>
<th>Capitals and Measures</th>
<th>Description</th>
<th>Rationale for Choosing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institutional Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate change planning</td>
<td>Whether the accommodation has a current climate change adaptation strategy</td>
<td>Planning requires the integration of climate preparedness plans within existing institutional plans of the businesses (Bahadur et al., 2013)</td>
</tr>
<tr>
<td>Political representation</td>
<td>Whether the accommodation is actively involved in the capacity-building initiatives at the regional/national climate change dialogue</td>
<td>Inclusion of tourism businesses in the national and regional decision-making process contributes to their capacity to act in addressing climate change (Parsons et al., 2018; Warrick et al., 2017)</td>
</tr>
<tr>
<td><strong>Natural Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of ecosystem services</td>
<td>Measured as Likert scale responses of the respondent’s perspective</td>
<td>The tourism businesses in SIDS is dependent on natural resources for a range of ecosystem services that put pressure on these resources (Nurse et al., 2014) and diminish the sector’s adaptive capacity</td>
</tr>
<tr>
<td>Presence of conservation projects</td>
<td>Measured as the absence or presence of coastal ecosystem protection measures</td>
<td>The businesses considerations of their impacts and protection measures can positively contribute to the natural capital (Brown et al., 2018)</td>
</tr>
<tr>
<td>Financial incentives</td>
<td>Measured as the absence or presence of financial mechanisms for coastal ecosystem protection measures</td>
<td>Businesses will be more willing to protect for ecosystems through public-private partnerships where the government offer financial incentives to co-manage such ecosystem with private interests (Hess &amp; Kelman, 2017; Lew &amp; Wu, 2017)</td>
</tr>
<tr>
<td><strong>Financial Capital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to credit</td>
<td>Measured as the presence or absence of formal (e.g., banks) and informal (e.g., family, friends) means to access credit</td>
<td>Financial security of the businesses and employees are integral to the resilience of tourism and adds to their capacity to adapt to a climate-related event (Biggs, Hall, &amp; Stoeckl, 2012)</td>
</tr>
<tr>
<td>Insurance mechanisms</td>
<td>Measured as whether an accommodation is insured against the potential risks or not</td>
<td>Presence of insurance helps in absorbing effects from climate-related events as well as cope up and continue business after an event (Brown et al., 2018; Orchiston, 2012)</td>
</tr>
</tbody>
</table>
I chose the indicators that measure broader climatic changes that contributes to the long-term resilience and sustainable development of many SIDS. The presence or absence of these indicators through binary responses leads to an understanding of the planning and preparedness of the tourism sector for climate change and other extreme events. Similar to the second section, anchored open-ended questions that elicited a further response on an otherwise binary question (Lee & Lutz, 2016) were used to provide participants with additional freedom to answer the questions.

3.4. Results

3.4.1. Contribution to Sustainable Development Measures

Research Question 1: To what extent does the accommodations tourism sector contribute to sustainable development measures in the Bahamas?

All participant interviewees suggested that their business strategy supports sustainable practices. However, the level of participation for such practices differs (Table 3.3). Most businesses reported buying seasonal produce, hiring local staff, and supporting non-discrimination policies thereby supporting SDGs of responsible consumption (SDG 12), decent work opportunities (SDG 8), and providing equal opportunities to all the social groups (SDG 1). While not a focus of my study, some of these activities also support additional SDGs in the country such as SDG 14 (life below water), SDG 1 (no poverty), and SDG 10 (reduced inequalities).

Eco-certification demonstrates a business’s commitment to sustainable practices and efficient resource management (UNWTO, 2017). Of the accommodations surveyed, 50% stated that they were eco-certified at the time of the interview. Certifications by Green Globe (n=3) (overall accommodation sustainability measures) and Blue Flag (n=2) (beach and water quality
measures) were the most commonly reported among these businesses. Other certifications such as Travel Life (n=1), Trip Advisor Green Leaders (n=1), and Earth Guard (n=1) were also mentioned by a few participants. One other business was planning to get certified within three months by Rainforest Alliance.

Table 3.3. Accommodation sector’s participation in the SDGs supporting practices.

<table>
<thead>
<tr>
<th>Actions by the accommodation providers</th>
<th>Level of participation*</th>
<th>Frequency**</th>
<th>Applicable SDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our business supports the purchasing of seasonal produce to support the local community</td>
<td>3</td>
<td>10</td>
<td>SDG 12, SDG 14</td>
</tr>
<tr>
<td>We currently have initiatives to hire more local staff</td>
<td>3</td>
<td>10</td>
<td>SDG 8, SDG 1</td>
</tr>
<tr>
<td>Our business strategy supports non-discrimination policies</td>
<td>3</td>
<td>10</td>
<td>SDG 1, SDG 10</td>
</tr>
<tr>
<td>We offer industry training to local communities to prepare them for work in our hotels and resorts</td>
<td>2.8</td>
<td>9</td>
<td>SDG 8, SDG 1</td>
</tr>
<tr>
<td>We promote education awareness-campaigns among staff, local communities, and guests</td>
<td>2.6</td>
<td>7</td>
<td>SDG 4</td>
</tr>
<tr>
<td>Our business provides donations to local educational institutions</td>
<td>2.5</td>
<td>7</td>
<td>SDG 4</td>
</tr>
<tr>
<td>Our business promotes energy-efficient measures such as solar heating in pools, to reduce our energy costs</td>
<td>2.6</td>
<td>6</td>
<td>SDG 12</td>
</tr>
<tr>
<td>Our business has an active recycling strategy</td>
<td>2.5</td>
<td>6</td>
<td>SDG 12</td>
</tr>
<tr>
<td>Our business has specific targets to reduce its water consumption</td>
<td>2.4</td>
<td>5</td>
<td>SDG 12</td>
</tr>
</tbody>
</table>

*1=no participation, 2 = low participation, 3 = high participation
**number of participating accommodations
3.4.2. Adaptation Strategies for Tourism Accommodations

Research Question 2: What adaptation strategies do tourism accommodation providers take to deal with climate change impacts and potential challenges to adaptation?

**Main adaptation strategies for tourism accommodations:** The survey explored different strategies undertaken by tourism accommodations to cope with climate-induced impacts. Participants were provided with 19 different adaptation strategies identified from the literature that are relevant to coastal businesses. In addition, the open-ended choice was provided to account for excluded items. Table 3.4 provides a list of the most common adaptation strategies mentioned by the accommodations. These strategies are further categorized into the type of adaptation and the potential impact of climate change on which they are focused. The adaptation options such as educational campaigns for guest awareness (n=3) and coastal retreat (n=2) and offering more indoor-based activities as compared to beach and coral reef-based tourism (n=1). Efforts to support EbA such as reef restoration, mangrove planting, and supporting MPAs were not highly prioritized by respondents.

The most frequent responses were in the Educational and Managerial categories of adaptation types (Table 3.4). Most businesses were more focused on short-term hurricane preparedness as compared to the possible impacts of storms potentially attributable to long-term ocean heating and other documented effects of climate change. Most businesses (n=9) provided emergency evacuation training to the staff members and had evacuation plans in place. Four businesses also provided hurricane guarantees and waivers to the guests, for example, refunds on their bookings or free meals in case of cancellations. As much as 80% of the surveyed businesses reported support for local climate research and monitoring for climate change. When further prompted, businesses suggested that this support was through financial donations. The Bahamas
building code (Ministry of Works & Utilities, 2003) was mandated to provide standards on building design and most businesses reported compliance with the regulations. Water availability was another issue of concern for some businesses and 50% of them had pumps and generators in place (Table 3.4). One large accommodation had also invested in a desalinization plant due to the decreasing freshwater lens at its site.

Table 3.4. Adaptation strategies undertaken.

<table>
<thead>
<tr>
<th>Adaptation Strategy</th>
<th>Frequency</th>
<th>Type of Adaptation</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training for emergency evacuations</td>
<td>9</td>
<td>Educational</td>
<td>Hurricanes</td>
</tr>
<tr>
<td>Compliance with building regulations</td>
<td>9</td>
<td>Policy</td>
<td>Hurricanes; Sea level rise</td>
</tr>
<tr>
<td>Supporting local climate research and monitoring</td>
<td>8</td>
<td>Managerial</td>
<td>Climate change</td>
</tr>
<tr>
<td>Developing emergency preparation and evacuation plans</td>
<td>8</td>
<td>Managerial</td>
<td>Hurricanes</td>
</tr>
<tr>
<td>Staff training for climate change awareness</td>
<td>6</td>
<td>Educational</td>
<td>Climate change</td>
</tr>
<tr>
<td>Buying pumps and generators</td>
<td>5</td>
<td>Technical</td>
<td>Water availability</td>
</tr>
<tr>
<td>Networking with other hotels and businesses to share best practices</td>
<td>5</td>
<td>Behavioral</td>
<td>Climate change</td>
</tr>
<tr>
<td>Increase representation of employees in the governing bodies for climate change</td>
<td>5</td>
<td>Policy</td>
<td>Climate change</td>
</tr>
<tr>
<td>Hurricane guarantees and waivers</td>
<td>4</td>
<td>Policy</td>
<td>Hurricanes</td>
</tr>
<tr>
<td>Hard infrastructure such as sea walls, breakwater, etc.</td>
<td>4</td>
<td>Technical</td>
<td>Sea level, storm surge</td>
</tr>
</tbody>
</table>

Challenges to climate adaptation: The two most common barriers to implementing climate adaptation were lack of knowledge (n=6) and lack of finance (n=5). Many participants felt that there is no clear knowledge of how climate change will impact their businesses, which limits
their adaptation responses. During the survey, some participants did not attribute coral bleaching or increasing erosion observed on the island to climate change, indicating a limited knowledge of the causes and effects of climate change. Lack of finance was another barrier to climate change adaptation. This was common among businesses of all sizes. While the smaller establishments were directly financially constrained, large-sized businesses as well did not see climate adaptation as a necessary investment to direct funds, possibly because of the lack of knowledge. One respondent from a larger business mentioned that the issue of climate change lacks priority in the budget year of their establishment.

3.4.3. Key Adaptive Capacity Factors

Research Question 3: What are the key factors that contribute to or limits the sector’s capacity to adapt to climate change?

Human capital was assessed through questions on access to both healthcare and climate change information. 70% of the interviewees stated that their establishment provided healthcare benefits to their employees. However, most of them agreed that this was usually limited to the managerial level employees and not the entire staff. However, in January 2020, the National Health Insurance Authority in the Bahamas was expected to release an employer mandate for large businesses in the country where employers and employees will share the responsibility to obtain health insurance that covers premium care and coverage for high-cost conditions (NHI Bahamas, 2020).

Access to climate information was measured as the extent of climate change-related discussions incorporated within a tourism establishment. Half of the interviewees agreed that there had been formal discussions in the form of workshops and meetings regarding climate change. These discussions were usually held by the Human Resource Departments and not
entirely focused on climate change. Nonetheless, climate change was included as part of the wider environmental initiatives such as eco-certification, conservation, etc. Outside of their accommodation, information from external sources of communication such as television or newspapers was available to eight out of ten accommodations. Most of this information was on hurricanes and extreme events, however, two interviewees mentioned sea level rise, reef destruction, and precipitation levels as prominent climate issues in the media.

