Vulnerability of Small Island Developing States: a case study of Dominica

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Vulnerability of Small Island Developing States

A case study of Dominica uncovering the root causes of vulnerability and how this translates to implementing (effective) adaptation measures

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Sincerely,

Cato Calmeijer Meijburg
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Abstract

Caribbean communities are faced with more frequent and intense hazards, sea-level rise, warming air and water temperatures, ocean acidification, changes in precipitation and many other climate impacts (Nurse, et al., 2014). While it is generally recognized that the projected changes in the global climate will have serious negative consequences for the Caribbean as a whole, it is becoming more and more evident that the impacts of climate change will not be uniformly felt across the region (Rhiney, 2015). This research has sought to understand and subsequently attempted to shed light on vulnerabilities of Small Island Developing States, also referred to as SIDS. A case study zooming in on Dominica was selected to investigate the structural forces exacerbating disaster risk in the Caribbean. In Dominica, in the aftermath of a disaster, up until now the emphasis has been on quick recovery because the political impetus and associated financial incentives for investing in mitigation and changes in land use have been insufficiently strong (Benson, Clay, Michael, & Robertson, 2001). After hurricane Maria in 2017, the government of Dominica expressed its wishes to become the first climate-resilient nation by 2030 after which the National Resilience Development Strategy was published. A number of ambitious strategies were listed in this strategy document to diversify the economy and improve the socio-economic conditions for Dominica's population. However, the strategy proved to be much more about mitigating or adapting to 'external' nature than it is about dealing with the island's social and political economic inheritance. Furthermore, the outcome of the research highlights that historical processes are fundamental to understanding how conditions of risk emerge and persist over time. Failure to acknowledge these historical drivers when formulating and implementing (future) adaptation strategies may jeopardize the effectiveness of transitioning into a resilient economy and society. It is therefore recommended that future critiques of and solutions to vulnerability, disaster, and catastrophe in the Caribbean be more attentive to its historical trajectories. Part of this includes taking valuable lessons from historic (colonial) decision-making processes (i.e.location and placement of assets and communities or the enforcement of DRR building codes) and integrating these into new (adaptation) strategies.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

BBB: Building Back Better

CRA: Climate Resilience Act

CREAD: Climate Resilience Execution Agency for Dominica

CRRP: Climate Resilience and Recovery Plan

DRR: Disaster Risk Reduction

ECCU: Eastern Caribbean Currency Union

IMF: International Monetary Fund

ODM: Office for Disaster Management

SIDS: Small Island Developing States

UN: United Nations

UNDP: United Nations Development Programme

UNISDR: UN International Strategy for Disaster Reduction

UNFCCC: United Nations Framework Convention on Climate Change

1. Introduction

There is a growing consensus that the global climate is changing and that anthropogenic emissions are driving this change. More importantly, the negative consequences of climate change threaten all countries – with developing regions and Small Island Developing States (also referred to as SIDS) being the most vulnerable (Nurse et al. 2014; World Bank 2010). SIDS were first recognized as a distinct group at the United Nations Conference on Environment and Development in June 1992 where it was stated: "Small Island Developing States and islands supporting small communities are a special case both for the environment and development. They are ecologically fragile and vulnerable. Their small size, limited resources, geographic dispersion and isolation from markets, place them at a disadvantage economically and prevent economies of scale" (United Nations, 1992).

Thomas et.al argue that "Despite their heterogeneity, SIDS are recognized as being particularly at risk to climate change and as they share numerous common traits, the United Nations recognizes them as a special group" (Thomas, Baptiste, Martyr-Koller, Pringle, & Rhiney, 2020). The island states have been quite active in calling attention to their high vulnerability to climate change and have played a leading role in advocating for stronger ambition to limit global warming through the United Nations Framework Convention on Climate Change (also referred to as the UNFCCC).

More specifically, Caribbean communities are faced with more frequent and intense hazards, sea-level rise, warming air and water temperatures, ocean acidification, changes in precipitation and many other climate impacts (Nurse, et al., 2014). While it is generally recognized that the projected changes in the global climate will have serious negative consequences for the Caribbean as a whole, it is becoming more and more evident that the impacts of climate change will not be uniformly felt across the region (Rhiney, 2015). According to Rhiney (2015), this is partly due to the diverse geophysical composition of the region itself. The region is said to have the largest number of SIDS and maritime boundaries in the world (Pulwarty, Nurse, & Trotz, 2010). Another major reason for the anticipated differences in future climate change impacts is related to the dissimilarities in the degree of vulnerability and adaptive capacities that exist among socio-economic groups and actors within Caribbean states and territories (Rhiney, 2015).

The dissimilarities in the degree of vulnerability and adaptive capacities that exist are closely intertwined with a nation's historical events. Barclay et al. (2019) build further on this by stating that historical processes are fundamental to understanding how conditions of risk emerge and persist over time. According to Barclay et al. (2019), uncovering these historical drivers and persistent issues illustrates lessons for pursuing a more resilient development trajectory, including through the promotion of economic restructuring and diversification, and land reform. An historical analysis can help to reveal the reasons why risk has been allowed to accumulate (and where exposure has been successfully dealt with). Furthermore, such an historical analysis helps to unpack whether current adaptation strategies really deal with the persistent issues associated with SIDS as mentioned above or fail to acknowledge these issues.

This thesis aims to uncover whether we can, in fact, speak of a correlation between these historical drivers and the effectiveness of implementing (future) adaptation strategies, in order to increase resilience. This study thereby contributes to the existing body of knowledge by filling in the research gap that currently exists regarding the examination of historical drivers of a nation (SIDS in particular) and their relationship with future resilience trajectories.

2. Research aim and questions

Knowledge gap

Small Island Developing States (SIDS) share a common vulnerability to climate change. However, as stated previously, the heterogeneity across Caribbean islands plays a vital role in the extent to which individual nations are affected by disasters. Furthermore, according to *Klöck and Nunn* (2019), adaptation to climate change and variability is urgently needed. While some research is already conducted on SIDS, research on the nature and efficacy of adaptation across SIDS is fragmentary. A deeper analysis exploring the (social) root-causes of disaster vulnerability within SIDS seems to be lacking within existing literature. Currently, most studies merely focus on the physical/geographical factors that seem to play a vital role in causing disasters by the interaction of natural hazards and exposure of communities.

Research aim

Since the late 1970s there has been a gradual realisation amongst social scientists that natural hazards are merely the trigger of a set of complex reactions governed by the social, economic, cultural, and physical vulnerability of society. Existing understandings of disaster risk as both a physical and social condition demonstrate us that historical processes are fundamental to understanding how conditions of risk emerge and persist over time. Hence, there has been an increasing realisation that it is important to know and reduce human vulnerability to disasters in its many different forms.

The research aim of this thesis is twofold. On the one hand, the research aims to identify several causal factors of vulnerabilities of Small Island Developing States (SIDS). Naturally, it is unfeasible to do this for all the Small Island Developing States, which is why a case study was chosen to examine the island of Dominica, located in the Caribbean. More specific details of this case study can be read in chapter 4. This thesis is geared specifically to Caribbean disasters research, underlining that historical processes are fundamental to understanding how conditions of risk emerge, and what causes them to persist over time. On the other hand, this thesis aims to identify several current and future (climate) adaptation initiatives that are implemented in Dominica. Building on this, this thesis aims to uncover whether the implementation of adaptation strategies deals with the root causes of the island's vulnerability.

<u>Research questions</u>

To structure the research, several research questions were created. The proposed methods of data gathering found later in this thesis will be able to supply answers and evidence to these research questions.

The main research question reads:

(How) does the implementation of climate adaptation strategies deal with the root causes of vulnerability of Dominica?

The sub-questions to support this main research questions were categorized according to two concepts, namely vulnerability and adaptation (strategies):

Concept 1: Vulnerability: Sub-questions

- What are the root causes of vulnerability for Dominica?

Concept 2: Adaptation (strategies): sub-questions

- What kinds of (climate change) adaptation initiatives are currently implemented in Dominica?
- What does the Government of Dominica intend to do to become climate-resilient by 2030?

3. Theoretical framework

The following chapter introduces the framework that I chose for this thesis. During the course of six months, I carried out extensive desk research including the analysis of many books, articles and reports, in order to select a framework that was most fitting and would address the key concepts that form part of the research aim. The key concepts of this framework include vulnerability, susceptibility, exposure, and livelihood resilience. Firstly, I will address why this holistic framework was chosen in particular, followed by other relevant theories that are centered around disaster vulnerability. After this, a literature analysis will be provided on the concepts mentioned in the theoretical framework. Each term will be explored by means of drawing on different definitions stated in literature. Lastly, broader areas of knowledge regarding disaster vulnerability and historical impacts in the Caribbean will be addressed in order to provide the reader with background information on Caribbean states and their turbulent histories.

3.1 Holistic approach to understanding disaster vulnerability

In the article "A Framework for Disaster Vulnerability in a Small Island in the Southwest Pacific: A Case Study of Emae Island, Vanuatu" by Jackson, McNamara & Witt (2017) the authors present a framework for disaster vulnerability in the Southwest Pacific, with in particular a case study of Vanuatu, another Small Island Developing State. The focus of this framework lies on understanding the **causal factors** of disaster vulnerability of small island developing states and proposes a holistic approach for analysis. I chose this framework specifically as it poses a deeper understanding to disaster vulnerability, including a number of causal factors such as: exposure, susceptibility to disasters and livelihood resilience. A visual representation of this can be found in figure 1 below. Additionally, this framework presents similarities with the National Resilience Development strategy, published by the Government of Dominica, in which the key elements of livelihood resilience that are mentioned in the figure below are also presented as important steps to achieve prosperity and an increased level of overall resilience for the country. In section 3.3 of this chapter, each separate concept that is mentioned in this framework will be explained by drawing on definitions stated within literature.

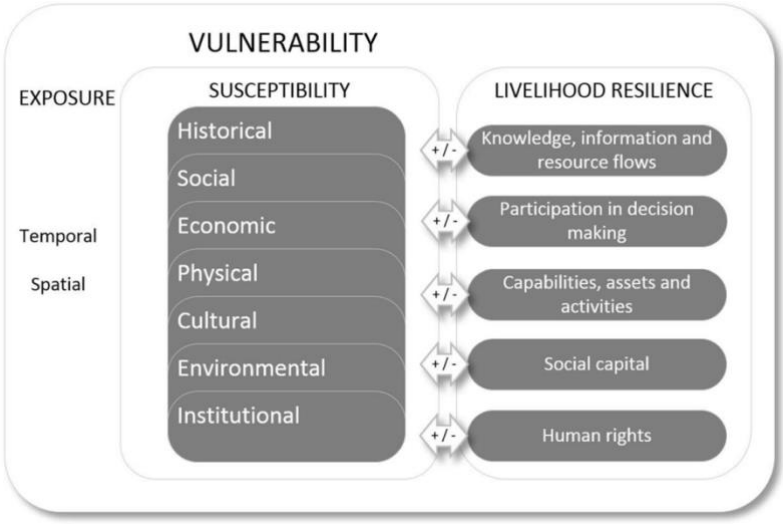


Figure 1: Dimensions of disaster vulnerability as affected by exposure, susceptibility, and livelihood resilience. Source: Adapted from the MOVE framework (Birkmann et al. 2013), and the concepts of livelihood resilience (Tanner et al. 2014) and 'historical constructions of disasters' (Oliver-Smith, 2010)

3.2 Other relevant theories

There are other theories that are relevant within the context of vulnerability. For example, the disaster risk community defines vulnerability **as a component within the context of hazard and risk**. This school usually views vulnerability, coping capacity and exposure as **separate** features. One example within this approach is Davidson's conceptual framework (see figure 2 below). This framework views risk as the sum of hazard, exposure, vulnerability and capacity measures (Ciurean, Schröter, & Glade, 2013). This framework enlists vulnerability as a separate component, in contrast to the abovementioned framework by Jackson, McNamara & Witt, where vulnerability is regarded as an overarching concept. However, we also see many similarities between the two frameworks, with the mentioned concepts being entirely the same, giving us the suggestion that there is a general consensus amongst scholars regarding the way in which disaster risk vulnerability frameworks are perceived.

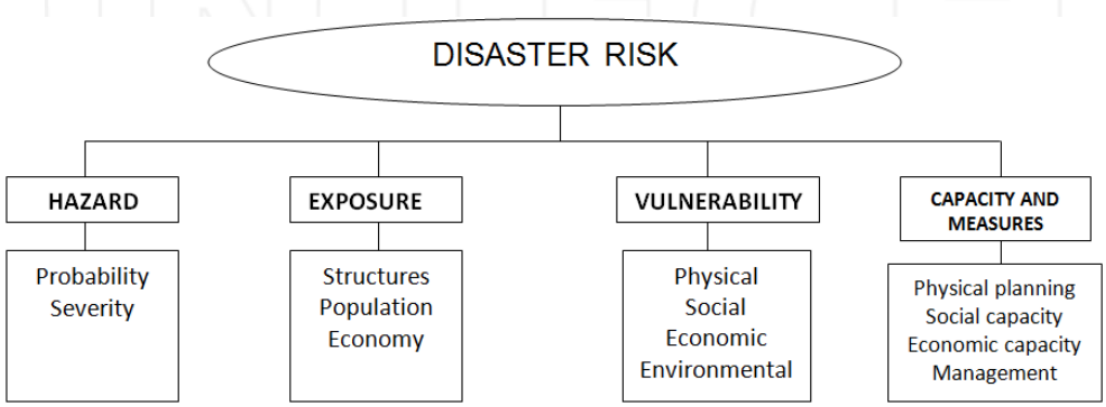


Figure 2: Conceptual framework to identify risk (Davidson, 1997)

3.3 Analysis of concepts

Vulnerability

As a first note, I feel it is noteworthy to state that there is an abundance of literature available on the many views shared on the concept of vulnerability. Within this next section, I will only discuss a few that were most relevant to this research. According to Ciurean, Schröter & Glade (2013), the last few decades have demonstrated an increased concern for the occurrence of disasters and their consequences for leaders and organizations around the world. The EM-DAT International Disaster Database statistics show that, in the last century, the mortality risk associated with major weather-related hazards has declined globally, but there has been a rapid increase in the exposure of economic assets to natural hazards. The implementation of mitigation and preparedness strategies to react to these natural hazards called for another approach, namely, to investigate the underlying characteristics of the environment and society that makes them susceptible to damage and losses – in other words the vulnerability in determining natural hazard risk levels.

The UN International Strategy for Disaster Reduction (UNISDR) defines vulnerability by means of determining two essential elements in the formulation of risk: a potential event – hazard, and the degree of susceptibility of the elements exposed to that source – vulnerability (see below).

RISK = HAZARD X VULNERABILITY

Ciurean, Schröter & Glade (2013) state that there are multiple definitions, concepts, and methods to systematize vulnerability, indicating the wide variety of views and meanings attached to this term. Birkmann (2013) noted that 'we are still dealing with a paradox: we aim to measure vulnerability, yet we cannot define it precisely'. However, there are generally two perspectives in which vulnerability can be viewed and which are closely linked with the evolution of the concept: (1) the amount of damage caused to a system by a particular hazard (technical or engineering sciences oriented perspective – dominating the disaster risk perception in the 1950s and still

significant today), and (2) a state that exists within a system before it encounters a hazard (social sciences oriented perspective – an alternative paradigm which has used vulnerability as a starting point for risk reduction since the 1980s). This thesis aims to identify the root causes of vulnerability, thereby falling into the second category of the social sciences-oriented perspective. The abundance of (internet) sources and literature studies on hazard impacts in Dominica give us an indication that the technical or engineering sciences-oriented perspective still dominates the literature landscape and calls for an alternative, social sciences view to uncover the causes of structural vulnerability in Caribbean states.

Terminology

"Given the complex and crosscutting nature of the term, it is not surprising that there is no single or universally accepted definition of vulnerability" (Rhiney, 2015). In general, vulnerability is often characterized or framed in terms of the sensitivity or exposure of a social or ecological system to shocks, stresses, or disturbances, and that system's ability to adapt to changing conditions (Luers 2005). The IPCC report in 2014 defined vulnerability as: "the propensity or predisposition to be adversely affected" (IPCC, 2014). The report further states that vulnerability encompasses a variety of concepts including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (Oppenheimer et al. 2014). Tompkins et al. (2005) define vulnerability as consisting of "the degree to which an individual, group or system is susceptible to harm due to exposure to a hazard or stress, and the (in)ability to cope, recover, or fundamentally adapt (become a new system or become extinct)."

Interestingly, Rhiney (2015) mentions in his article that in these definitions a certain viewpoint is embedded that vulnerability must always be linked to a social or ecological system's level of exposure and inherent sensitivity to external stresses and shocks, as well as the capacity of that system to anticipate, respond to, recover from, or even adapt to these occurrences. Vulnerability, especially within the disaster literature, is therefore usually seen as having an external and an internal component. Bohle (2001) shares the same view and, according to him, the external side is related to the exposure to risks and shocks and is influenced by political economy approaches (e.g. social inequities, disproportionate division of assets), human ecology perspectives (population dynamics and environmental management capacities), and the entitlement theory (first introduced by Robert Nozick in 1974). The internal side is called coping and relates to the capacity to anticipate, cope with, resist and recover from the impact of a hazard and is influenced by the Crisis and Conflict Theory (control of assets and resources, capacities to manage crisis situations and resolve conflicts), Action Theory Approaches (how people act and react freely as a result of social, economic or governmental constrains) and Model of Access to Assets. See figure 3 below for an illustration of this.

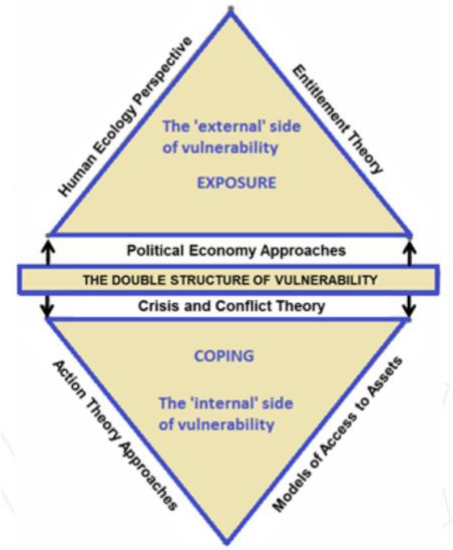


Figure 3: Bohle's conceptual framework for vulnerability analysis (2001)

Susceptibility

"Susceptibility of the exposed assets can be understood by exploring the historical, social, economic, physical, cultural, environmental, and institutional dimensions of susceptibility" (Jackson, McNamara & Witt, 2017). What this entails is diving into the true meaning and definition of susceptibility. Only then, can we fully understand how this concept relates to disaster risk and vulnerability. In literature, María José Domínguez-Cuesta (2016) refers to the term susceptibility as: ""the state of being susceptible" or "easily affected." In natural hazard terms, susceptibility is related to **spatial aspects** of the hazard. It refers to the tendency of an area to undergo the effects of a certain hazardous process (e.g., floods, earthquakes, tsunamis, subsidence, etc.) without taking into account either the moment of occurrence or potential victims and economic losses" (Domínguez-Cuesta, 2013).

In the framework by Jackson, McNamara & Witt, susceptibility is seen as an overarching concept that encompasses several themes, such as historical, economic, environmental, physical, cultural, etc. We can then further analyze these themes by dividing them into a number of key indicators. See table 1 below for an overview.

Table 1: Key indicators for each susceptibility dimension of disaster vulnerability (Jackson, McNamara, Witt)

Dimension	Themes represented as susceptibility as a dimension of disaster vulnerability
Historical	Relocation of villages to shoreline
	Population growth
	Resource diminishment
	Changing lifestyles
Social	Disaster impact on health
	Water security
	Disaster impact on education
	Losing self-reliance
Economic	Economic impact from cyclone Pam
	Perceived increased need for money to access goods and services
	Lack of funding for programs (for example, DRR, climate change adaptation, and development) and a dependence on volunteers
	Desire for other economic activities
Physical	Infrastructure: location and design
	Lack of safe houses/evacuation centers
	Loss of communications
	Loss of coastal tree cover
Cultural	Loss of ecosystem services (impact on five customary elements: yams, pigs, mats, kava, and bananas)
	Spiritual connection with land impacted by disasters
Environmental	Climate change
	Impact from cyclone Pam
	Ecosystem services
	Resources diminishment
	Water security
Institutional	Weakening traditional practices
	Community/land disputes
	Weak national institutions
	Changing community structure

Livelihood resilience

Pratt et al. (2004) in the manual of the Environmental Vulnerability Index (EVI), state "When we talk about vulnerability, we are automatically also talking about resilience because the two are opposite sides of a single coin", suggesting that the two concepts go hand-in-hand and are related to one another. This is confirmed by Scandurra, Romano, Ronghi, & Carfora (2018), who state that some scholars include the concept of resilience in their assessments of vulnerability. Moreover, the concept of vulnerability and/or resilience can regard specific aspects (i.e., economic vulnerability, environmental resilience) and/or particular areas (i.e., pacific area, developing countries).

The term 'livelihood resilience' is also mentioned in the framework by Jackson, McNamara & Witt, where five factors or assets that form part of this livelihood resilience are listed, including: knowledge, information and resource flows, participation in decision-making, capabilities, assets and activities, social capital and human rights. Interestingly, there has been some debate about the terminology of resilience amongst social scientists. Kevon Rhiney (2019) for examples argues that the term 'resilience' is problematic in a sense that nations often refer to it as 'bouncing back'- insinuating a return to a pre-disaster state, which predisposes the system to the same or similar kinds of vulnerabilities and threats. "Resilience should facilitate the transition to a new and improved configuration of an impacted socio-ecological system through the identification and deployment of calculated techniques, technologies and strategies of governmental control." At its core, resilience implies that change, disruption and vulnerability provide potentially beneficial conditions for a system to transition into an improved state, without losing its essential identity and functions.