To ensure that an establishment has the necessary knowledge to deal with climate-related events, skilled staff with access to relevant climate information are an essential part of its human capital. When interviewees were asked whether they had specific staff for climate issues, two establishments had a) an environmental team responsible for conservation efforts involving waste, water, and energy and b) a facilities team responsible for hurricane-related issues. Three accommodations had an employee in an environment-related position whose job roles included providing training and presentations to spread awareness about climate change in their organization, collaborate with local and national organizations, storm preparation, and water level monitoring. In all other cases, the management team was responsible in case any climate-related event happens.

Cultural capital was examined through the respondent’s awareness regarding climate change and its perceived impacts on their businesses. It is important to note that the awareness differs based on the background of the participants. Most survey participants had some understanding of climate change. The extent of their understanding varied from slightly aware (n=2), to moderately (n=3), very aware (n=4). Only one interviewee responded to be extremely aware of climate change issues. Most business owners and managers involved in the tourism
accommodations sector had average to relatively high awareness regarding changing climatic conditions.

Most of the interviewees agreed that they had witnessed examples of at least one climate-induced change. Storm frequency and intensity (n=4) were the most common manifestation of potential climate change mentioned, followed by beach erosion (n=3), and coral bleaching (n=3). Despite observing changes, half of the respondents believed that climate change had not affected their businesses.

Social capital was assessed through the absence or presence of social networks and the participation of employees. Social networks were measured through group events and gathering for the employees. Seven interviewees agreed that their organization held group events for the staff. The frequency of these events differed among establishments, being held either annually (n=3), quarterly (n=1), and monthly (n=3). One business also reportedly had weekly departmental events in addition to the events for entire accommodation.

Participation was measured through formal associations, clubs, and societies that strengthen the social ties of an organization. Six out of ten interviewees stated that there were formal societies for their establishment employees. As these differ among different departments and employees, owners/managers were not able to provide detailed information regarding the nature of these associations.

Institutional capital was predicted through climate planning and regional cooperation. Interviewees were asked if their establishment had a current climate adaptation strategy or action plan. Only two reported having an active plan to tackle climate change as part of their broader business planning. Two others had such action plans in the development phase and set to be in place within the next 4-6 months.
Interviewees were also asked if their establishment was involved in climate change dialogues at the national or regional level. None of the businesses were directly involved at the wider Caribbean level, however, two reported to have indirect involvement in The Caribbean Community (CARICOM) risk mitigation plans and through other efforts. The participation was relatively better at the national level where some accommodations reported direct (n=2) and indirect (n=1) involvement in national efforts to support coral reef decline and engage in education and outreach for climate issues.

Natural capital was predicted through the reliance on ecosystem services, conservation efforts, and the availability of financial incentives. Ecosystem services such as the provision of freshwater, local seafood, recreational activities, and aesthetic beauty were considered important by each establishment. Unsurprisingly, recreational activity was the most important ecosystem service for tourism businesses. This high reliance suggests potentially concentrated pressures on coastal systems such as beaches and coral reefs by the tourism businesses.

In my evaluation of their efforts to protect these ecosystems, many participants stated that their businesses were undertaking conservation measures for the protection and restoration of beaches (n=7) and coral reefs (n=4). Beach clean-up campaigns were the most common conservation strategy incorporated by businesses (n=4). Businesses also suggested innovative strategies such as offering the invasive lionfish for in their restaurants to aid fishery protection, constructing coral nurseries, restoring mangroves, and planting seagrass plants along the coast to prevent erosion. Potentially unsustainable engineering measures that may result in maladaptation such as the construction of a break wall (n=1) and dredging (n=1) were suggested by two businesses as part of their conservation strategies. None of these businesses reported receiving any financial incentives from the government for protecting the coastal ecosystems they market.
Financial capital was measured through insurance mechanisms and access to credit. The majority of the businesses (n=9) were insured against climate-induced risks. Most of these insurances plans primarily covered damages against natural disasters, specifically hurricanes. These included damages due to flooding, wind, and other structural damages induced by extreme weather events.

Interviewees were asked about the likelihood of their business to receive credit through formal and informal institutions in case of a climate-related event. Most interviewees (n=7) placed high likelihood - from extremely (n=5) to very likely (n=2) - for their business to access credit through formal institutions such as banks in case of an extreme event. On the other hand, most of them (n=7) ranked the likelihood to access informal sources of credit as moderate.

3.5. Discussion and Recommendations

The first step in this study was to gauge the current levels of participation in the tourism sector toward selected aspects of five of the 17 UN SDGs. The accommodation sector reflected high participation through employing the local Bahamians, and thus, contributing to creating decent work opportunities in the country (SDG 8). Thomas (2012) found 92% of the small hoteliers in the NP and PI islands did not participate in any environmental practices or planned to improve their environmental impacts while large hoteliers had some voluntary practices such as energy-efficient retrofitting. Thus, my findings show a general improvement in the sustainability initiatives of the accommodations sector. This is due to the growing concern over many environmental issues in the Bahamas. For example, Queen Conch, seafood staple in the Bahamas, is facing depletion due to overfishing and there have been well-designed public education campaigns. Research on Andros Island suggested that people involved in the tourism sector were more likely to support fisheries protection measures (Hayes et al., 2015) which
aligns with my findings of the businesses’ high level of participation for purchasing seasonal produce (Table 3.3). However, the businesses indicated relatively lower participation in reducing their water consumption or recycling their waste, challenges for most SIDS. The Bahamas is completely dependent on groundwater resources and a recent study found an overall increase in seawater intrusion over the last decade in 43 SIDS including the Bahamas (Allen, Klassen, Van Pelt, Gurdak, & Taniguchi, 2014). Similarly, recycling remains another sustainability challenge in tourism as well as the entire Bahamas. Some of the most common challenges of recycling in the tourist resorts are the associated short-term costs, labor costs, re-training the employees to change old habits and adopt new technologies (Sealey & Smith, 2014).

In contrast to measures for sustainable development, my findings suggest a relatively low level of support for practices that are specifically related to climate change adaptation, SDG 14. Insufficient adaptation to climate change hampers the tourism sector’s objective to achieve sustainability (Scott, Hall, & Gössling, 2015). Two out of the four most frequently stated adaptation measures – emergency evacuation training and evacuation plans (Table 3.4) are aimed to address hurricanes and disaster preparedness, indicate the short-term, extreme event focus of many adaptation measures. The tourism sector in many other SIDS such as Fiji and Samoa have invested in similar disaster preparedness strategies due to their inherent geographic vulnerabilities (Becken et al., 2014). Likewise, in the Bahamas, these measures are deemed necessary in the face of damages caused by the recent hurricanes Matthew and Dorian. My findings also correspond with other studies that suggested experienced environmental threats such as hurricanes encourage pro-environmental attitudes and practices (Chen et al., 2013; Hayes et al., 2015). As revealed by my findings and other literature, there can be a public lack of association between extreme events and climate change which calls for risk communication.
campaigns that frame such events within climate change to drive adaptation (Madsen et al., 2019; van der Linden, 2014).

Using a capitals approach, my study developed specific indicators most relevant to the tourism sector in the Bahamas for long-term climate change. My findings highlight the capital resources that enhance or diminish the capacity of these accommodations to adapt to future climate change. While my study is focused on climate change, the five measured capitals are useful in determining the resilience of the Bahamas’ tourism to other shocks. A current example is the COVID-19 pandemic that calls attention to the importance of healthcare, adequate planning, diversified markets, and collective social action to a country’s resilience in light of a global shock. Similarly, the indicators chosen in my study are useful in gauging the capacity and resilience for the future events of climate change.

Some actors in accommodations tourism in the Bahamas demonstrated high adaptive capacity in terms of social networks and participation. This social capital was manifested through the presence of social networks and regular participation of employees (social actors) in some hotels, an important factor to deal with climate impacts through collective action on small islands (Petzold & Ratter, 2015). Such social networks are also recognized as highly important for tourism destinations in SIDS (Van Der Veeken et al., 2016) and social interactions through participation can contribute toward the adaptive capacity and resilience of many island communities (Barnett & Waters, 2016; Warrick et al., 2017).

Other factors that contribute toward the adaptive capacity of the accommodation sector are the provision of healthcare to its employees and its ability to access formal credit and insurance mechanisms in case of climate-related events. The Bahamas is a mature tourism destination in the Caribbean that explains its financial capital and ability to provide basic
provisions to its employees, especially, the medium to large-sized coastal accommodations. Ease in accessing formal credit is valuable to a business’s survival and resilience in the event of a climate event (Biggs et al., 2012). It is worth noting that the wages in the country have grown at a rate of 1.9% per year from 2000-2016 reflecting a marginal gain for employees in the sector (Hendrickson & Skerrette, 2020). This growth in salaries does not match up to the scale of tourism growth in the country. There is an evident difference between the financial capacity of the businesses and their employees, and this suggests a possible explanation for my findings of moderate level expectations for the capacity of employees themselves to access credits from informal sources.

Tourism on the NP-PI islands demonstrated limited human and cultural capacity in terms of access to information and employing staff competent in climate change issues, which can be justified by the way climate change is perceived in general. The employees mostly rely on external sources of communication for any climate-related information and only a few accommodations invested in employing staff trained in environmental management. Half of the interviewees from the coastal accommodations stated that their business has not been affected by climate change despite observing erosion, coral bleaching, and storm surges. The literature has often shown that tourism businesses do not necessarily relate ongoing environmental changes to anthropogenic climate change (Becken, 2005; Chin, Day, Sydnor, Prokopy, & Cherkauer, 2019; Saarinen, Hambira, Atlhopheng, & Manwa, 2012; Su, Hall, & Ozanne, 2013) which is often considered a distant risk (van der Linden, 2014). In the NP-PI islands, 8% of the hoteliers located on the coast and facing erosion in 2012 did not see any implications from climate change for their business and many small hotel businesses were completely unaware of climate change (Thomas, 2012). In the case of this study, the majority of such responses included
accommodations on Paradise Island that are also situated less than 50 m from the coast. Nevertheless, my findings still convey a generally increased awareness in the perceived impacts of climate change. While the tourism sector on the two islands demonstrated a higher awareness as compared to Thomas (2012) regarding their understanding of climate change, low levels of risk perception are a significant hindrance among the broader SIDS (Betzold, 2015), Bahamian people (Thomas & Benjamin, 2018), and among many in the tourism sector.

Barriers to institutional capital are not uncommon in SIDS (Betzold, 2015). In the Kingdom of Tonga, Van Der Veeken et al. (2016) found that limited cooperation and coordination between different tourism stakeholders contributed to the country’s vulnerability and limited adaptive capacity. Similarly, I found little coordination among the private accommodation sector with the regional or national governing bodies responsible for climate change. At the regional level, for example, the Caribbean Climate Online Risk and Adaptation Tool – CCORAL - is an online tool available to stakeholders within CARICOM countries such as the Bahamas for climate-resilient decision-making. The tool helps to identify actions to combat climate-related losses and build climate-resilient developments for the private sector (CCORAL, 2014). However, none of the establishments seemed to be aware of such tools or suggested they would incorporate them into their planning. At the national level, the government of the Bahamas introduced the National Climate Change Committee in 2010 and none of the interviewees stated that their accommodation had representation on the committee. The involvement of the tourism sector is primarily indirect through sustainability initiatives with limited government guidance on climate change. Within their businesses, the plans are limited for disaster preparedness and hurricane management, with few long-term strategies in place for climate change. Bahadur et al. (2013) stressed the importance of climate adaptation interventions
as an important component of preparedness for climate change uncertainties. However, these uncertainties in climate change projections also hamper planning for this sector. Additionally, the short-term profit focus of tourism differs from the timeframes of climate change (Chin et al., 2019), making consequential planning seem unnecessary for their businesses.