Despite the ongoing attempts to retheorize the meaning of resilience, it still remains unclear as to how well these translate into transformative practices on the ground. I agree with this statement, as for Dominica it remains unclear as to how the impacts of adaptation strategies and practices will unfold in the future and whether this will unlock the country's full potential, including achieving full resilience for vulnerable communities within Dominica.

Exposure

According to the United Nations, exposure is defined as "the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas" (UNDRR, n.d.) . As stated in the UNDRR glossary, "measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability and capacity of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest" (UNDRR, n.d.).

More concretely, when examining figure 4 taken from the article *Prioritization of flood vulnerability, coping capacity and exposure indicators through the Delphi technique: A case study in Taquari-Antas basin, Brazil* by Madruga de Brito, Evers & Höllermann (2017), we see how all three spheres intersect one another and form the element of risk in the middle of the figure. Exposure, in this case, comprises of a number of elements including: structures, population, agriculture, business and assets. In contrast to the framework by Jackson, McNamara and Witt, this framework does not mention exposure being either temporal or spatial, but rather focuses on the elements that cause certain exposure to natural hazards within (vulnerable) communities.

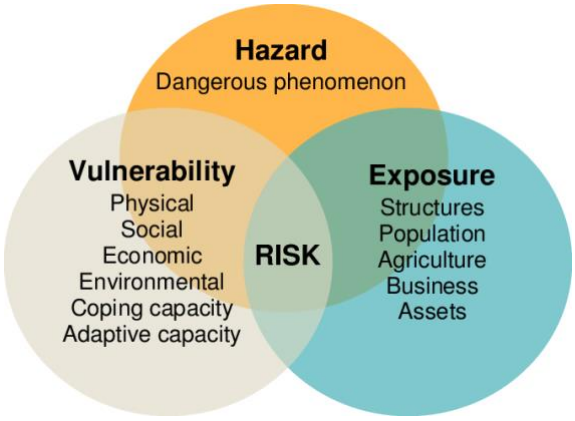


Figure 4: Conceptual framework for disaster risk assessment (Spalding, et al., 2014)

Adaptive capacity

This concept was not mentioned in the vulnerability framework by Jackson, McNamara and Witt, but was chosen to analyze as many adaptation strategies are geared towards increasing adaptive capacity to shock pressures of disasters. The term adaptive capacity is often used in combination with the rather problematic phrase (as mentioned above) to 'bounce back'. This is criticized by scholars (Rhiney, 2019), as 'bouncing back' to the same vulnerability pre-disaster state is undesirable and this is not what adaptation strategies ultimately aim to achieve.

Already in 2003, authors Joel B. Smith, Richard J.T. Klein and Saleemul Huq spoke of adaptive capacity as an alternative to mitigating the effects of climate change. Here, they referred to adaptive capacity as "the ability of a system to adapt to climate change, reduce adverse effects or take advantage of beneficial effects" (Smith, Huq, & Klein, 2003). Examples of this are increasing wealth and improving education, income distribution, institutions and health care so that society is better prepared to cope with climate change and other stresses. Moreover, Smith et. al state that ultimately, the question becomes whether it is more prudent to invest in specific adaptations or enhancements of adaptive capacity. The IPCC further states that adaptive capacity is a function of: wealth, access to technology, stable and effective institutions, systems in place for dissemination of information, equitable distribution of power and well-functioning social systems. The adaptive capacity of communities is determined by their socioeconomic characteristics. The enhancement of adaptive capacity represents a practical means of coping with change and uncertainties in climate, including variability and extremes (Smith, Huq, & Klein, 2003).

Another paper by I.M. Ferdinand, T. Haynes and M. Richards (2014) was chosen for this concept, in which an assessment was made on vulnerability and adaptive capacity in relation to hazards and climate change and the implications for Small Island Developing States (SIDS) in the Caribbean. According to the paper, building capacity to hazards and climate change is most effective if communities are integrally involved in assessing risks and reducing vulnerability. This entails integrating a bottom-up approach, rather than the conventional top-down approach.

Conclusions

What can be concluded from this theoretical framework chapter is that there is an abundance of literature written on disaster vulnerability assessment and that there is no single or universally accepted definition of the term vulnerability. However, what many frameworks have in common within disaster risk assessment is the combination of the concepts hazard, exposure and vulnerability. There seems to be a consensus or understanding among disaster scholars that vulnerability encapsulates the interplay between these three phenomena. When examining the concepts separately, we can note that susceptibility of the exposed assets can be understood by exploring the historical, social, economic, physical, cultural, environmental, and institutional

dimensions of susceptibility. Concrete examples of this include looking at population growth, water security, resource diminishment, lack of funding for programs, etc. Furthermore, there has been some discussion amongst disaster scholars regarding the term 'resilience', as some view this as problematic in a sense that nations often refer to it as 'bouncing back'- insinuating a return to a pre-disaster state, which predisposes the system to the same or similar kinds of vulnerabilities and threats. Because the aim of this thesis also involved examining the adaptation strategies set by the government of Dominica, I thought it would be relevant to explore the meaning of adaptive capacity in order to fully understand the adaptation strategies. Here, adaptive capacity refers to "the ability of a system to adapt to climate change, reduce adverse effects or take advantage of beneficial effect" (Smith, Huq, & Klein, 2003). Furthermore, research revealed that building capacity to hazards and climate change is most effective if communities are integrally involved in assessing risks and reducing vulnerability.

4. Case study: Dominica

4.1 Motivation

Dominica was selected as a case study for this thesis due to its high ranking (3rd place out of 181 countries) in the WorldRiskIndex (Behlert, et al., 2020) highlighting the country's vulnerability and exposure to climate shocks, and due to the media attention this country has received in light of prime minister Roosevelt Skerrit's announcement in 2017 to become the first climate-resilient nation by 2030. The article published online by the National Geographic in November 2019 titled "This Caribbean Island is on track to become the world's first 'hurricane-proof' country" announced the ambitions plans set by the government of Dominica for the first time in mainstream media. After reading this article, I became intrigued by the island and its historic and future development trajectory and I decided to select this country as a case study for my thesis topic.

WorldRiskIndex 2020 Overview

Classification	WorldRiskIndex	Exposure	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
very low	0.31 – 3.29	0.91 – 9.55	22.81 – 34.13	8.32 – 16.75	37.36 – 59.21	14.59 – 24.65
low	3.30 – 5.67	9.56 – 12.13	34.14 – 42.38	16.76 – 20.97	59.22 – 71.76	24.66 – 34.35
medium	5.68 – 7.58	12.14 – 14.64	42.39 – 48.12	20.98 – 27.93	71.77 – 78.01	34.36 – 40.64
high	7.59 – 10.75	14.65 – 19.69	48.13 – 61.49	27.94 – 45.13	78.02 – 85.20	40.65 – 52.72
very high	10.76 – 49.74	19.70 – 86.77	61.50 – 76.34	45.14 – 70.83	85.21 – 93.80	52.73 – 69.72

Max. value = 100, classification according to the quintile method

Rank	Country	WorldRiskIndex	Exposure	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
1.	Vanuatu	49.74	86.77	57.32	38.81	52.42	80.73
2.	Tonga	29.72	61.21	48.56	28.76	37.08	79.85
3.	Dominica	28.47	62.74	45.38	26.12	38.82	71.21

Figure 5: The WorldRiskIndex, 2020 *(Behlert, et al., 2020)*

4.2 The Context: Dominica

The Caribbean Island of Dominica consists of approximately 750 square kilometers of land. The highest elevation is *Morne Diablotins,* which is part of a chain of rainforest-covered volcanic peaks that creates a central steep mountain range, from which a total of 365 rivers originates (Barclay, et al., 2019). This precipitous topography creates unstable slopes, strong variation in rainfall and "a steep marine shelf" (Benson, Clay, Michael, & Robertson, 2001). Dominica also lies under the influence of the "intertropical convergence zone, with a shift in wind patterns and broadly increased rainfall during the July to October hurricane season" (Barclay, et al., 2019). Therefore, high rainfall in the mountainous non-coastal areas of the island also results in frequent localized flooding and landslides, which are recurrent annual problems for the island. Next to this, Dominica is prone to a wide variety of natural hazards, including hurricanes and tropical storms, intense rainfall, slope instability, volcanic eruptions, seismic activities, and tsunamis (Wilkinson et al. 2016). Approximately 70% of the island's total land base is considered unsuitable for agriculture, primarily due to the risk of sheet erosion (the uniform removal of soil in thin layers) or waterlogging (Burke & Lovell, 2000). This creates a national dependency on food imports for the local population and makes Dominica's economy particularly vulnerable to external shocks.

As stated above, Dominica is highly vulnerable to the effects of climate change, the impacts of which have already been experienced by the impacts of hurricane Maria in 2017, Tropical storm Erika in 2015 and many other disaster events in the previous decade. When Hurricane Maria destroyed the island of Dominica in 2017, the devastation stimulated an ambitious goal to make the island fully adaptive to climate change (Gibbens, 2019). The country's prime minister Roosevelt Skerrit gave a speech after the category 5 hurricane in 2017, announcing to make Dominica into the world's **first fully climate resilient nation**. According to the prime

minister, it requires not 'replacing what was lost, but building for a future where climate change all but guarantees a storm of Maria's scale will strike again' (Gibbens, 2019). Dominica is striving to construct not only hurricane-proof buildings but also a diverse economy, including a tourism sector that attracts more high-end spenders and an agricultural system that grows a variety of fruits and vegetables eaten locally, rather than primarily exporting bananas (Gibbens, 2019). Fundamentally, the vision of building a climate resilient Dominica is about significantly reducing the impact of, and time to recover from, climatic and other shocks as well as boosting the overall socioeconomic development trajectory of the country (Gibbens, 2019). This is because Dominica has always been in a vulnerable position economically, socially, culturally, and environmentally given its susceptibility to disasters and its ecological and economic fragility. Vulnerability to climate change in Dominica, like many Small Island Developing States (SIDS), is exacerbated by external pressures affecting its resilience and adaptive capacity such as terms of trade, impacts of globalisation (both positive and negative), financial crises, international conflicts, external debt and internal local conditions such as population growth, reliance of fossil fuel imports, incidence of poverty, inadequate social capital, unemployment, limited resource base for economic development, reduced social cohesion, and a widening gap between poor and rich, together with the interactions between them.

Conclusions

To sum up, there are multiple structural problems that constrain development in the region of Dominica. This case study focuses on the underlying economic vulnerabilities and physical exposure to hazards created by historical events and agricultural, economic, and social practices. Interestingly, the case study conducted by Benson et al. in Dominica revealed that a particular level or form of hazard vulnerability is not inevitable. It appears that some sectors and sub-sectors are more vulnerable than others, whilst measures can be taken to reduce structural vulnerability. The latter is what the government of Dominica attempts to do through implementing a number of resilience strategies and policies. More on this can be read in chapter 8 of this thesis.

4.3 Environmental/physical characteristics

The following sub-paragraph will go into further detail on the current characteristics of the island, focusing on some of the geographical and/or environmental aspects. I have decided to divide this theme into a number of sub-topics, namely: volcanic activity, coastal zone and erosion, landslides and lastly environmental resources. Figure 6 on page 19 illustrates the towns, surfaced roads, rivers and streams and mountainous peaks in Dominica along with the geographic vulnerabilities of the island. These include previous volcanic activity in the 1990s, sea defences required along the coastal area and particular infrastructure damages along the coastline. When comparing figure 6 and 7, we can establish a correlation between the population distribution in Dominica and the limited infrastructure, with in particular roads going inland. We can also establish a connection between many points along the coastline where a large percentage of the population is located and where sea defences are required. This makes the population in these towns extra vulnerable. The rivers flowing inland from the mountainous areas also form a risk to landslides, placing communities living inland also in a vulnerable position.

Volcanic activity

As seen in figure 6, Dominica's population groups residing along the coastline in the southwestern part of the island are at risk for potentially hazardous volcanic activity, next to facing the risks of its fragile coastal ecosystem. The island of Dominica is geologically extremely young and almost completely volcanic in origin. Following a recent volcanic alert, communities' susceptibility and vulnerability to volcanic activity in the future is now a major cause for concern. According to website *ThinkHazard* of the GFDRR, in Dominica the volcanic hazard is classified as high according to the information that is currently available. This means that the selected area is located at less than 50 km from a volcano for which a potentially damaging eruption has been recorded in the past 2,000 years and that future damaging eruptions are possible. The volcanic activity also poses a risk for any agricultural activity that is encouraged by the government in order to achieve self-sufficiency and become less dependent on imports.

Coastal zone

Given Dominica's mountainous physical topography, most of the population and infrastructure are located along the coast (as seen in figure 7), posing an existing threat to life and property. Human settlements, industry and infrastructure are located along the coastline and are therefore more prone to flooding and the impacts of hurricanes and storms (OAS, 2019). The high concentration of communities or population groups residing along the coastline is not coincidental, as strategic historic decisions have shaped the location and formation of towns and assets in Dominica. More on this can be read in chapter 7.1 of this thesis. Currently, the lack of enforcement of building codes along with the unplanned and unregulated developments which have occurred in the coastal areas, pose a serious threat to life and property. Proper disaster risk reduction (DRR) measures such as shelter housing, enforcement of strict building codes or strengthened housing to withstand disasters is something which has never been implemented in Dominica. A lack of knowledge, funding and governmental instruments to implement such measures were the root causes of this. The potential negative impacts of global climate change and disasters are expected to exacerbate the already existing negative impacts on the watersheds and coastal zones of Dominica (Commonwealth of Dominica, 2017).

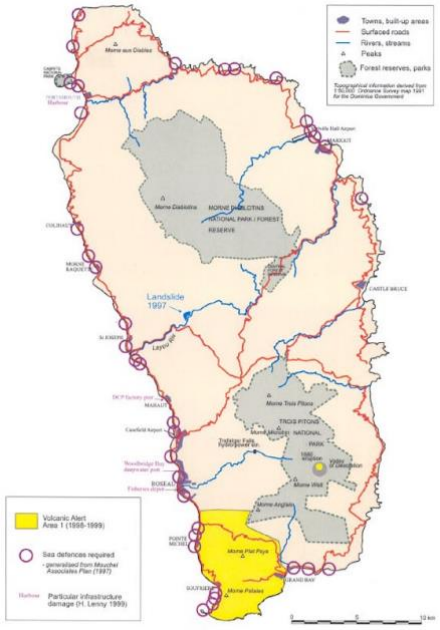


Figure 6: Natural hazard vulnerability map (GFDRR, 2001)

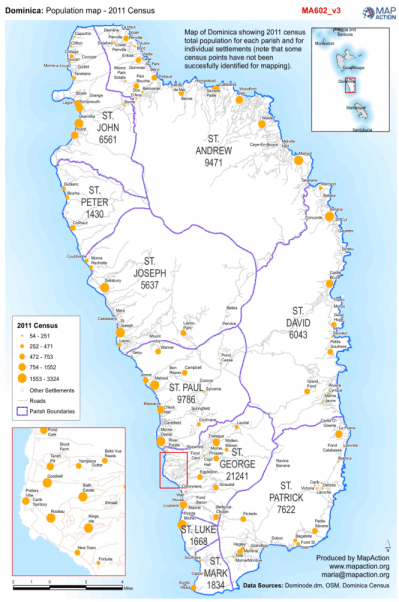


Figure 7: Population distribution map of Dominica (OSM, 2011)

Hurricanes and erosion along coastlines

Literature revealed that next to high tides and storm surges, hurricanes can also cause accelerated erosion to coastlines, damaging physical structures that have desirable value such as beaches and reefs. In Dominica, informants drew attention to several examples of such damage on the island's west coast after Hurricane Lenny. Hurricane David, which occurred in 1979, can be considered as the biggest disaster event in the previous 40 years. Almost all the roads and most of the bridges were damaged by Hurricane David. Many roads were blocked by landslides and road communication between different parts of the country was greatly limited. The flooding that frequently accompanies hurricanes resulted in the acceleration of soil erosion and increased turbidity of the near shore waters. This contributed to further degradation of watersheds and an accompanying increase in vulnerability. Next to this, hurricanes have had negative impacts on wildlife and marine life. The impact of hurricanes on the marine environment is accepted, but to a large extent remains poorly described, assessed and quantified. This is because it is extremely difficult to establish benchmark data such as species composition,

population totals and measurements of coral reefs in a small island developing state like Dominica. The poorer settlements along the coastline of Dominica in combination with the high frequency of hurricanes and storms, forms a high level of vulnerability for these settlements, whose livelihoods depend on the fisheries industry.

Landslides

Another phenomenon that is typical for the island of Dominica is landslides. The Caribbean islands of Dominica and Saint Lucia are characterized by their intense heavy rainfall and steep slopes which give rise to frequent landslide occurrences (Yifru, 2015). Many forces and features combined make Dominica extremely vulnerable to landslides and mudslides. Intense rainfall is considered to be the most important trigger of landslides. Even though there might be earthquakes occurring on the island, their expected intensity is generally not considered to be high enough to cause substantial landslide problems. Dominica is among the wettest in the Caribbean, its annual rainfall ranging from 1000mm to 10,000 mm in different parts of the island (Yifru, 2015). The geology of Dominica coupled with its topography make the country very susceptible to landslides. Between the period of May until December, the country experiences the highest precipitation levels and most of the disaster events occur during this period. According to De Graff and others (1987), at least 2% of the total land area has been disturbed by landslides. In the past the country has encountered many landslide events and almost all these events are related to high amounts of rainfall. As seen in figure 9 below, already in the 1980s, Dominica has had by far the highest number of landslides and also largest in size compared to the nearby located islands of St. Vincent and St. Lucia.

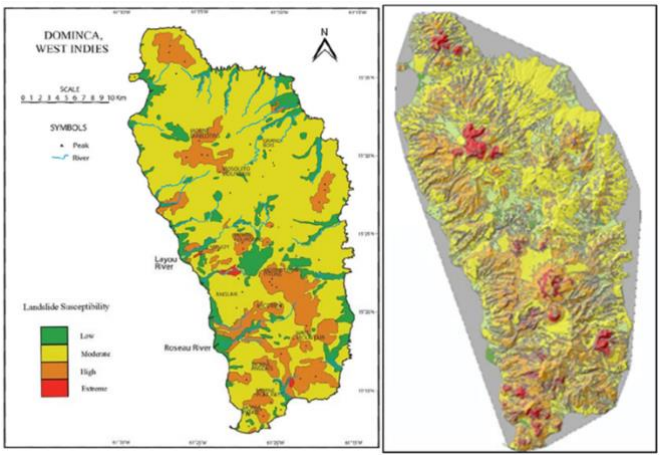


Figure 8: Previous landslide susceptibility maps for Dominica: Left: study carried out by DeGraff (1987, 1990). Right: study carried out by CIPA for USAID in 2006, as part of a multi-hazard mapping project

Island	Number of Landslides	Landslide Size (in hectares)	Landslide Density (per sq.km)	Terrain Disturbed (in percent)
		Average and Largest		
St. Vincent	475	0.5 and 4.0	1.4	1
St. Lucia	430	3.0 and 5.0	0.7	2
Dominica	980	4.0 and 12.5	1.2	2

Figure 9: Number, size and area disturbed by past landslides on three islands mapped by DeGraff in the 1980's (DeGraff et al., 1989).

Environmental resources

For Dominica, the environmental resources, in the sense of visible land, sea, flora and fauna, are important economic assets. The environment has value to the people of Dominica, which can be quantified, and these resources, beaches, forests and specific fauna are particularly vulnerable to natural hazards" (Benson, Clay, Michael, & Robertson, 2001). The rich and diverse natural resource base and mostly unspoiled landscape have led to Dominica being known as the "Nature Island of the Caribbean". According to Benson et al. (2001), we see

that these resources are coming under increasing pressures from the island's economic development efforts based primarily on agriculture (bananas), agro-processing, manufacturing and more recently: tourism (Benson, Clay, Michael, & Robertson, 2001). It is this combination of a challenging physical environment and the dependence of the population on the land for their socio-economic well-being which, more than anything else has guided the course of Dominica's history, its economic development and patterns of land and coastal zone degradation (Organization of American States (OAS), 2019).

Furthermore, there have been significant changes to Dominica's climate system characterized particularly by increases in temperatures, and the frequency and intensity of rainfall events that lead to flooding. It is expected that these temperatures will continue to rise along with higher sea levels and intensified storm surges (NRDS, 2020). Additionally, the geographic characteristics of Dominica offer opportunities for further development (tourism), but simultaneously make the country more susceptible to natural hazards and disasters. The densely populated coastline, the mountainous terrains and volcanic activity pose a risk to communities living on the island of Dominica in the case of insufficient disaster management and/or response implemented by the government.

Conclusions

According to the IUCN (2019), human vulnerability to natural hazards is further exacerbated by ongoing environmental degradation, high population densities in exposed areas, increased frequency of extreme weather events and lacking or ineffective government policies. "The most vulnerable are often those who are most dependent on natural resources for their livelihoods. Ecosystem restoration and sustainable management of natural resources can therefore play a critical role in people's ability to prevent, cope with and recover from disasters (IUCN, 2019)." For Dominica this would entail working out a strategic plan for sustainable management of its natural resources and finding alternative economic development efforts. This thesis aims to analyze whether the adaptation strategies will succeed in achieving the beforementioned goals.