Based on my findings, I provide the following main recommendations for the accommodation sector in the Bahamas to improve their adaptive capacity, build resilience to deal with climate change, and better achieve the goals of sustainable development. The initial steps should be taken in the direction of raising awareness and building a consensus on climate change among tourism sector leaders which should be followed by a specific focus on adaptation that is synergistic with the SDGs of the country.

**Education:** Even when the interviewees demonstrated high awareness of climate change, climate change knowledge within the sector remains one of the major barriers to adaptation. The school of Hospitality and Tourism Studies at the University of the Bahamas is the principal source of providing education, training, and internships through on-job experience for preparing future employees in the sector. In addition, the government offers a certified course called BahamaHost for training and skill development of the professionals and organizations in the tourism sector. While these programs include a component of sustainable tourism, a clear component of current and future climate changes is recommended for such programs. An understanding of how climate change may or may not affect their businesses is the first step in facilitating any adaptation planning.

**Risk communication:** Encouraging education may not lead to action unless it is placed into the context of local climate vulnerabilities. I agree with Thomas and Benjamin (2018) that risk communication should focus on specific impacts of climate change relevant to the Bahamians.
which is equally applicable within the tourism sector of the country. There is a need to better emphasize the linkages between impacts such as storm surge, sea level rise, and coral bleaching to the economic resilience of the accommodations sector. While not discussed here, supporting work for this study conducted geospatial mapping and found that a large proportion of the total tourism infrastructure (hotels and resorts) on the islands of NP-PI are currently situated in Cat 3 (69%) and Cat 5 (83%) storm surge zones. With the literature suggesting a potential increases in the frequency of severe Cat 4 and 5 storms like Matthew and Dorian in the 21st century (Bender et al., 2010; Walsh et al., 2016), it is important to put such events in the context of sea level rise which will enhance the damage potential of such events. Risk communication can be emphasized following a local extreme event (Madsen et al., 2019) and is essential in bringing the focus of the sector toward long-term adaptation for other climate-induced impacts.

**Toward sustainable adaptation:** The findings also support the need for sustainable adaptation in tourism reliant SIDS. This can be achieved through the following approaches:

*Ecosystem-based adaptation:* EbA aligns more closely with the adaptation and sustainable development objectives (Munang et al., 2013) and thus needs to be better integrated within the tourism sector. While many businesses agreed that they had undertaken strategies for conserving natural capital, these were mostly limited to beach clean-ups and other more involved adaptation options were largely absent. Therefore, I propose two important mechanisms for facilitating EbA among the tourism businesses in the country - product diversification and financial incentives.

In a study conducted with 57 tourism operators in the Caribbean, 84% placed high importance on diversifying their tourism products to reduce the risk of overdependence on a few markets (Hendrickson & Skerrette, 2020). The scope of diversification ranges from diversifying the tourism product (eco-tourism and nature-based tourism) to market diversification from
tourism. The Bahamas has now incorporated sports tourism, culture and heritage tourism, and eco-tourism (Hendrickson & Skerrette, 2020) to diversify from the traditional sun and sand tourism offered in the country. For example, fly fishing tourism, as part of eco-tourism in the country, can benefit from the protection of mangrove systems, an important habitat for many species, thereby protecting a system that plays a vital role in ecosystem-based adaptation to climate change. While my findings revealed little will among businesses to offer indoor activities in contrast to the beach and reef-based activities and diversify their tourism product, I propose that encouraging such practices can remove pressure from vital coastal resources and even enable their protection. Market diversification for SIDS to move from a single economic source of tourism to other sectors such as agriculture and fishing is another viable option discussed in the literature (Mycoo, 2018), however, it remains outside the scope of my sector-focused recommendations.

Financial incentives from the government in the form of incentives and tax breaks to co-manage beaches and coral reefs can also enhance the protection of such resources. Currently, no such incentives are available for the tourist sector in my study area. Such a public-private partnership can be fruitful to encourage mutual coastal conservation benefits and were favored as an adaptation strategy by many tourism stakeholders in some SIDS (Hess & Kelman, 2017).

Green jobs: The central responsibilities for green jobs are “reducing consumption of energy; limiting greenhouse gas emissions; minimizing waste and pollution; protecting and restoring ecosystems; fair work practices; and improvements to the welfare of nations (Esposto, 2016, p.7).” Such jobs are increasingly becoming popular in other sectors such as building and government sectors, however, their potential remains largely untapped in the tourism sector in my findings. I propose incorporating such job roles in Bahamian accommodations tourism to
enhance the human capital, knowledge, and adaptive capacity of businesses for climate change. These jobs also align with the focus on sustainable development and open further avenues for employment opportunities, particularly those staff competent in environmental and green business issues.

3.6. Conclusion

The objective of this study was to identify tourism’s contribution to sustainable development and climate change adaptation in the Bahamas through a resilience approach. My findings confirmed the tourism accommodation sector’s ability to contribute toward some of the UN SDGs, particularly SDGs 1, 8, and 12. In the absence of such benchmark data in SIDS (UNWTO, 2017), these findings are highly relevant in providing a snapshot of the accommodation sector’s contribution to SDGs. However, my findings only provide a basic idea of tourism’s contribution to SDGs, and further in-depth research exploring the sector’s detailed contribution to each indicator of the 17 SDGs is required. When it comes to climate action, SDG 14, there remain significant shortcomings. The most commonly identified adaptation measures were limited to disaster planning for hurricanes, and longer-term climatic changes (e.g., sea level rise) were not a high priority. These findings came to light when the businesses revealed limited knowledge and human capital for climate-related matters. Moreover, a disconnect between the perceived impacts on their businesses also hampered their adaptation planning. Most businesses did not have any formal climate adaptation plans or representation on any regional or national climate change bodies. Despite the barriers, the businesses demonstrated the potential capacity to adapt due to developed social networks and the financial strength of their enterprises. Many businesses also adopted some strategies to conserve coastal ecosystems necessary for their businesses. I suggest a need to expand on such measures to promote ecosystem-based adaptation,
in addition to enhancing education and risk communication among the tourism sector in the country.

I have attempted to refrain from generalizing my findings as resilience, adaptation, and progress toward sustainable development are very context specific. Furthermore, there are no simplistic solutions to issues as complex as coastal climate change adaptation and resilience. The small sample size of this study further prevents generalizations. However, there are at least several contributions from this work that can be considered in future studies. Firstly, my work contributes to the empirical investigation of some aspects of accommodations sector resilience with the challenges of climate change and sustainable development in a SIDS setting. The indicators for evaluating climate adaptation and SDGs can be tailored for specific case studies. Nonetheless, including them in future studies for resilience is fundamental to all SIDS relying on single economies, coping with changing climate while moving toward their SDGs. Secondly, the capitals approach for adaptive capacity used in this paper provides a flexible methodology to incorporate a wide range of site-specific determinants and can be extended to other SIDS facing multiple challenges to their capacity to adapt. Thirdly, most of my findings reinforce much literature on SIDS tourism which recommends immediate, proactive long-term climate adaptation plans and strategies for such coastal tourism locales. My findings suggest policy gaps in the mainstreaming of climate adaptation within sustainable development for accommodations tourism, which is very likely applicable to many other tourism sectors in various SIDS and remains one of their biggest challenge for resilience.

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https://doi.org/10.1016/j.ijdrr.2018.09.014


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CHAPTER FOUR:
CLIMATE CHANGE POLICIES IN PRACTICE FOR BAHAMAS TOURISM PLANNING: A SMALL ISLAND DEVELOPING STATE PERSPECTIVE

Abstract

Tourism, a key economic sector for Small Island Developing States, is extremely vulnerable to climate change. It has been becoming increasingly evident that proper planning is essential for the sector to manage future impacts of climate change. Considering the need for strong climate policy interventions in the tourism sector, this study aims to examine the climate policies relevant to the tourism sector in a SIDS, the Bahamas, with an emphasis on climate adaptation.

Facing similar climate vulnerabilities as many other SIDS, the Bahamas was chosen because it is a mature tourism destination that provides an avenue for existing policy innovations. In-depth, semi-structured interviews were conducted with eight policy actors from the government, tourism associations, and NGOs in the country. The findings revealed that the policy actors have a good knowledge of climate change. However, planning for tourism and climate change is fragmented, with most climate policies formulated with the scope of mitigation such as greenhouse gas reduction strategies. The policy implementation faces many gaps common to SIDS such as funding and human capacity. At present, the future tourism planning targets sustainable and eco-tourism markets. Based on my findings, I provide recommendations such as leveraging public officials’ knowledge of climate change, steering locally relevant adaptation measures, and directing immediate attention toward projects in the pipeline to ensure timely
planning. The study adds to the current knowledge of climate policy context in the Bahamas with implications for other SIDS.

**Keywords:** climate change, adaptation, policies, Bahamas

**Publication:** The abstract for this article has been submitted to be considered as a potential chapter in the upcoming book called *Tourism, Natural Disasters and Pandemics: An Examination of Resilience in Caribbean Small Island States.*

### 4.1. Introduction

Climate change is a pressing concern for many Small Island Developing States (SIDS) that rely heavily on tourism for revenue. With SIDS tourism being mostly located along coastal areas, this sector is vulnerable to direct climate change that causes rising sea levels, more intense tropical storms, and increasing ocean temperatures. These environmental changes can lead to infrastructure damage, loss of vital ecosystems (beaches and coral reefs), and other indirect impacts induced by broader societal change due to climate change (Scott & Verkoeyen, 2017). 

Even with this heightened vulnerability, the sector continues to grow. For example, many tourism-reliant SIDS in the Caribbean although recovering from the 2017 hurricane season, showed a tourism growth rate of 3.5% in 2019 compared to 2.5% in the global economy (WTTC, 2020). SIDS such as the Bahamas, Maldives, Aruba, Virgin Islands, Antigua, and Barbuda are ranked in the top 10 of 185 countries whose relative contribution to GDP and employment come from the tourism sector (WTTC, 2020). Consequently, the importance of tourism in these countries and potential shocks from climate change cannot be ignored.

The World Travel and Tourism Council (WTTC) highlights the need for proper planning i.e. planning for managing additional external shocks to tourism such as the current COVID-19 pandemic while ensuring sustainability of the sector (WTTC, 2020). Such action would allow the
sector to play an important role in the recovery of the Caribbean economy from impacts of the pandemic. Given the significance of the tourism sector to SIDS, it is surprising there are only a handful of studies that discuss climate change planning in the tourism sector for SIDS. Klint et al. (2012) found that climate change is not a priority in the tourism planning for the government in Vanuatu. Similarly, Shakeela and Becken (2015) found no specific policies for climate adaptation and mitigation in the Maldives tourism development, and certain government policies negatively influenced risk perception and induced maladaptation.

The first International Conference on Climate Change and Tourism, held by the World Tourism Organization in 2003, was pivotal in bringing climate policy into tourism (Kaján & Saarinen, 2013). However, a focus on climate policy interventions in tourism is still limited (Scott, Hall, & Gössling, 2016). Using the analytical framework of policy cycle, I seek to examine the climate policies relevant to the tourism sector in a SIDS, the Bahamas, with a particular focus of climate adaptation. I also aim to understand the planning for future tourism and climate change in the country. Two main research questions are posed:

1. How do key actors involved in tourism and climate change planning in the Bahamas engage in different stages of the policy cycle? In particular, I a) examine the perception of climate change among policy actors, b) evaluate the existing climate policy environment for the tourism sector and gaps in implementation, and c) identify barriers that inhibit implementation.