5. General Caribbean literature – wider areas of knowledge

Within the theoretical framework I chose to also select a number of articles that focus on colonialism in the Caribbean region and how this has lead to an increased level of vulnerability. This was chosen intentionally, in order to 'zoom out' and examine the region as a whole, and how its history has shaped its current growth (or lack of). When taking a broader overview of the Caribbean and its development trajectory, the colonization of the Caribbean islands is generally portrayed as problematic for future growth and for becoming more resilient against natural hazards. Within this sub-chapter, colonialism in the Caribbean will be linked with increased vulnerability and disaster risk, and therefore fits well within the literary framework that was chosen for this thesis. A more thorough, detailed elaboration of these links can be found within the findings and results section of this thesis (chapter 7.1), demonstrating how this theory relates to the findings that were acquired during the data gathering stage for the specific case of Dominica.

The article "Disaster, Debt and 'Underdevelopment': The Cunning of Colonial-Capitalism in the Caribbean by Gahman, Thongs & Greenidge (2021) provides a critical overview of the structural forces exacerbating risk related to disasters in the Caribbean. It asserts that future critiques of and solutions to vulnerability, disaster and catastrophe in the Caribbean be more attentive to the historical trajectories of imperialism, debt and 'underdevelopment'. Furthermore, the article proposes that 'decolonization' in the region remains incomplete and whilst the vast majority of the nation states in the Caribbean have been independent since the 1960s-1970s, they are marked by "a paradoxical type of political sovereignty and experience of development" (Gahman, Thongs, & Greenidge, 2021). This argument proves itself to be true, as my own research (particularly the interview with prof. Webber) revealed that many countries in the Caribbean remain dependent on foreign (British) investment capital, knowledge capacity and export markets, in order to achieve development aims. Therefore, it remains challenging to completely accept and embrace the idea of full sovereignty and a finalized decolonization trajectory.

Another argument that Gahman, Thongs & Greenidge (2021) present in their article is that the Caribbean region continues to be plagued by plantation logics, debt and import dependency. More specific details on Dominica's national debts can be read in chapter 7.2 of this thesis. Furthermore, the concept of development is framed in the article as 'an ideology born and refined in the Global North – a Western ideology devised largely to meet the needs of (neo) colonial agents that were in search of a more 'appropriate' tool than naked violence for their economic and geopolitical expansion (Gahman, Thongs, & Greenidge, 2021).

Views on development and modernization

For this sub-paragraph, I'd like to draw on the scholar Walter Rodney, who devoted much of his time investigating how the Western nations caused for 'underdevelopment' in previously colonized countries. There is an abundance of literature available on this topic and many research scholars have explicated their own personal view on this topic. Firstly, we can link the modernization theory by W.W. Rostow (1960) to underdevelopment, as this theory suggests "traditional" or underdeveloped countries can be brought to development in the same manner more developed countries have been. Modernization is particularly interesting in this sense as many adaptation strategies that are written nowadays are created within the scope of modernization, with the overarching goal of bringing a nation to development by means of implementing effective (economic/agricultural) strategies. Adaptation, in this sense, deals with not only climate adaptation strategies, but is also geared towards transitioning from a less developed economy, into a flourishing one, generating more wealth and future prospects for entering the global market. Globalization and modernization are two terms that go hand in hand, it is argued that globalization is related to the spreading of modernization across borders.

Literary perspectives regarding development

In the abovementioned article, the authors state that development became a doctrine that 'aided and abetted a dying and obsolete colonialism, allowing it to transform into an aggressive instrument to (re)capture land, labour and capital, as well as to create new markets' (Gahman, Thongs, & Greenidge, 2021). The scholar Walter Rodney refers to development as the "asymmetrical extractive nature of Western development, posing as an ongoing threat to former colonies" (Gahman, Thongs, & Greenidge, 2021). Underdevelopment, he continues, is not the absence of development but it is very much tied to the fact that human social development has been uneven and from an economic point of view, some human groups have advanced further by producing more and becoming wealthier. Development, according to him, revolves around exploitative ideas and extractive practices of "free trade", privatization, industrial production and the transfer of wealth/resources.

Another article by Levitt (2005) revealed that the relationship between the practices or processes of colonialism and capitalism continue to be highly influential in how governance, societies, economies and certain cultural norms have been shaped and operate within the Caribbean. The article argues that the impacts of hurricanes and the course of the subsequent recovery are determined by a country's preparedness and capacity to respond. At national and regional level, state attention and expenditures on disaster prevention, recovery services and public health and education can function as a protective shield. Furthermore, Levitt (2005) states that a debt-induced lack (or mismanagement) of financial resources paired with the failure to protect ecosystems, dismissals of climate science, ongoing corruption of regional governments and/or reductions of investment in social welfare pose large threats to many living in small island developing states and 'underdeveloped' areas.

I draw on another article that supports this claim, namely by Alex A. Moulton & Mario R. Machado, titled 'Bouncing Forwards After Irma and Maria: Acknowledging Colonialism, Problematizing Resilience and Thinking Climate Justices, where the authors state: "continued structural dependency and outright entanglement in colonial relationships complicated recovery and coordination of aid to affected communities across the region." (Moulton & Machado, 2019). One of the arguments mentions that the outcomes of hurricanes Irma and Maria invite for examinations of persisting colonial power dynamics in discussions of climate hazard. "The damage to infrastructure and loss of life from Irma and Maria reflect the persisting impacts of racial capitalist development on the social and ecological dynamics of the Caribbean." According to Moulton & Machado, the reproduction of a racial hierarchy has been an essential condition for capitalist accumulation. Another article by Kevon Rhiney "Dispossession, disaster capitalism and the post-hurricane context in the Caribbean" (2020) poses that the damages of disasters has little to do with the actual hurricanes themselves, but rather the ways in which these disasters become 'embroiled' in a longer history of structural violence that undergird the way the Caribbean has long been experimented with and exploited. Here, the connection is drawn with colonial exploitation and the increased vulnerability of communities and nation states within the Caribbean.

Conclusions

The Caribbean region has had a turbulent history, and failure to acknowledge this history would lead to a lesser understanding of the Caribbean nation states' current characteristics, and lack of (climate) resilience. It therefore seemed evident to include a theoretical framework that would not merely provide insights on general disaster vulnerability frameworks and theories, but also to include specific literature that emphasizes the effects of colonialism in the Caribbean on modern-day climate and resiliency challenges. This literature stated a number of arguments, including that decolonization in the Caribbean region remains incomplete and that some Caribbean states are marked by "a paradoxical type of political sovereignty and experience of development" (Gahman, Thongs, & Greenidge, 2021). Furthermore, what came forward during this literature study is that the Caribbean region continues to be affected by plantation logics, debt and import dependency and that a debt-induced lack (or mismanagement) of financial resources paired with the failure to protect ecosystems, dismissals of climate science, ongoing corruption of regional governments and/or reductions of investment in social welfare pose large threats to many living in small island developing states and 'underdeveloped' areas (Gahman,

Thongs, & Greenidge, 2021). The relationship between the practices or processes of colonialism and capitalism continues to be highly influential in how governance, societies, economies and certain cultural norms have been shaped and operate within the Caribbean and according to Gahman, Thongs & Greenidge (2021), future critiques of and solutions to vulnerability, disaster and catastrophe in the Caribbean should be more attentive to the historical trajectories of imperialism, debt and 'underdevelopment'.

6. Methodology

In this methodology chapter I will first elaborate briefly on the overall research approach. Thereafter, I will motivate my decision for choosing a case study to demonstrate my findings and results. I will explain the research methods that were used to gather data and discuss possible shortcomings that may have constrained my research. Lastly, I will describe the process of writing this thesis, including the process of finding the interviewees and my own personal development throughout this thesis trajectory of 12 months.

6.1 Research approach

I have used qualitative research methods to answer the formulated research questions. Boeije (2009) explains that 'the purpose of qualitative research is to describe and understand social phenomena in terms of the meaning people bring to them'. In this research, I used a case study to focus on one Small Island Developing State in particular, as it would be unfeasible to do so for the entire region of the Caribbean. General claims cannot be made regarding these nations in the Caribbean, due to the heterogeneity of the islands. This is also a reason why a case study was chosen in particular, to focus more in-depth on one of the islands.

Yin (1981) explains that case studies can serve the goal of explanation and fit within research with the focus on examining a phenomenon in its real-life context, but with unclear boundaries between the phenomenon and its context. This fits the critical realism perspective (Easton 2010), which acknowledges events (in 'the actual') that are linked to social constructs (in 'the real') (Tinsley, 2021). A case study is most often characterized by the selection of one case, a high level of intensity and detail and placing of the research in context and the use of multiple methods for data collection (Lewis, 2003).

6.2 Research methods

This thesis was centered around a descriptive, theoretical research approach. This includes describing a certain phenomenon (in this case vulnerability and/or adaptation strategies of Dominica). The research was empirical - based on observation and measurement of phenomena - as directly experienced by the researcher). Unfortunately, the opportunities to retrieve empirical data from island communities were unfeasible at the time of data gathering due to global COVID restrictions. Moreover, the thesis consisted of fundamental research or theory-oriented research which goal is to gain knowledge to improve or expand existing knowledge about a specific phenomenon. The section below clarifies how the data for this thesis was gathered.

6.3 Data gathering and analysis

This thesis sourced its data for the most part from non-empirical sources, the reasoning behind this is explained in the previous section. Non-empirical data in this case includes data stemming from literary sources, including documents, records and (online) publications. Aside from this, the data gathered during interviews (explained in the section below) provided some empirical data.

Semi-structured interviews

I completed two semi-structured interviews in the months July and August of 2021. I had gathered many articles and started a search online for stakeholders which I could possibly interview. Soon after this, I came across CREAD (Climate Resilience Execution Agency for Dominica) after a quick Google search and I recognized a name that was listed on the website, a researcher who had also written an article on the historical trajectories of Dominica, namely Emily Wilkinson. I contacted many authors of literary articles that were of relevance to me, but unfortunately I only received a few replies. I contacted researchers who had written articles concerning Dominica, but also more broadly, namely on the Caribbean as a whole. I stumbled across an article online that linked the plantation history in the Caribbean to an increased level of vulnerability, written by Prof. Oscar Webber. I was able to retrieve his contact details online and reached out to him for an interview. Fortunately, he responded very swiftly and I had planned my second interview.

I had the intention of conducting more interviews but unfortunately this could not be realized due to very limited response of my potential interviewees. I found the process of finding respondents particularly difficult, due to the travel restrictions that prevented me from visiting the island. This made the data gathering more challenging; as the reliability of the research could not be compromised and therefore, I had to broaden my literature base for this research by searching for more books, articles and publications that could support (or refute) my claims.

I spent a vast amount of time searching for literature that was of sufficient quality and that would enrich my other findings. Throughout the course of gathering the data, I was looking for a way to structure my findings and stumbled across the holistic framework that is mentioned in chapter 3.1 of this thesis. This provided me with a certain structure, and I was happy to categorize the findings into these separate sub-topics. This also provided me with some more direction, as in the beginning I struggled to specify my research aim and the specifics of what I intended to investigate. From here on, the writing phase of the thesis became much easier, and I grouped my findings into historically themed data and current data on Dominica. The interviews I transcribed earlier in 2021 also helped me to dive into the historic events of Dominica and how this shaped the (failing) development trajectory for the country.

Towards the end of gathering and categorizing my findings, I started analyzing the findings and tried to investigate how the results related to the current available literature and theories. It was at this point that I realized that I did not fully agree with the way in which the framework by Jackson, McNamara and Witt (2017) was designed, and started to alter this framework to my own personal preference. This was, evidently, backed up by supporting arguments that originated from my own findings. By finding other theories and seeing how the current resilience strategies relate to these theories, I was able to critically analzye the feasibility and framing of these strategies according to available literature online. By doing so, I believe I have developed my analytical skills that have helped me to come to an overall conclusion and to summarize my findings. The knowledge I gained during the first year of my master's degree within the Sociology (SDC) track helped me by providing a basis of social scientific perspectives and ideas that helped me to critically assess my own findings and see where they fit within the realms of social theory. I can therefore conclude by stating that the trajectory of writing this thesis has most definitely helped me to develop my own personal skills, including interviewing, analysis and writing skills.

Research process

Initially, I had the intention to make this thesis consist out of a comparison of two case studies in order to increase the representability and validity of the data. However, I soon realized that the limited availability of literary sources focusing on Vanuatu (that were of sufficient quality) would lead to a weak comparison. In particular, the amount of information that focused on the historic trajectory of the island group was inadequate. Therefore, I chose to focus solely on Dominica, in order to provide a more in-depth analysis on the country's root causes of vulnerability. This provided me with more clarity and focus and proved to be beneficial for the sake of time constraints, as I had to analyze many of the policy documents published by the government of Dominica. This also helped me to investigate broader areas of knowledge, by diving into literature that elaborated on Caribbean history, colonialism and (under)development views.

7. Findings and results

In this chapter I will elaborate on the findings and results after having conducted a case study on Dominica, located in the Caribbean. This chapter consists of two separate parts: chapter 7.1 will reflect on historical trajectory of Dominica and how this has shaped the country's vulnerability, while chapter 7.2 will elaborate on current characteristics of the country (with the exception of the island's environmental/geographic features, as these have already been mentioned in chapter 4). Following this chapter, the adaptation strategies in the scope of becoming climate-resilient by 2030 published by the government of Dominica in various documents will be listed along with a discussion critiquing some of these strategies and their feasibility within the next 10 years.

When examining the available theory, the anthropology of disasters focuses on understanding how physical phenomena become catastrophic events. This socially-oriented perspective views vulnerability as a state that exists within a system before it encounters a hazard. This sub-chapter aims to describe this 'state', including the historical trajectory of Dominica and how these historic events have shaped the country's disaster management/response and its resilience to cope with natural hazards.

7.1 Historical trajectory of Dominica

The interview held with Oscar Webber on the 3rd of June 2021 brought to light that the historical events which took place in Dominica were utmost influential in shaping the island's development trajectory. Throughout the course of the data gathering, it soon became clear that every key element mentioned in the theoretical framework by Jackson, McNamara and Witt (2017) such as the environmental, economic, social, cultural, and institutional facets of susceptibility were all intertwined in the history of Dominica. This chapter and its information therefore became the starting point for this thesis. Throughout the process of data gathering, I found that my data corresponded with a statement made by Barclay et al. (2019), namely that decisions taken by the colonial powers (by the French and then the British) have played a significant role in shaping population distribution and growth patterns, land use, and recovery from hazardous events. Therefore, the decision was made to combine noteworthy historical events and how this has influenced decision-making processes in Dominica that shaped the economic path of the country, along with its socio-cultural implications. Overall, this sub-chapter will examine several key elements of Dominica's history, providing a deeper analysis into the root causes of Dominica's vulnerability.

Endogenous phenomena

Broadly speaking, hurricanes are the hazards that are most synonymous with the Caribbean according to Webber (2018). Reflecting that, they have received the most attention from historians (Webber, 2018). However, historians have tended to consider them as they have traditionally treated disaster, namely as a mostly *exogenous* phenomenon (Webber, 2018). There has been little attention paid to the role *endogenous* factors have played in exacerbating the potential for loss from hurricane impacts. According to Webber, disasters arise when people are made vulnerable to the impacts of natural phenomena; this vulnerability is constructed over time and therefore strongly linked to a nation's historical characteristics and events.

Dominica and its plantation agriculture

One of the ways in which these endogenous phenomena unfold is the influence of plantation agriculture on the deterioration of (arable) land in the Caribbean (Webber, 2018). Environmental anthropologists have begun to recognize the value of examining slavery's environmental subjects, noting the "devastating transformation of diverse kinds of human-tended farms, pastures, and forests into extractive and enclosed plantations, relying on slave labor and other forms of exploited, alienated, and usually spatially transported labor" (Hauser, 2021). According to Webber (2018), environmental devastation that the plantation agriculture brought upon the Caribbean environment has been examined in the past. However, it is the implications of that devastation (in the form of deforestation, soil erosion and the marginalization of subsistence crops) in the context of nature-

induced hazards that has been little examined (Webber, 2018). The answer to why such hazards were particularly common in the Caribbean lies in understanding how sugar plantations expanded in the region. Sugar requires open land and therefore, the creation of plantations throughout the British Caribbean began a process of land clearance and deforestation (Webber, 2018). The hurricane that struck Dominica in 1834 gives us a case that works as an useful analogue to illustrate to some degree the effects that sugar plantations and the mass deforestation they occasioned had on exacerbating vulnerability to hurricanes (Webber, 2018). However, one of the ways in which Dominica differed from Barbados in the 1830s was their agricultural configurations. Where Barbados very obviously focused on the cultivation of sugar, Dominica differentiated and instead focused on coffee (Webber, 2018). Although the growth of coffee production on Dominica was accompanied by some level of deforestation, some of the crucial problems of soil cohesion were mitigated by the focus on coffee. In Dominica "only" 29 people died during the disastrous hurricanes in 1831, nearly all of them enslaved peoples, as they were exposed to even greater vulnerability through lack of shelter. By contrast, planters on Barbados estimated they had sustained losses amounting to £2,311,729 and that 1787 people died as a result of the hurricane, the highest proportion of which were enslaved peoples (Webber, 2018).

Monocropping

Building on Dominica's differentiated agricultural configuration; the history of Dominica since the late 17th century was characterized by successive (failed) attempts by the British colonial powers to establish dominant large-scale agricultural production that would provide income for the colony and home nation and enable the island to flourish. During the colonial period, despite various attempts to rectify the situation, the island's economy remained structurally weak with low levels of productivity and high susceptibility to external economic shocks and hazards (Barclay, et al., 2019). Decisions that were taken regarding land ownership and agricultural and road infrastructure investments by the government increased this underlying economic vulnerability (Barclay, et al., 2019). The large-scale agricultural production in Dominica in the colonial period consisted of mostly monocropping practices, which in turn exacerbated the environmental vulnerability of the island to natural hazards and extreme weather events.

Monocropping in the case of Dominica entailed that one crop would succeed the other and the intention for each crop was to generate profits for the plantation owners through exports (Barclay, et al., 2019). In Dominica a range of coffee, sugar, cocoa, limes, and bananas dominated and rotated as a main export crop throughout the colonial period (Barclay, et al., 2019). This can be seen in figure 10 on page 29 of this thesis. However, the assumption that dominated amongst plantation owners that investment and development on any island would follow from the profits of agriculture after land sales and redistribution proved to be untrue in the case of Dominica in the late 18th century (Murdoch 1984; Trouillot 1988; Honychurch 2017). Figure 10 below provides a description of each crop and the challenges it presented for Dominica's agriculture. The information is taken from the article "Historical Trajectories of Disaster Risk in Dominica" by Barclay, et al. (2019).

Homogeneous approach

The decisions that were taken by Dominica's government regarding land ownership and agricultural and road infrastructure investments deepened the high level of economic vulnerability (Barclay, et al., 2019). In 1763, Dominica was handed over to the British by the French and was grouped administratively together with other Caribbean Islands. The remote colonial system of governance (also referred to as absenteeism) meant that a homogenous approach to development was often adopted across islands, despite particular recommendations generated by locally and regionally commissioned reports (Barclay, et al., 2019). When an approach appeared to generate income in one place, the approach was modified for all, rather than considering the distinctive geographical, resource, and social opportunities represented by each island. This was also the reasoning behind the monocropping practices in Dominica.

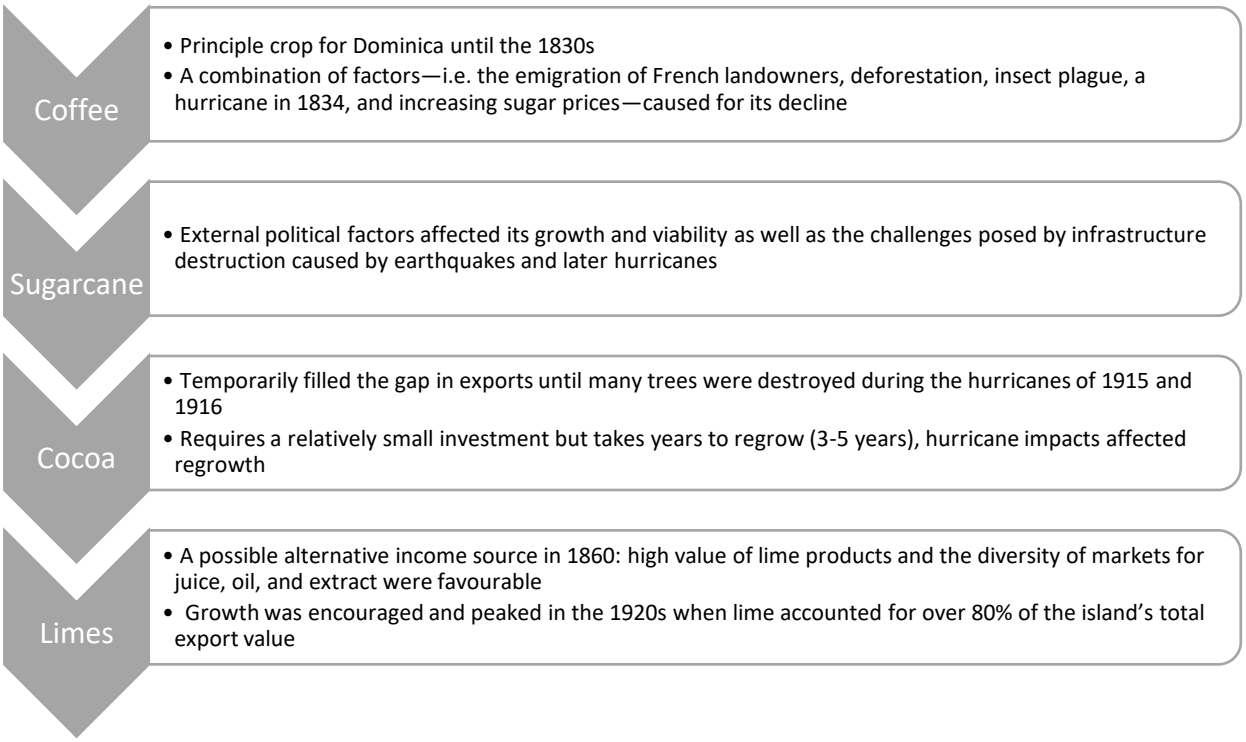


Figure 10: Trajectory of crops grown in Dominica (Source: Barclay et al. 2019)