2. How do the key actors plan for future of the tourism sector in the face of severe impacts of climate change?
4.1.1. Background: Climate Adaptation in SIDS

Mitigation and adaptation are part of policy responses to climate change. While some literature separate adaptation and mitigation policy choices (Weaver, 2011), the recent IPCC’s report on small islands considered them to be complementary components of a climate change response (Nurse et al., 2014). Mitigation includes strategies to reduce greenhouse gas emissions by improving energy efficiency, increasing the use of renewable energy and other carbon offsetting strategies in the tourism sector (Simpson, Gössling, Scott, Hall, & Gladin, 2008). In this regard, mitigation focuses on lessening the climate impacts caused by the tourism sector in SIDS. While SIDS such as the Maldives are aiming for carbon neutrality, these efforts are challenging due to their heavy reliance on tourism and the carbon-intensive nature of the sector (Grydehøj & Kelman, 2017; Thomas, Baptiste, Martyr-Koller, Pringle, & Rhiney, 2020). Use of renewable energy is a suitable mitigation strategy. However, research on climate mitigation in Barbados suggested a lack of national energy policy and regulatory framework are barriers to the adoption of renewable energy (Wyllie, Essah, & Ofetotse, 2018).

Adaptation is defined as the actions undertaken to adjust to present or anticipated problems such as climate change (Simpson et al., 2008). The research on climate adaptation by tourism stakeholders has evolved into six key themes – business adaptation, consumer adaptation, destination adaptation, adaptation policy, frameworks for adaptation, and sustainable adaptation (Njoroge, 2015). However, academic publications on climate policy related to adaptation in tourism remain limited (Njoroge, 2015).

Since the Kaján and Saarinen (2013) study, research on climate adaptation in SIDS has been growing (Betzold, 2015; Mycoo & Donovan, 2017; Robinson, 2017), however, not regarding government institutional policies and programs (Klöck & Nunn, 2019). Academic
research on adaptation policy specific to the tourism sector is even more limited. Two exceptions are Klint et al. (2012) and Mycoo (2014) who analyzed existing policies for adaptation in the tourism sector of Vanuatu and Barbados respectively. Klint et al., (2012, p. 250) underscored that “understanding the tourism sector’s ability to adapt to climate change requires an understanding of policies.” Similarly, Mycoo (2014) concluded that climate adaptation policies should be a vital component of national sustainable development policy in SIDS. Other SIDS like Tobago and Jamaica have agencies developing climate adaptation and tourism policy frameworks (Spencer, 2019). Exploring the current policy context in detail is an important step toward such policy formulation and revision.

Strategic planning in the tourism is a policy or planning tool that helps a tourism entity to achieve its future goals (Edgell, Allen, Smith, & Swanson, 2008). Despite the vulnerability and potential future impacts on tourism in SIDS, there is little evidence of strategic tourism planning to deal with future climate change. Some of the common barriers to adaptation efforts in SIDS are lack of resources, limited awareness, and perception of climate change among local and national decision-makers (Betzold, 2015). Institutional barriers such as limited data, technical capacity, and human resources also hinder the implementation of climate change planning in SIDS (Robinson, 2017). Difficulties with implementing adaptation also arise due to the long time-horizon of climate change that does not align with the short planning horizon of political leaders (Klöck & Nunn, 2019).

4.2. Policy Cycle Framework

The policy cycle framework consists of four conceptual phases/stages of planning processes including agenda setting, policy formulation, policy implementation and evaluation (Clar, Prutsch, & Steurer, 2013; Jann & Wegrich, 2007). This is a useful approach to guide
policy analysis and shape a general understanding of the policy process (Jann & Wegrich, 2007). Clar et al. (2013) used the framework for organizing and sorting the existing barriers in adaptation policy-making at different stages of the policy cycle. While the framework has been criticized for its simplified, sequential and discreet stages that do not always align with the real-world policy-making conditions (Jann & Wegrich, 2007; Weible, 2014), it is still widely considered a heuristic framework for understanding the policy process. As such, I feel it provides a suitable analytical framework for my study.

The four phases of the policy cycle are described below:

**Agenda setting:** It is the phase where a problem enters the political domain through getting the attention of public authorities and recognized as needing a policy response on their part (Jann & Wegrich, 2007).

**Policy formulation:** At this phase, the problem is transformed to government programs where the policy actors consider different policy options and recommend actions (Jann & Wegrich, 2007).

**Policy implementation:** This involves execution or enforcement of a policy by the responsible institutions and organizations (Jann & Wegrich, 2007).

**Evaluation:** This feedback phase assesses the intended outcomes of a particular policy (Jann & Wegrich, 2007).

Public officials play an important role in the policy process through setting the agenda, formulating a policy, garnering public and political attention to specific issues, evaluating policy options, and engaging stakeholders (Vogel & Henstra, 2015). With respect to tourism, besides public officials, other key policy actors include tourism industry associations and non-governmental organizations (NGOs) (Hall & Jenkins, 2004; Klint et al., 2012). These actors in
the tourism sector also play an important role in climate risk perception and communication to the local and international audience (Shakeela & Becken, 2015). These actors come together to form “policy communities” for sector-specific issues such as tourism and exert great influence on the policy cycle (Wu, Ramesh, Howlett, & Fritzen, 2017).

4.3. Methods

Based on the exploratory nature of this study, I undertake a qualitative approach to evaluate the policy context of the climate adaptation and tourism sector in the Bahamas. The Bahamas is selected because it is a mature tourism destination in the Caribbean that, nonetheless, faces similar vulnerabilities to climate change as other SIDS. Consequently, it provides a venue for investigating the existing policy environment on this issue.

Primary data was collected through semi-structured in-depth interviews with eight policy actors from the government, tourism associations, and NGOs. The actors included representatives from government agencies such as the Bahamas’ Ministry of Tourism, BEST commission, and Ministry of Environment; the Bahamas Tourism Cooperation (BTC); and NGOs such as The Nature Conservancy and the Bahamas National Trust. These individuals were selected via purposeful sampling that allowed the selection of information-rich participants combined with snowball sampling to identify other well-suited participants for my study (Patton, 2002). An initial list of actors was identified using local experts and secondary sources such as contributors to the key planning documents. Overall, the selected key actors were leading climate change and tourism planning in their respective organizations. Their selection also represented a diversity of organizations with direct or indirect strategic roles in the policy-making process for tourism and climate change. Table 4.1 provides a detailed description of their organizations.
The interviews were structured to shed light on the different stages of policy cycle and covered the following thematic areas: an overview of their organization’s work, existing policies, and actions for climate change relating to tourism, support and barriers to adaptation. Further probing questions were used to obtain clarification and additional information on some areas. Informants were also asked questions on their understanding and personal beliefs of climate change and the future of tourism industry in the face of climate change in the country. With their consent, all interviews were conducted in-person by the primary author at the key informant’s workplace and audio-recorded. The average duration for the interviews was 45 minutes lasting from 22 minutes up to 1 hour and 25 minutes.

Table 4.1. Description of key informant’s organizations.

<table>
<thead>
<tr>
<th>Organization (key actors interviewed)</th>
<th>Objectives of the organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahamas National Trust (BNT 1)</td>
<td>• Develop policies for national parks</td>
</tr>
<tr>
<td></td>
<td>• Species and habitat conservation activities</td>
</tr>
<tr>
<td></td>
<td>• Advisory board for the national government</td>
</tr>
<tr>
<td></td>
<td>• Disseminate scientific information to the public</td>
</tr>
<tr>
<td>Bahamas Tourism Cooperation (BTC 1)</td>
<td>• Forge tourism linkages across different sectors of the economy</td>
</tr>
<tr>
<td></td>
<td>• Bring local fisheries and farmers to the tourism value chain</td>
</tr>
<tr>
<td>Ministry of Environment (MOE 1)</td>
<td>• Ensure protection and conservation of the environment for the residents and visitors</td>
</tr>
<tr>
<td>Ministry of Tourism (MOT 1, MOT 2, MOT 3)</td>
<td>• Assess the development of country through tourism development</td>
</tr>
<tr>
<td></td>
<td>• Foreign exchange earnings through importing goods and services</td>
</tr>
<tr>
<td></td>
<td>• Job creation</td>
</tr>
<tr>
<td>The Nature Conservancy (TNC 1)</td>
<td>• Protection of lands and waters that Bahamians depend on</td>
</tr>
<tr>
<td>BEST Commission (BEST 1)</td>
<td>• Focal point for the major UN multilateral environmental treaties, conventions and agreements</td>
</tr>
<tr>
<td></td>
<td>• Provide advisory services to the government through reviewing Environmental Impact Assessments</td>
</tr>
</tbody>
</table>
Interviews were transcribed using Otter.ai and organized to create thematic nodes in NVivo 10. Research objectives were used to identify the themes and further themes also emerged from the interview data. Secondary sources of data such as planning documents were used for examining the current policies and further helped in data triangulation, thereby, adding to the reliability of the findings.

4.4. Results

4.4.1. Overview of Tourism and Climate Change Policies in the Bahamas

The Bahamas was the first country in the Caribbean to develop a sustainable tourism guideline in 1994. The Ministry of Tourism created “A Sustainable Tourism Policy, Guidelines and Implementation Strategy for the Out Islands of the Bahamas” that focused on green marketing, monitoring environmental impacts, waste management, and environmental training and education in the sector. In 1996, the Bahamas set up a technical committee called National Climate Change Committee to increase public awareness on climate change (The Commonwealth of the Bahamas, 2001). The nation submitted its first National Communications on Climate Change mandated by the United Nations Framework Convention on Climate Change (UNFCCC) in 2001 where tourism was identified as a valuable but vulnerable sector in terms of climate change. Section 3 of this report highlighted the need to move toward adaptation and underscored the importance of planned adaptation to avoid losing competitiveness in the tourism sector. The report emphasized the development of eco-tourism programs on the family islands based on smaller and less dense tourism. In 2005, National Policy for the Adaptation to Climate Change was developed by the NCCC and the Bahamas Environment, Science & Technology (BEST) Commission that provided directives such as the development of strategic plans and physical planning guidelines in the tourism sector for climate change impacts. The policy
required regular review and monitoring by the National Climate Change Committee to determine its progress toward the set goals and objectives. A recent State of the Nation Report prepared as a basis for the National Development Plan in the Bahamas concluded that little systematic and comprehensive adaptation has been undertaken in the country and several directives from the National Policy for the Adaptation to Climate Change such as coastal setbacks are neither implemented nor enforced (NDP Secretariat, 2016; Thomas & Benjamin, 2018).

The Bahamas also produced several other key planning documents related to tourism and climate change planning (Table 4.2).