As seen in figure 10 above, coffee was the main export crop of Dominica until the 1830s, when a combination of factors—including the emigration of French landowners, deforestation, an insect plague, a hurricane in 1834, and increasing sugar prices—caused for its decline (Barclay, et al., 2019). Sugarcane production soon followed after this and consequently increased but external political factors affected its viability as well as the challenges presented by infrastructural destruction caused by earthquakes and hurricanes. After this, cocoa temporarily filled the gap in exports until many trees were destroyed during the hurricanes of 1915 and 1916. Although growing cocoa required a relatively small investment, this was counteracted by the long-term hurricane impact, as cocoa takes longer to regrow (Barclay, et al., 2019). Limes had been identified as a possible alternative income source in 1860 due to the value of lime products and the diversity of markets for juice, oil, and extract (Barclay, et al., 2019). As sugar declined in value, the growth of limes was encouraged and peaked in the 1920s when lime accounted for over 80% of the island's total export value (Nelson 2010).

A report by the West India Royal Commission had recommended Dominica to establish fruit trade, particularly bananas, with North America. Bananas, referred to as ''green gold'' by Thompson (1987), were the central component of Dominica's economy until the 1990s when, together with sporadic impacts from hurricanes, preferential trade tariffs from the EU that had existed since independence came to a halt (Barclay, et al., 2019)

Conclusions

To sum up, the success of each export crop in Dominica was associated with a complex combination of diseases, hazards, and economic circumstances, leading to either an increase or drop in output (Barclay, et al., 2019). These factors often accumulated, threatening the long-term sustainability of each crop as a commercial enterprise. The cycle of 'rise and demise' resulted from an economy dominated by monocultural agricultural practices on large plantation estates; however this was not encouraged (Barclay, et al., 2019). For example, various regionally commissioned reports recommended alternative practices, but there were barriers to implementing these practices. Next to this, Dominica's mountainous terrain had presented severe challenges to agricultural development throughout the colonial period and a great infrastructural investment was needed to unlock the agricultural potential of Dominica (Barclay, et al., 2019). However, land purchase and ownership

arrangements severely restricted this investment and the encouragement of crop diversification. The economic system of plantation agriculture stemming from the 18th century British West Indies ‘‘rested on a complex and permanent system of borrowed capital, to finance the establishment of plantations and short-term loans to finance the year-on-year running costs, the resultant debts being serviced out of the profits on each year’s crop’’ (Murdoch, 1984). This complicated system caused the nation to be unable to develop further and forms the reason as to why Dominica never fully unlocked its agricultural potential. The economy was put into a “stasis” and never had the chance to develop any meaningful industries, according to Webber. This also meant that the nation became very dependent on both exports to Western countries for economic prosperity, and imports of agricultural products for local consumption as self-sufficiency could not be achieved.

Land ownership and chattel houses

Absenteeism

Another relevant aspect of the influence the plantation agriculture had in Dominica is the social repercussions this had. According to Webber, through the system of slavery that built and worked the plantations, “racial bifurcation became the fundamental pillar on which British Caribbean society was built” (Webber, 2018). Historians of the British Caribbean have repeatedly shown that this system created severe material inequalities that made the African-Caribbean population vulnerable in other ways. One example of this is absenteeism. The concept of absenteeism was introduced during the interview with prof. Webber and the phenomenon entails that the plantation owners who were profiting from the colonized islands in the Caribbean and exploiting its crops were not the people facing the disasters. The enslaved population of Dominica was working on the plantations facing the risks of disasters, while the beneficiaries of the plantation yield were residing in northern Europe at the time. Here, we can state that the differentiated vulnerability of persons based on their race reflects the racist social calculations of whose life is worth exposure to risk. The stark racial bifurcation that existed in the British Caribbean at the time which Webber referred to both in his article and during the interview laid bare the power dynamics between plantation owners and slaves, with the enslaved population being most at risk to disasters.

Housing, land ownership and DRR in colonial Dominica

According to Webber (2021), there was a limited use of hurricane shelters in the British Caribbean in the middle of the 18th century, these houses were no longer being used. One of the things that is peculiar about the history of the British Caribbean is that the white planters who made their fortune in the Caribbean were really worried about being perceived as “part Caribbean, as a kind of creole” by the people back home in Britain. This had an association with blackness and they did not want to be perceived as “not-British. And so, unlike the Americans, the British people in the Caribbean went to great extents to preserve their Britishness by, for example, building big country manor houses in Jamaica that were completely at odds with the environment. Furthermore, hurricane shelters would not be utilized because effectively, it seemed to be too much of an adaptation to the environment and these planters seemed to be actively trying to not adapt to the environment. Therefore, the colonizers were actively not pursuing any DRR nor thinking about how to reduce disaster risk. One key adaptation the planters did make was developing and refining maritime insurance because they soon realized that the voyages were dangerous and they cared about insuring their own profits, imports and exports set for the Western countries. The British were very aware of the hazards, but did not make any kind of investments in disaster risk reduction methods. They deliberately built houses that were not fit to withstand hurricanes or strong winds. At the end of the 19th century, the Americans were the first to install early warning systems (telegraph systems) on some of the previously-owned British islands. The Americans were the first to implement these warning systems, “which is truly bizarre, as the British had been there for centuries” (Webber, 2021).

Furthermore, the time people had to accrue capital on the island of Dominica was very limited, as slavery only came to an end 160 years ago. Slavery came to an end in 1833 in the British Caribbean, there was a compromise solution reached in 1833 and the enslaved population did not become free but instead “apprenticed” which is

effectively the same. The planters were terrified that they were going to lose their workforce. That particular system came to an end in 1838 and the formerly enslaved became legally free and across all of the British Caribbean the planters were very concerned that the African-Caribbean population would have leverage. What the planters did is that they worked together to keep the wages of the plantation workers as low as possible, effectively acting as a cartel. They did absolutely everything in their power to stop the African-Caribbean people from purchasing land or getting access to land because the last thing they wanted is for people to be self-sufficient, because then they would no longer have to work on a plantation. The planters made it illegal to sell land to black people and otherwise they would use the instruments of the law (accusation of trespassing) to stop people from purchasing land. This had a really significant impact and perhaps conjecture towards why certain populations were more vulnerable than others. The main issue here lies in the fact that these communities or people did not have any historic chance to accrue capital to own property and to own land, that would allow them to be self-sufficient and to grow their own crops. Yams, for example, are very a hurricane-resilient crop. They had not been able to build up that resilience (Webber, 2021).

In Barbados, the local population could rent land from the plantation owners. However, the white population could just randomly decide to terminate the rental agreement or contract. What this meant was, that there were *chattel houses*, houses that are very temporary and designed to dismantle them, pick them up and move to a different plantation and rent a new piece of land somewhere else. This had serious implications for vulnerability in Barbados as these houses were designed to be temporary, they were designed to be dismantled, they did not have cement foundations and they were not sunk into the ground. People are currently still living in these disposable, chattel houses in Barbados in the 21st century. There is a historically-informed housing situation, they did not have the chance to accrue capital and thereby improve their own housing situations. In Dominica, these chattel houses were located in Rousseau, the capital city of Dominica as seen in figure 11 below.

Figure 11: A traditional Caribbean "chattel house" on the corner of Old and Great Marlborough Streets next to the Kent Anthony Guest House, Rousseau (Cloutier, 2019)

Infrastructure

Lack of investment in road infrastructure

The lack of agricultural development was closely linked to the absence of a decent infrastructure network, caused by the unavailability of profit by the government (Barclay, et al., 2019). The government of Dominica tried to implement certain tax regimes to ensure that this investment would take place (Barclay, et al., 2019). Some of the unpaid debt from initial land sales also caused for many conflicts and led to further debt and uncertainty around obligations for infrastructural development and repayments. This was intensified by asset and income losses due to hazards and disease in the country. Many plots were completely inaccessible, with investors who purchased them required to construct roads to access their estates (Barclay, et al., 2019). The

result was that most estates developed along the coastal strip, while plots inland remained inaccessible and undeveloped (Honychurch 1995). The remoteness of certain houses and plots located inland present a number of challenges to this day, with these areas being more difficult to reach in light of disaster management and disaster response. Aid cannot be provided in a timely manner, due to the remoteness of some of the plots in mountainous areas of Dominica.

In creating and sustaining suitable infrastructure, it is noteworthy to mention the importance of not just high-impact hazardous events but also the challenges posed by low-grade hazardous activities such as heavy rainfall and landslides. High rainfall and rugged terrain have impeded road building in Dominica. The first road across the island was not completed until 1956, and it was not until 1984 that a major road-rehabilitation project was launched to improve accessibility of the island (Barclay, et al., 2019). During the 1950s and 1960s in Dominica, there was a program of road building to complete the major roads as well as the *feeder road network* (Barclay, et al., 2019). These feeder roads allowed the Crown Lands inland to be accessed and sold to smallholders for banana cultivation (Barclay, et al., 2019). The trans-insular road linking the east and west coasts was completed in 1956, and a road linking the main urban centers of Roseau and Portsmouth was opened in 1972 (Honychurch 1995) (Barclay, et al., 2019). See figure 12 below for a topographic map, showing the main roads and settlements in Dominica. The infrastructure upgrades in Dominica have unlocked the agricultural potential of the island to small-scale farmers, but much of this expansion occurred during a period of minimal storm activity, so roads were not built to withstand hurricane impacts. The cost of maintaining these roads with the reality of more frequent tropical storms and hurricanes in recent years has been a considerable challenge.