Table 4.2. Key planning documents related to tourism and climate change in the Bahamas.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Document</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministry of Tourism</td>
<td>A Sustainable Tourism Policy, Guidelines and Implementation Strategy for the Out Islands of the Bahamas</td>
<td>1994</td>
</tr>
<tr>
<td>The BEST Commission</td>
<td>First National Communication on Climate Change</td>
<td>2001</td>
</tr>
<tr>
<td>BEST Commission</td>
<td>National Environmental Management Action Plan for The Bahamas</td>
<td>2005</td>
</tr>
<tr>
<td>The National Climate Change Committee &amp; The BEST Commission</td>
<td>National Policy for the Adaptation to Climate Change</td>
<td>2005</td>
</tr>
<tr>
<td>The Government of the Bahamas</td>
<td>The Second National Communication on Climate Change</td>
<td>2014</td>
</tr>
<tr>
<td>National Development Plan Steering Committee</td>
<td>National Development Plan (2nd Working Draft)</td>
<td>2017</td>
</tr>
<tr>
<td>Inter-American Development Bank</td>
<td>Sustainable Development Master Plan for the Andros Island</td>
<td>2017</td>
</tr>
</tbody>
</table>
Some of these documents are either outdated, for example, Bahamas Building Code, not implemented, such as the National Policy for the Adaptation to Climate Change, or still in the development phase, such as the National Development Plan. Furthermore, as mentioned in the National Development Plan (2016), the National Climate Change Committee created in 1996 needs to be re-established. Without regular review and monitoring, and a lack of technical committee, enforcement of these plans is a challenge to the Bahamas.

4.4.2. Agenda Setting

**Perception of climate change and its impacts:** Climate change is a key policy issue for the actors in policy community. Most agree that they have observed or experienced climate change effects in the Bahamas. One of the actors was hesitant about a stance on climate change, but nevertheless wanted their organization to be prepared for the uncertainty of future events. Interviewees considered hurricanes as the most significant manifestation of climate change and reported changes in the frequency and intensity of the recent hurricanes. During the interviews, other concerns of climate change were changes in weather patterns, particularly increasing surface, and water temperatures. Anecdotal evidence of increasing temperature and shifting seasons over the years in the country is a common theme of the interviews. Another cause of concern in the interviews is sea level rise due to the low elevation, flatness, and narrowness of the major touristic islands in the country. Table 4.3 provides a range of climate-induced impacts that emerged from the interviews. It is evident that most policy actors in my study are aware of the Bahamas’ vulnerability to climate change.
Table 4.3. Various climate change impacts identified during the interviews.

<table>
<thead>
<tr>
<th>Climate Change Impact</th>
<th>Frequency</th>
<th>Key informant’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurricanes</td>
<td>8</td>
<td>“we’ve seen an increased frequency and the closeness of hurricanes or the number of hurricanes”</td>
</tr>
<tr>
<td>Increase in frequency</td>
<td>3</td>
<td>“a lot of the hurricanes are now going off to category four, category five...it’s very intense”</td>
</tr>
<tr>
<td>Increase in intensity</td>
<td>4</td>
<td>“most of the impact on the infrastructure has been sea surge”</td>
</tr>
<tr>
<td>Storm surge</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Temperature increase</td>
<td>6</td>
<td>“it's ghastly hot everywhere” “we would not venture to go on the beach in December around Christmas time, now, people come home for vacation so they can go on the beach in December”</td>
</tr>
<tr>
<td>Sea level rise</td>
<td>4</td>
<td>“sea level rise is going to be our greatest threat” “over the past 30 years, we have seen the sea levels rise from what we knew them to be”</td>
</tr>
<tr>
<td>Coral bleaching and ocean acidification</td>
<td>2</td>
<td>“coral die of as a result of bleaching events and ocean acidification, for our marine environment, that’s really significant”</td>
</tr>
<tr>
<td>Flash flooding</td>
<td>2</td>
<td>“you have a flash storm and areas that never used to flood are flooding”</td>
</tr>
<tr>
<td>Saltwater intrusion</td>
<td>1</td>
<td>“we can see the issue of crops being affected over the level of freshwater resources being there saltwater intrusion into the line”</td>
</tr>
</tbody>
</table>

Political support and awareness for climate adaptation: The actors were asked to assess the level of political support for, and awareness of climate adaptation in the country. In terms of political support, the response ranges from as low as 1 (n=1) to as high as 5 (n=3). Three interviewees place their responses between 2-3 and one KI declining to answer the question. The policy actors that were convinced to have higher political support states that funding still hampers their planning toward climate change. In response to a close-ended question on awareness, seven out of the eight interviewees rank awareness between 2 to 3 on a scale of 1 to 5 (5 being the highest). One interviewee ranks awareness as high as 4 arguing that most political
leaders are very aware of the climate situation from the data continually provided to them by the technical public officials. Two of them believe that climate awareness differs between individuals with some being more aware and having more genuine interest in planning than others.

4.4.3. Policy Formulation

**Climate change policies:** At the policy formulation stage, policy choices for addressing problems from the agenda setting phase are generated. The Bahamas government has several key policies and planning documents such as the National Policy for Adaptation to Climate Change, National Environmental Management Action Plan, and most recently, the National Development Plan of Action that guides their climate and tourism planning. These documents highlight climate change with respect to tourism in their sector-specific segments. One of the actors from the Ministry of Tourism states that “we have this sustainable tourism policy guideline, which we need to update...it deals with aspect of climate change.” Common in all the interview responses is the fact that there is no explicit policy for tourism and climate change. One of the interviewees feels that a policy on climate change and environmental protection would be enacted by the end of 2019 by cabinet. However, climate change as it specifically relates to tourism is not explicit in this document. Rather, tourism planning focuses more on sustainable tourism planning with elements of climate change. Nonetheless, climate change is considered in the strategic planning of organizations and policy actors more broadly and to varying extent. Some key themes that emerge during the interviews are discussed below.

**Mitigation versus adaptation:** When asked about planning specific to the tourism sector, the policy actors provide examples of climate-related strategies and policy choices undergoing development in their respective organizations. These include measures such as raising the
roadways and board walks, creating coral nurseries, and removing invasive species for supporting the mangroves. The Ministry of Environment focuses on mitigation strategies such as auditing energy consumption of small hotels and working with large hotels to improve their energy and water efficiency (MOE 1). One actor states that the tourism sector is the largest consumer of water, energy, and other resources in the Bahamas. Although the large hotels generate their own power rather than pull from the national grid, the subsidized fuel that is imported is still a huge cost for the Bahamian national economy (BEST 1). When further prompted on adaptation related planning, the actors’ responses focus on working with the tourism stakeholders to educate them on beach erosion (MOT 2) and include them in consultation workshops (TNC 1).

Inclusive planning: Consultations with other members of the policy community provides an opportunity to overcome technical challenges, and allow them to understand the depth, breadth, and urgency of the problem (Wu et al., 2017). It is evident from the interviews that all planning related to the tourism sector involves the relevant stakeholders, particularly from the accommodation and cruise tourism subsector. Through stakeholder consultations, tourism advisory boards, and formal discussions, the stakeholders from private tourism sector are involved early in the climate-related decision-making through workshops. One of the organizations (TNC 1) is looking into further tapping the financial capacity of the tourism sector for sustainable financing to protect marine protected areas. The organization is also proposing levy taxes on cruise ships in the Bahamas for supporting climate adaptation funding. One actor recognizes that many climate projects are private sector driven and the input, resources, and financing from the sector is vital to the organizations’ projects and plans (MOE 1). When asked if they faced any resistance from the tourism sector in their strategic actions toward climate
change, all interviewees unanimously dismiss this suggestion. One of the policy actors ties it back to the importance of including and educating the stakeholders:

Sometimes when businesses and communities, when they don’t understand what’s going on, they tend to be against it. (MOT 2)

However, given that the tourism sector reaps the largest economic benefits through adaptation and mitigation policies in the Bahamas, the sector is usually on board with various organizations’ efforts. As quoted,

I think the private tourism sector is more sensitive to the issues because, for them, it’s not political. It’s not personal. It’s dollars and cents what make sense to them. (BEST 1)

4.4.4. Policy Implementation

Implementation gaps: Despite the examples provided during the interviews, a common thread among the interviews is that many plans and projects are still in the development phase such as the Integrated Coastal Management Framework. Another project called the Ccoral project, in which the Ministry of Tourism participated was completed but was not implemented at the time of this interview. Enforcement after implementation is another challenge which is highlighted in this quote,

...the biggest problem working in tourism and going to meetings in the Caribbean is not a lack of policies, its lack of enforcement of legislation. Nothing is enforced, I mean, minimum one says, in act. (MOT 3)

Factors that inhibit implementation: Implementation of climate change and tourism policies were limited due to the current funding and human capacity in the Bahamas. The fragmented nature of the current planning also inhibited implementation.
Funding: Many plans are contingent to funding which is a major concern to most actors (n=6) in hampering implementation. All of the organizations represented by the interviewees require international financing from donor agencies to put their climate plans into action. One example is the Green Climate Fund (GCF), discussed by the Ministries of Tourism and Environment, to help with adaptation planning. However, the GCF is dependent on contributions from the developed countries and faces problem of insufficient financing which is further exacerbated by the United States’ decision to withdraw from it (Cui & Huang, 2018). In the absence of international funding, three key informants explain that funding for climate plans is reliant on the national purse where it receives less priority than social services and healthcare. As interviewee states:

Oh, the climate is changing, and we need to protect some ecosystems, how do you get that issue to rise to the top of the agenda in the face of all of these other things? (TNC 1)

Human capacity: Three policy actors suggest that another limitation to climate change policy implementation is a lack of human capacity in their organizations. One actor highlights that local experts who understand the localized environment of the Bahamas are required to execute the plans in their organization (BNT 1). However, another states that there are only five technical officers in the central government responsible for all environmental projects.

There are not many of us. And the workload is a lot... And so, we have projects that are constantly running to address climate change. But then our jobs are not climate change exclusive. We have other preservation activities to do, other National Environmental priorities that we need to address. So, you can imagine, it becomes a lot. (MOE 1)

Fragmented planning: Although policy actors interviewed provide examples of climate plans in progress, a common thread in the interviews is a lack of coherence between different organizations. For example, one of them mentions the potential of providing mooring buoys to
prevent cruise ships from anchoring to the coral reefs. However, their organization does not have the mandate to make decisions on visitation or tourist arrivals. The plans and policies in the different Ministries and other tourism organizations have different objectives for tourism development and climate change with no coordination mechanism between the organizations. Within the organizations, planning for climate change is just another component to consider in addition to other pressing socio-economic concerns rather than a central focal point of their work. This is a concern for many other SIDS in the Caribbean where climate policy coherence is weak with a lack of collaborative processes that stem from deeper governance challenges in the region (Scobie, 2016).

4.4.5. Future of Tourism and Climate Change

When asked about the future of climate change in the next ten years, interviewees state that the current climate trends will continue to accelerate. I deliberately chose a shorter timeframe of 10 year for eliciting this response as it appeals to immediate planning and decisions. The increase in temperature is the most common concern which can change tourists’ preferences for choosing the Bahamas as their vacation destination. In terms of hurricanes, a change in hurricane patterns in which the storms will form in unexpected places further hampers their planning (BNT 1). Another actor suggests a change in precipitation and temperature patterns results in more tornado formation and expects sea level rise across the entire Bahamas (MOE 1). As described by one interviewee, the consequences of these changes will extend beyond one sector:

I think it's unfortunate for us that we are gonna lose part of our culture and part of our history because growing up, if I know I used to go to that beach and used to hang out there in the summertime, and I'd walk home and I wouldn't pass out from heatstroke.
Now, everybody wants to stay indoors and turn on the AC and the beach is gone. Fishing is you have to go further to catch stuff. So the whole dynamics of our culture is changing.

(BEST 1)

Despite the changes in climate, the actors, particularly from the tourism organizations, are optimistic about the future of tourism in the country.

I think that the tourism here is going to grow in leaps and bounds. I think we're going to grow from strength to strength. I think that we realize what it's going to take to make the tourism product sustainable. (BTC 1)

But I also think that in the middle of all of this doom and gloom, that sounds like climate change. There is also the opportunity. There are also new economic opportunities. (TNC 1)

Others argue that a more sustainable tourism product will be required to attract tourism in the future. Currently, tourism planning faces sustainability challenges such as overharvesting of marine species and illegal dumping, particularly by cruise ships. The dominance of the sector by foreign investors is also a challenge for the Ministry of Tourism who are focused on increasing local participation in the sector as tour guides, and scuba instructors, and encouraging local Bahamian investment in smaller boutique hotels. These goals may not be possible in the heavily developed, mass tourism islands such as New Providence,

I also think that megastructures being built too close to the sand dunes, also with the increase of visitors coming to our shores, people wanting to go diving and snorkeling. you know the more into natural coral reefs. Ecosystems are very sensitive. (MOT 1)
This is where most of the cruise ships come. This is where we have like mega-hotels that are cutting through coral reefs to be able to put in their marinas that are cutting into the only freshwater lens that was any use for the island. (BNT 1)

However, in the family islands (islands outside of New Providence and Grand Bahama), the Andros master plan has already been developed for the Andros Island. This plan, while awaiting funding to implement, emphasizes nature-based tourism activities for sustainable tourism on the island.

### 4.5. Discussion and Recommendations

The lack of awareness and perception of climate change among the public stakeholders and decision-makers has been considered as one of the barriers to climate adaptation in SIDS (Betzold, 2015). This is not the case in the Bahamas where climate change is on the agenda for the most tourism leaders who demonstrate a significant awareness of its induced impacts. Given their central role in climate policy-making, the perceptions of these actors regarding present and future climate change strongly indicates that climate change has entered the Bahamas’ policy dialogue. Despite this, my findings reveal that there is still no national climate policy in the Bahamas. This lack of a formal climate policy is a trend in many Caribbean SIDS as revealed by state officials (Scobie, 2016). In Bahamas, no interviewee mentions the National Adaptation Policy for Climate Change of 2005 suggesting that the policy is not enacted or implemented. In the absence of a national climate policy, a policy specific to the tourism sector is a distant goal.

Strategy 11.1 of the Bahamas’ National Development Plan calls for researching and implementing climate change adaptation and mitigation measures. Half of the indicators of success in this strategy are based on the increasing use of alternate energy sources including a 50% increase in renewable energy sources for energy consumption (National Development Plan,
Within the tourism sector, my findings reveal a similar emphasis where the policy formulation is concentrated on mitigation efforts to reduce the carbon footprint of large accommodations. Given the energy-intensive nature of the tourism sector, these strategies are an important step in reducing the reliance on fossil fuels but may not be considerable toward global climate mitigation due to the low contribution of SIDS to GHGs.

Along the lines of the National Development Plan, Goal 14a, that focuses on increasing tourism revenue and tourists’ arrivals, I see no indication of controlling future tourism development. This is relevant in the context of Grydehøj and Kelman (2017) who warn that aggressively pursuing sustainable tourism or eco-tourism can divert attention from more pressing social and environmental problems. While pursuing such initiatives, islands can place themselves in eco-island traps trying to maintain costly renewable and other sustainability initiatives for the benefits of eco-tourism (Grydehøj & Kelman, 2017). It can also distract away the attention from the need for comprehensive policy action (Grydehøj & Kelman, 2017). Instead, a stronger focus on locally relevant climate adaptation is therefore more feasible for SIDS (Grydehøj & Kelman, 2017). However, the current adaptation planning is limited to generic education and communication efforts between the public officials and private sector stakeholders.

The institutional and economic barriers to policy implementation for climate adaptation discussed in the SIDS literature also apply to the tourism planning in the Bahamas (Betzold, 2015; Robinson, 2017). As is commonly mentioned in the literature, a lack of funds is an ongoing barrier to climate adaptation is also prevalent in the Bahamas. The Bahamas does not qualify for Official Development Assistance (ODA) and relies on loans and grants through multi-lateral development banks such as Inter-American Development Bank (IDB) for many of their climate projects. In the light of high public sector debt in the country that expanded by...
8.5% from 2014 to 2015 (USD 6 billion to USD 6.51 billion; CHTA, 2016), the effectiveness and efficiency of such grants in the country require further evaluation. Additionally, international funding is contingent on donor priorities and may lead to the reluctance of any local proactive measures for climate adaptation (Betzold, 2015). In that case, low-cost adaptation policies that also support the private tourism stakeholders can be integrated into the tourism planning (Klint et al., 2012).

It is worth noting that the policy formulation and implementation for the tourism and climate change faces additional barriers related to overall governance in the country. The Bahamas, similar to many other SIDS, has weak governance effectiveness in the country that further hampers their climate planning. According to the World Bank’s Worldwide Governance Indicators (WGI) developed by Kaufmann, Kraay, and Mastruzzi (2010), the country registered a score of 0.54 in the year 2018 on a scale of -2.5 to 2.5. The WGI indicator on governance effectiveness measures the perceptions of the quality of public services and civil service, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. This government effectiveness has further decreased over the last ten years in the Bahamas from 1.15 in 2008 to 0.54 in 2018. This is a challenge for many other Caribbean SIDS where the indicator values were no more than 0.50 in 2018, for example, Barbados (0.43), Jamaica (0.50), Dominican Republic (-0.40) when compared to the developed nations such as the United States (1.58).

My key findings indicate a) good knowledge of climate change among the officials, b) fragmented policies are skewed toward mitigation c) prevailing implementation gaps, d) average political support and awareness for climate change plans, and e) there are no plans of controlling future tourism in the country. Table 4.4 summarizes the supporting or hindering factors that
emerged from my study for the policy cycle. Based on the results of my study, I provide a set of recommendations that can be incorporated at different stages of the policy cycle. In addition, I also place emphasis on managing the future tourism in the Bahamas to account for uncontrolled visitations to protect vital and threatened ecosystems.

Table 4.4. Summary of findings and recommendations.

<table>
<thead>
<tr>
<th>Policy cycle</th>
<th>Supporting (+) or hindering (-) factors</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agenda setting</td>
<td>Awareness and perception of policy actors (+)</td>
<td>Leveraging public officials’ knowledge of climate change for bringing the issue at the forefront of tourism planning in the country</td>
</tr>
<tr>
<td></td>
<td>Awareness of political leaders (-)</td>
<td></td>
</tr>
<tr>
<td>Policy formulation</td>
<td>Focus on mitigation than adaptation (-)</td>
<td>Steering planning efforts toward climate adaptation that is locally relevant, cost-effective, and aligns with a more sustainable tourism model in the country</td>
</tr>
<tr>
<td></td>
<td>Inclusive planning (+)</td>
<td>Using collaborative approaches through regular stakeholder consultations and meetings, private and other non-governmental stakeholders to foster engagement in climate change and tourism arena</td>
</tr>
<tr>
<td>Policy implementation</td>
<td>Funding (-); Human capacity (-); Fragmented planning (-)</td>
<td>Directing immediate attention to many climate projects that are in the pipeline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pushing toward coherent and explicit climate policy is essential to divert political attention and resources</td>
</tr>
</tbody>
</table>

4.6. Conclusion

Here I use the Bahamas as a case study of the policy challenges that many SIDS experience in the face of the potentially severe impacts of future climate change. Although tourism in the country continues to grow, strong policies and planning that incorporate strategies to deal with this threat are lacking. I explored the existing policies by interviewing the public
stakeholders central to their planning and implementation. The sample size of my study is limited to only public stakeholders and future research incorporating other perspectives from private stakeholders would be beneficial. For studies to come, the competing developmental priorities that interfere with the tourism planning from other sectors (such as land use and coastal zones) need to be considered. Nevertheless, my work provides essential groundwork for future tourism and climate planning in the Bahamas. While not all encompassing, my findings and recommendations may be applicable to other SIDS who concentrate on tourism growth in the face of climate change. My research is also useful for conducting future comparative studies with other tourism-reliant SIDS.

4.7. References


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CHAPTER FIVE:
CONCLUSION

The goal of this research was to evaluate the vulnerability and resilience of a tourism-dependent Small Island Developing State (SIDS) – the Bahamas – that faces similar climate change and sustainability challenges as other SIDS. The three manuscripts in this dissertation achieved this goal through investigating impacts of climate change on tourism, assessing businesses’ resilience and adaptive capacity, and evaluating climate adaptation in current plans and policies regarding tourism.

5.1. Key Findings

Objective 1: To examine the direct and indirect impacts of climate change to the Bahamas’ tourism sector and spillover socio-economic losses to the country from these projected impacts.

This manuscript helped in quantifying potential risks of climate change to the tourism sector and the Bahamas in general. The findings estimated that many tourism properties on New Providence and Paradise Island currently lie in the storm surge zone of Category 1, Category 3 and Category 5 storms. The extent of threat to coastal properties increases further with a 1m sea level rise resulting in more than 80% of the businesses susceptible to coastal flooding induced by a future Category 5 storm. Sixty percent of properties are also situated within 100 m of the coastline and face damages by erosion. Given the economic importance of tourism on these islands, the potential impacts will cause significant losses in local tourism as well as far-reaching
socio-economic consequences to the entire country. The findings call for the need of integrated planning such as ICZM in the Bahamas.

**Objective 2:** To explore the resilience of the tourism sector by identifying its contribution to sustainable development and climate change adaptation.

While threatened by climate change, coastal accommodation sector has undertaken some measures for sustainable development, climate change adaptation and build their resilience. The results of the survey were used to explore this objective indicated that tourism businesses demonstrated moderate to high level of participation in activities that support the Sustainable Development Goals of the Bahamas. In terms of climate change adaptation, the businesses focus on short-term strategies such as disaster preparedness for hurricanes and were limited by lack of finance and knowledge. The adaptive capacity of such businesses is further diminished by human and institutional capitals such as lack of access to climate information and specific climate planning. The findings from the chapter highlight the need for raising awareness and building consensus on climate change among private tourism stakeholders followed by adaptation measures such as ecosystem based adaptation and green jobs that are synergistic with the broader sustainable development of the country.

**Objective 3:** To evaluate the extent to which climate change is considered in current plans and policies related to tourism and existing policy gaps.

Planning for climate change was better in the public than private sector. The findings from in-depth interviews conducted with eight key policy actors revealed that these actors have a good knowledge of climate change. However, there are no explicit policies for climate change and tourism and the current planning is fragmented among different organizations with a stronger focus on the mitigation. Policy implementation is limited due to funding and human
capacity. According to the policy actors, there are no plans to control the future tourism growth in the country and future planning targets sustainable and eco-tourism markets. The findings recommend policy solutions such as leveraging public official’s knowledge to bring climate change at the forefront of tourism planning and directing locally relevant, cost effective adaptation solutions using collaborative approaches.

5.2. Research Contributions

5.2.1. Contributions to Literature

This dissertation contributes to the climate change and tourism literature in SIDS that is currently an underrepresented subject. In a comprehensive review of climate change and tourism literature over the last 25 years, Fang et al. (2018) found that the field of research is dominated by Australia, USA, Canada, New Zealand, and European countries. The dissertation supports Fang et al. (2018) call for urgent attention to research efforts in developing countries with higher relative economic importance of tourism. The dissertation also provides an avenue for comparative studies with other SIDS. The emphasis on SES approach for the tourism systems is novel. By considering tourism as a SES and its ability to affect social and ecological systems, the research contributes to a solution-oriented and resilience perspective for the SIDS.

The specific chapters of the dissertation also contribute to the relevant literature. Chapter 2 operationalizes and develops specific indicators for the quantification of impacts and potential losses in a SIDS setting. Similarly, Chapter 3 uses capitals approach to develop 13 tourism and climate change specific indicators applicable in a SIDS context. By using these proxy indicators

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developed particularly for tourism in SIDS using a systems thinking, the dissertation strengthens the vulnerability and resilience analysis that do not lend itself to direct analysis.

5.2.2. Contributions to Policy

The dissertation makes two policy contributions. Firstly, the findings from the three chapters suggest a need of adaptation planning and policy. Chapter 2 provides quantitative evidence for incorporating integrated coastal zone management to manage the tourism sector sustainably while dealing with climate change. Chapter 3 and 4 evaluates the onsite situation related to adaptation efforts and further enforces the need for adaptation planning. Chapter 4 also emphasis a need for stronger focus on adaptation in climate change planning while overcoming the challenges to such policy implementation.

More specifically, the three chapters weave a foundational theme that coastal ecosystems such as beaches and coral reefs are tied to the tourism sector in the Bahamas. Therefore, the dissertation further champions the need for ecosystem-based adaptation efforts with the public and private tourism sector. Such adaptation also aligns with the resilience and sustainable development objectives of this work.

From Agenda 21 of Earth Summit in 1992 to Barbados Programme of Action (BPOA), Mauritius Strategy of Implementation (MSI) held in 2005, MSI +5 held in 2010, and the recently held SIDS Accelerated Modalities of Action (SAMOA) Pathway in 2014, SIDS have remained at the heart of climate change and sustainable development discussions in the international arena. This dissertation addresses some of the concerns of these conventions as well as addressing Goal 13 of the Sustainable Development Goals that requires an integrated approach towards climate change and its impacts. Involving different stakeholders from the public and private sector further support the integrated nature of this work.
5.3. Limitations

While undertaking this research, I encountered several challenges. Chapter 2 faced constraints for geospatial, climate change and tourism data. Although a Lidar-based DEM would have provided more accurate geospatial analysis, such high-resolution data is not available for the Bahamas. ALOS (Advanced Land Observing Satellite) DEM used for this chapter had a vertical accuracy of 30 m as compared to a cm high resolution of LIDAR data. The scope of this chapter was also limited in terms of climate variables i.e. sea level, storm surge, erosion and surface temperature and type of tourists i.e. stopover tourists. In doing so, other climatic factors (high tides, precipitation changes) and other types of tourists (cruise ship visitors) that may impact the findings were excluded. In Chapters 3 and 4, surveys and interviews were developed based on a comprehensive review of literature. However, due to limited time and financial resources, I was not able to pretest the instruments that may excluded other non-tangible factors affecting the day-to-day climate adaptation and planning in the public and private tourism sector.

The sample size of the surveys and interviews were small and further studies will be needed to generalize the findings. The survey findings were based on respondents’ judgement on current adaptation and may not always provide the most accurate information. Several other factors that influence their responses such as educational background, past experiences were not considered. Such in-depth analysis was outside the focus of my work the purpose of which was to establish a baseline understanding of existing adaptation efforts and adaptive capacity. The same applies to the interviews conducted in chapter 4 where the interviewees background had potential influences on their respective responses.
5.4. Future Work

The dissertation explored climate impacts and adaptation in the tourism sector of the Bahamas with a particular focus on sustainable development. The research provides a point of comparison for other SIDS that are tourism-dependent and face similar climate vulnerabilities and other challenges to their sustainable development. The indicators used in this work can be expanded and adjusted for other SIDS to identify set of best practices that can help the tourism sector in dealing with climate change while contributing toward sustainable development of the country. Expanding the indicators in this work with other existing indicators such as Environmental Vulnerability Index (EVI) will also help to understand additional vulnerability challenges for tourism-dependent SIDS. Comparative studies to explore core-periphery relations between the case study islands in this research (New Providence and Paradise Island) and other peripheral small islands in the country can also help in understanding the variations in climate impacts and adaptation planning between a country. The goal of my research was to establish the baseline information on the policy environment. Future research can be useful to explore the differences in perception and behaviors in policy and planning based on an interviewee’s background.

My research revealed that there are no explicit climate change and tourism planning and policies in the Bahamas. This is an interesting avenue for more action-oriented research in the future. Through collaborating with the tourism stakeholders, public sector and local communities, researchers can engage in climate adaptation planning, in particular Ecosystem-based Adaptation (EbA), that are context and location specific. Research that attempts to understand and improve tourism businesses’ contribution to sustainable development of the host country also needs to be undertaken. Such research can be helpful in devising on ground
solutions that are practical and applicable to the SIDS and their tourism businesses. The findings
will be communicated to the public stakeholders from the key governmental and non-
governmental organizations involved in the study area to contribute toward climate adaptation
and policy development. The findings will be published in the peer-reviewed academic literature
and circulated to the coastal accommodations to help their adaptation planning.

5.5. Concluding Remarks

SIDS are inarguably vulnerable to climate change that also hampers their sustainable
development. The more I delve into my research and existing literature, the more I learned about
other global and external stressors adding to their existing challenges. For my dissertation, it was
important to settle on a succinct research problem that was possible within the realm of available
time and resources. Moving forward, I learned certain aspects of fieldwork in terms of locating
participants, being objective as a researcher, and gathering data that were only possible by
going my feet wet in the study area. Analyzing the data collected from fieldwork was valuable
in learning how to extract the most important information pertaining to my research objectives.
Much like the focus of my dissertation, my journey has taught me the importance of planning
and being adaptive in the face of practical research problems.
APPENDICES
Appendix A: Tourism Adaptive Capacity Survey

Note to the respondents
The purpose of this study is to gather information on adaptation of your business in the face of climate change. If you choose to participate, you will be asked to complete a confidential survey through a face-to-face interview. All responses will be used only for the purposes of this survey with no disclosure of your name. Participation in the survey is voluntary and you may wish to withdraw at any stage.

Section A: General Information

Respondent
- Title/Position/years held:

Accommodation (Physical Capital)
- Name of accommodation:
- Type of accommodation (hotel/resort/other):
- Years of operation:
- Age of the establishment (in years):
- Value of property (in local currencies):

Section B: Sustainable Development

1. Does your business strategy support sustainable tourism?
   - Yes
   - No

2. Please choose your level of participation for the following business activities/actions pertaining to sustainable development

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2Based on the survey conducted by UNWTO. (2017). *Tourism and the Sustainable Development Goals – Journey to 2030*. [https://doi.org/10.18111/9789284419401](https://doi.org/10.18111/9789284419401)
<table>
<thead>
<tr>
<th>Actions by the accommodation providers</th>
<th>No, and no future plans</th>
<th>No, but under potential consideration</th>
<th>Yes</th>
<th>Other, please specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our business strategy supports non-discrimination policies</td>
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<tr>
<td>We promote education awareness-campaigns among staff, local communities and guests</td>
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<tr>
<td>Our business provides donations to local educational institutions</td>
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<tr>
<td>We currently have initiatives to hire more local staff</td>
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<tr>
<td>We offer industry training to local communities to prepare them for work in our hotels and resorts</td>
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<tr>
<td>Our business supports the purchasing of seasonal produce to support the local community</td>
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<tr>
<td>Our business has an active recycling strategy</td>
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<tr>
<td>Our business has specific targets to reduce its water consumption</td>
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<tr>
<td>Our business promotes energy-efficient measures such as solar heating in pools, to reduce our accommodations’ energy costs</td>
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</table>

Eco-certifications “assures travelers that certified products are supported by a strong, well-managed commitment to sustainable practices and provides high quality nature-based tourism experiences.”

Below are some of the common eco-certifications available for tourism businesses in your country.
EarthCheck, Travelife, TripAdvisor GreenLeaders, ISO 14001. What is your stance on eco-certifications?

☐ Our business is eco-certified. Please name the certification and level.

__________________________________________

☐ Our business is not eco-certified, but we aim to be certified by __________________________ certification in the near future

☐ Our business is not eco-certified
Section C: Overview of climate change impacts and adaptation options

3. Where would you rank your awareness regarding the understanding of climate change?
   □ Not at all aware or I don’t know anything about climate change
   □ Slightly aware/I know a little
   □ Moderately aware
   □ Very aware
   □ Extremely aware

4. Has your business already been affected by one or more of the following climate change impacts? Please tick (✓) all the applicable options.
   □ Sea level rise
   □ Increased storm frequency and intensity
   □ Coral bleaching
   □ Beach erosion
   □ Reduced water availability
   □ Others, please detail:
   □ Not applicable

Adaptation Options

5. What structural or physical responses are being undertaken to address climate change impacts on your establishment/property? Please tick (✓) all the applicable options.
   □ Hard infrastructure, e.g. sea walls, breakwater, etc.
   □ Replanting mangroves
   □ Coral reef regeneration for visitors’ attraction
   □ Beach nourishment
   □ Rainwater collection and water recycling systems
   □ Allocating marine protected areas (MPAs)
   □ Buying pumps and generators
   □ Other, please specify. ________________________________

6. What educational measures are being undertaken or considered by your establishment to address issues related to climate change? Please tick (✓) all the applicable options.
   □ Education campaign to increase tourist awareness
   □ Staff training for climate change awareness
   □ Training for emergency evacuations in case of extreme events
   □ Networking with other hotels and businesses to share best practices
   □ Other, please specify. ________________________________
7. What behavioral measures are being undertaken or considered by your establishment to address the issues related to climate change? Please tick (✓) all the applicable options.
   - Developing emergency preparation and evacuation plans
   - Hurricane guarantees and waivers
   - Offering more indoor-based activities in contrast to the beach and reef-based tourism
   - Other, please specify. ________________________________

8. What policy strategies are being undertaken or considered to address the issues related to climate change in your establishment? Please tick (✓) all the applicable options.
   - Increase representation of employees in the national governing bodies for climate change
   - Supporting local adaptation research and monitoring
   - Coastal retreat or setting back buildings
   - Compliance with building regulations
   - Designing specific climate change adaptation plans and strategies
   - Other, please specify. ________________________________

9. Which of the following act as barriers to implementing climate change adaptation measures? Please select all that apply.
   - Lack of knowledge
   - Lack of finance
   - Lack of skilled staff
   - Lack of technology
   - Lack of government incentives
   - Lack of political will
   - Lack of support from the guests
   - No need for any measure
   - Other barriers, please specify. ________________________________

Section D: Adaptive Capacity

Human Capital

10. Does your establishment provided healthcare insurance to the employees?
    - Yes
    - No

11. Have there been any formal discussions regarding climate change within your accommodation (e.g., workshops, strategic/expert meetings, etc.)?
    - Yes
No

If yes, briefly describe the nature of these discussions (if possible, please provide reference documents for any proceedings/conference summary):

______________________________________________________________________________
______________________________________________________________________________

12. Is there a specific employee or team in your establishment responsible for issues related to climate change?
   □ Yes (single person)
   □ Yes (team/group)
   □ No

If yes, briefly describe their responsibilities:

______________________________________________________________________________

13. Do you receive information regarding changing climate and climatic events through external source of communication, for example, television, radio or newspapers?
   □ Yes
   □ No

If yes, please specify the climate change issue most prominent in the media:

______________________________________________________________________________

Social and Institutional Capital

14. Does the establishment hold group event gatherings for the employees?
   □ Yes
   □ No

If yes, how often are these events held?
   □ Weekly
   □ Monthly
   □ Annually
   □ Never
   □ Other, please specify. ____________________________
15. Are there existing formal associations/clubs/societies for employees that contribute toward their social participation?

☐ Yes
☐ No

16. Does your establishment have a current climate change adaptation strategy or action plan?

☐ Yes
☐ No
☐ In development (please provide anticipated timeline). ____________________________

If yes, please provide study/report reference of the strategy, if possible):
____________________________________________________

17. There are various capacity-building initiatives taking place in the Bahamas. Some examples include Caribbean Carbon Neutral Program and Caribbean Climate Online Risk and Adaptation Tool – CCORAL by the Caribbean Community Climate Change Centre. Is your establishment actively involved (directly or indirectly) in any such initiative at the regional level?

☐ Yes, directly involved
☐ Yes, indirectly involved
☐ No

If yes, please provide the details of the initiative (name, organization responsible, etc.):
______________________________________________________________________________

18. There are climate change dialogues taking place in the national governmental organizations. Some examples include formulations of National Adaptation Plans, Climate change committees, education and outreach programs, etc. Is your establishment actively involved (directly or indirectly) in any such dialogue at the national level?

☐ Yes, directly involved
☐ Yes, indirectly involved
☐ No

If yes, please provide the details of the initiative (name, department responsible, etc.):
______________________________________________________________________________
Natural Capital

19. Ecosystem services are the benefits people obtain from healthy ecosystems (MEA, 2005\(^3\)). Tourism in your country is dependent on marine ecosystems that provide various ecosystem services. Below are some of the ecosystem services that will be potentially impacted by climate change. Please rate the importance of the following local ecosystem services that concern your business and visitors to your accommodations.

<table>
<thead>
<tr>
<th>Ecosystem Service Example</th>
<th>Very Important</th>
<th>Somewhat Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of freshwater for visitors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision of local seafood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational activities (scuba diving, snorkeling, swimming, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aesthetic beauty</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20. Has your business undertaken any conservation measures to protect and restore the coastal ecosystems such as beaches and coral reefs?

☐ Yes – for beaches
☐ Yes – for coral reefs
☐ No measures taken

If yes, please provide a name of the project, a brief summary of the protection measure:

________________________________________________________________________
________________________________________________________________________

21. Do you receive any financial incentives from the government for the protection of coastal ecosystems?

☐ Yes
☐ No

Financial Capital

Please select one.

<table>
<thead>
<tr>
<th></th>
<th>Extremely</th>
<th>Very</th>
<th>Moderately</th>
<th>Slightly</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>22. How likely it is for your business to access credit through formal institutions such as banks in case of a climate-related extremity?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>23. How likely it is for employees to access credit through informal institutions such as friends and family in case of a climate-related extremity?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

24. Is your establishment insured against potential climate-induced risks?
   ☐ Yes
   ☐ No

If yes, please provide the details of insurance (name of the plan, risks covered, etc.):

______________________________________________________________________________
______________________________________________________________________________

25. Are there any other issues or concerns regarding climate change and sustainable development that are not covered in this survey that you feel are important to consider? Please elaborate in the space below.
Appendix B: Interview Guide

Date:

Case Site:

Participant ID:

Objectives: To understand the policy context and range of adaptation options for climate change within the tourism sector

Format: semi-structured; open-ended; face-to-face

Interview Information:

Attached is a list of potential interview questions for the research. More specifically, these are the key topics and examples of the types of questions that I seek to explore. In reality, the nature of the interview was more organic, and the exact phrasing of the question varied among interviewees. This “grounded” approach allowed me to explore any unanticipated topics raised during the interviews and minimize any potential interpretative bias.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Guiding question</th>
<th>Further questions/prompts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm-up questions</td>
<td>Employment history (number of years involved), role in the organization, main objective of the organization</td>
<td></td>
</tr>
<tr>
<td>General understanding of climate change</td>
<td>Please provide an idea of your personal views and expertise on climate change.</td>
<td>a) Expert, High Level of Knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Above Average Experience and knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Limited Experience and low level of knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Non-Expert, No Experience, no knowledge</td>
</tr>
<tr>
<td></td>
<td>To what extent is climate change considered in your organization’s plans/policies?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What are the key climate-related impacts and vulnerabilities targeted within your organization?</td>
<td>Prompt: sea level rise, temperature increase, extreme events</td>
</tr>
<tr>
<td>Theme</td>
<td>Guiding question</td>
<td>Further questions/prompts</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td><strong>Overview of climate change policies (explicit v/s implicit)</strong></td>
<td>Is there an explicit (specific) plan/policy addressing climate change adaptation for the tourist industry? Are there other plans/projects/policies addressing adaptation directly or indirectly pertaining to climate change within the tourism sector?</td>
<td>Prompt: please provide a copy of it</td>
</tr>
<tr>
<td><strong>Identify adaptation options</strong></td>
<td>Discuss some of the main adaptation strategies being implemented with respect to tourism for dealing with climate change. <em>If no strategies so far:</em> What are the anticipated strategies to deal with climate change within the tourism sector generally and for your business, specifically?</td>
<td><em>Technical adaptation</em> (e.g., desalination plants, early warning systems) <em>Managerial adaptation</em> (e.g., insurance and subsidies) <em>Policy</em> (e.g., integrated coastal zone management, building design standards) <em>Education and Research</em> (e.g., monitoring programs for coral reefs, beach water quality; water conservation campaigns) <em>Behavioral</em> (e.g., planned retreat)</td>
</tr>
<tr>
<td></td>
<td>Is there a focus on EbA? If yes, examples of such measures?</td>
<td>Prompt: EbA definition; soft protection measures</td>
</tr>
<tr>
<td><strong>Evaluate adaptation options</strong></td>
<td>What adaptation options are a) cost-effective, b) easy to implement, c) lie within your institutional capacity d) high priority?</td>
<td></td>
</tr>
<tr>
<td>Theme</td>
<td>Guiding question</td>
<td>Further questions/prompts</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>Barriers to adaptation</strong></td>
<td>Does your organization have the necessary capacity to deal with climate change issues affecting the tourism sector?</td>
<td>Prompt: financial resources, trained staff, etc.</td>
</tr>
<tr>
<td></td>
<td>Are there any potential trade-offs for implementing climate adaptation within the tourism sector?</td>
<td>What are the possible adverse impacts of any adaptation strategy on environment or people?</td>
</tr>
<tr>
<td></td>
<td>How would you describe the level of political awareness and support for adaptation planning within the public sector stakeholders for tourism?</td>
<td>Prompt: a) high awareness and high political support, b) average awareness and support, c) no awareness and support, d) no idea</td>
</tr>
<tr>
<td><strong>Sustainable tourism</strong></td>
<td>Does your organization have plans/policies for sustainable tourism? What are the key sustainability issues with respect to tourism in your country?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is climate change being addressed in sustainable tourism policies? Which policies? To what extent?</td>
<td></td>
</tr>
<tr>
<td><strong>Wrap-up and Snowball</strong></td>
<td>Are there additional ideas or suggestions you wish to discuss concerning your approach to climate adaptation?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Can you recommend any other individuals for this study?</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Recruitment Letter for Interviews

Dear participant,

My name is Arsum Pathak and I am a Ph.D. candidate in the department of Geography and Environmental Science and Policy at the University of South Florida, USA. I am requesting your participation in a doctoral dissertation research study. You are chosen to participate because of your current role as a public official in the Bahamas.

The primary purpose of this study is to understand the policy context and range of adaptation options for climate change within the tourism sector. This requires a series of in-depth semi-structured interviews with a range of public stakeholders in the country that are involved in tourism and climate change planning and decision-making.

Participation in the interview is voluntary and you may wish to withdraw at any stage without any repercussions. If you choose to participate, the interview will be strictly confidential. Each interviewee will be given a personal identification number. Personal identifiers such as names, and job title/position will not be used in any publications originating from this research. However, I seek permission to use the name of your organization. If you are interested to participate:

**Before the interview**

- Please send an email to arsumpathak@mail.usf.edu stating your willingness to participate.
- In the subsequent emails, we will set up a date, time, and place for interview.

**On the day of interview**

- I will explain you the informed consent procedure i.e. anonymity, confidentiality, and voluntary nature of the research.
- You will be handed the IRB consent form to read and return a signed copy back to me.

**During the interview**

- The time estimated for the interview is between 60 to 90 minutes, however, this will ultimately depend on the information you wish to provide.
- I am not looking for a right or wrong answer, rather, my intent is to gather your opinions.
- With your permission, I would like to audio-record the interview to facilitate a smooth flow of conversation and the collection of information without any interruptions.

**After the interview**

- I will share the transcripts of the interview for your reviewing before transcribing them for analysis.
o You will have the opportunity to confirm the accuracy of our conversation, as well as, change or omit certain parts of the interviews.

Attached is a list of potential interview questions for my research. More specifically, these are the key topics and examples of the types of questions that I seek to explore.

Sincerely,

Arsum Pathak
Ph.D. candidate
School of Geosciences
University of South Florida
4202 E. Fowler Ave
Tampa, Fl 33620
Appendix D: IRB Approval

July 5, 2019

Arsum Pathak
Geography
Tampa, FL 33613

RE: Exempt Certification
IRB#: Pro00039791
Title: Climate Change and Sustainable Development within the Tourism Sector of Small Island Developing States

Dear Ms. Pathak:

On 7/5/2019, the Institutional Review Board (IRB) determined that your research meets criteria for exemption from the federal regulations as outlined by 45 CFR 46.104(d):

(2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects’ responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

As the principal investigator for this study, it is your responsibility to ensure that this research is conducted as outlined in your application and consistent with the ethical principles outlined in the Belmont Report and with USF HRPP policies and procedures.

Please note, as per USF HRPP Policy, once the exempt determination is made, the application is closed in ARC. This does not limit your ability to conduct the research. Any
proposed or anticipated change to the study design that was previously declared exempt from IRB oversight must be submitted to the IRB as a new study prior to initiation of the change. However, administrative changes, including changes in research personnel, do not warrant an Amendment or new application.

We appreciate your dedication to the ethical conduct of human subjects research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Kristen Salomon, Ph.D.,
Chairperson USF Institutional Review Board
Appendix E: Letter of Support

June 21, 2019

Institutional Review Board
University of South Florida
4202 E. Fowler Avenue
Tampa, FL 33620
U.S.A.

Re: Letter of support for the Bahamas

I have reviewed and discussed the document provided by Ms. Arsum Pathak, PhD candidate at USF on the research project “Climate change and Sustainable Development within the tourism sector of Small Island Developing States.”

I understand this study, which is a part of her doctoral dissertation research, will involve interviewing public tourism stakeholders from several government organizations, and conducting questionnaires, based surveys with private tourism stakeholders.

From the research protocol, I believe that this research will be carried out following sound ethical principles and that participant involvement in this research study is strictly voluntary and confidential. The research does not pose any foreseeable risks to the participants.

Therefore, as a representative of The Bahamas Ministry of Tourism I offer no objection to Ms. Pathak’s carrying out this research project.

Sincerely,

Joy Jibrilu
Director General