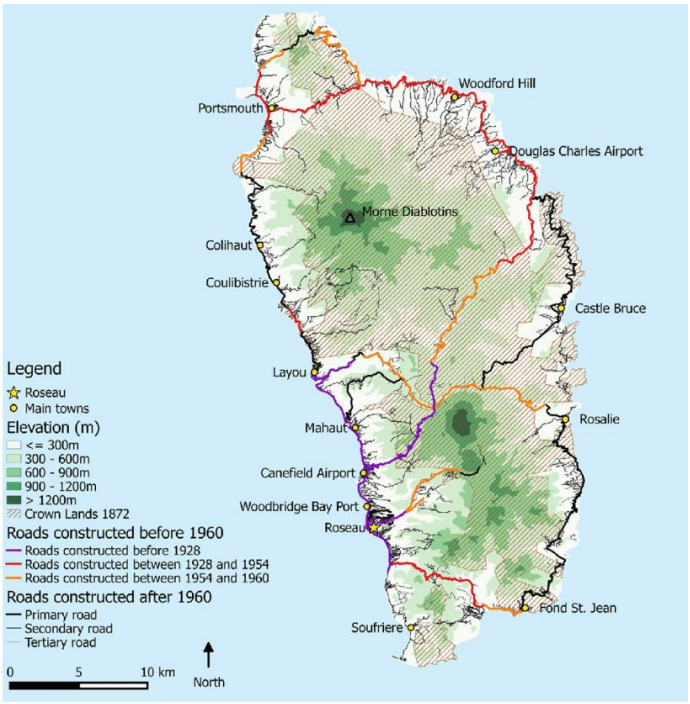


Figure 12: Topographic map of Dominica showing the capital city Roseau and other selected settlements, ports and airports, and main roads (Barclay, et al., 2019)

Conclusions

The combination of a remote colonial system of governance applying a homogenous approach across nations, monocropping practices, a weakened economy with high national debts due to a complex and permanent system of borrowed capital to finance the establishment of plantations and short-term loans to finance the year-on-year running costs, lack of DRR measures in housing and an undeveloped infrastructure have caused for Dominica's underdevelopment. The system of absenteeism in Dominica caused for a lack of disaster risk

reduction practices (housing and implementing warning systems) and strategic decisions regarding settlement placements taken by plantation owners caused for the country's vulnerability to remain unchanged over time.

7.2 Current economic and social characteristics of Dominica

Introduction

Many of Dominica's current economic and social features can be linked to historic impacts, as can be read in the previous sub-chapter. For example, the formation and trajectory of Dominica's economy linked to plantation agriculture and complex national land ownership systems, which created high amounts of (public) debt. This following sub-chapter will elaborate on Dominica's current economic and social statistics.

National debt

To this day, according to Webber (2021), the ex-British colonies of the Caribbean are some of the most heavily indebted nations in the world, as can be seen in figure 10 below. Jamaica, for example, owns an astronomical amount of money to the IMF (International Monetary Fund). Many of these Caribbean economies have effectively been in permanent austerity since approximately the 1980s. In many of the former British-Caribbean colonies, the capacity of the state is completely absent, the state is completely hollowed out because the state in many of these economies is facing astronomical debts on so-called 'development loans'. These nations are so astronomically indebted and the capital to invest in risk reduction doesn't exist, "the state simply does not function like that"(Webber, 2021).

In Dominica, the public debt in 2021 amounted to 613 million dollars, an increase of 17 million since 2020. This equals to 101.9% of the country's GDP (Country Economy Database, 2022). The tremendous amount of public debt in Dominica is the basis for its incapacity to implement well-functioning disaster prevention and recovery services, in order to become more resilient against natural hazards. In comparison to other Caribbean nations, Dominica scores high on public debt as can be seen in table 2 on page 34. Figure 13 below highlights the large amounts of public debt owed by some Caribbean states, compared to some of the highest debts in the rest of the world.

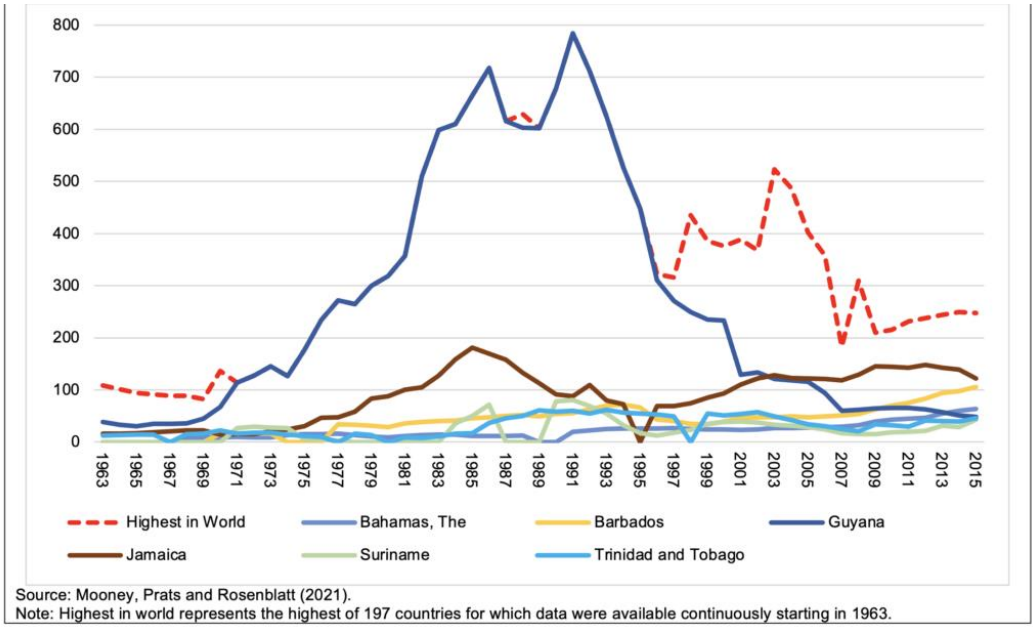


Figure 13: Public debt levels - Caribbean versus the rest of the world (in % of GDP) (Mooney, Prats & Rosenblatt, 2021)

Table 2: National debt of Caribbean countries as % of the GDP (Caribbean Development Bank, 2016)

COUNTRY	2015	2016	CHANGE IN %
Antigua and Barbuda	99.1	93.6	-5.5
Dominica	85.5	87.2	2.2
Grenada	94.3	89.2	-5.1
St. Kitts and Nevis	70.7	67.2	-3.5
St. Lucia	77.0	81.1	4.1
St. Vincent and the Grenadines*	79.2	81.5	2.3
Trinidad and Tobago	52.1	56.6	4.5

Source: Caribbean Development Bank 2016 Economic Review 2017 Forecast

*: ECCU Central Statistical Offices and Eastern Caribbean Central Bank

Underdeveloped economy

Next to examining the environmental and physical characteristics of the country, one could also argue that the economy of Dominica plays a large role in shaping its vulnerability to external hazardous shocks and events. A strong, diversified economy is able to 'bounce back' after a disaster and restore at a swift pace. The UN emphasized that policy choices matter for resilience against shocks, such as "a swift and strong response, health and social investments, quality of infrastructure, and economic diversification" (UN ESCAP, 2021). Economic resilience, as defined by Adam Rose (2004) in his paper, refers to "the inherent and adaptive responses to disasters that enable individuals and communities to avoid some potential losses". This sub-chapter aims to explore where Dominica currently stands at achieving this economic resilience.

As stated in earlier chapters, Dominica's economy is characterized by a certain reliance on exports, 'underdevelopment' in a sense that the country did not develop any meaningful industries, high levels of national debt, short-sighted policy and investment decisions taken by the government, monocropping in the agricultural sector leading to a lower output of agricultural yields and therefore export and lastly the lack of investment in infrastructure by the government. The interplay of these factors have caused for an economy that has been unable to grow in a sustainable way, and is confronted with the effects of disasters on a regular basis. To explore this further into more detail, we examine both the export of goods for Dominica of 2020 and its public debt for the same year. I have chosen to examine these two graphs in particular because history has played a great role in both cases and the two graphs represent clearly the current status of the economy's deficiencies. Figure 14 below shows Dominica's total export of goods in percent of the total world input.

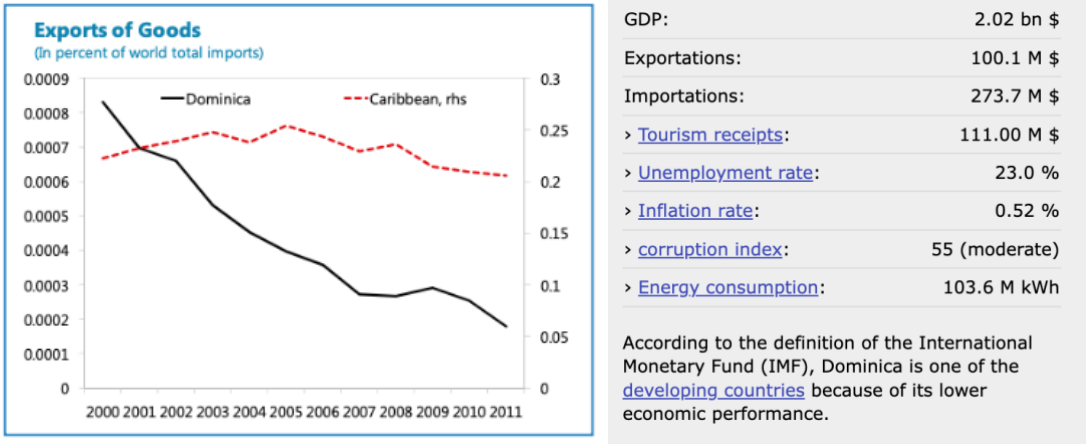


Figure 14: Dominica's export of goods (in % of world total imports) (Worldbank, 2005)

Reliance on exports

"Centuries of slavery and colonialism imposed an export imperative on the region; the raw materials of the land, primarily sugar, were exported in bulk to fuel Europe's industrial revolution" (Pattullo, 2005). The overreliance of Dominica on a few main crops for export and economic profitability, alongside the subsistence economy, was questioned in Dominica as it was in other parts of the Caribbean (Barker 1993). According to Barclay, et. al (2019), a number of reports recommended crop diversification and the encouragement of small landowners and labourers to produce more than just subsistence crops. Currently, Dominica is the poorest and least developed of the Windward Islands. Its economy is still mainly dependent on agricultural exports, especially bananas. As mentioned earlier, the island's mountainous terrain prohibits much cultivation. Even so, agriculture remains the main source of employment and income revenue and remains much more important to Dominica than to other Caribbean islands. As a result, the threatened removal of preferential access for Dominican banana exports into the European market was disastrous for the island's economy. Despite attempts to broaden its economic base, Dominica remains critically dependent on agricultural exports and especially on the threatened banana trade. The resulting uncertainty from this trade has stimulated migration since the mid-1990s and led to a decline in production and exports. Rural poverty is a large problem, and economic growth has faltered in recent years due to the banana crisis and external shocks from natural hazards.

Unequal (economic) growth patterns

Dominica has a per capita income at the lower end among the Eastern Caribbean Currency Union (ECCU) countries but relatively high social indicators. As mentioned in the paragraph above, the economy is highly dependent on agriculture (banana) with manufacturing and tourism playing a lesser role (IMF, 2005).

Table 3: Social indicators of Dominica compared to the rest of the Caribbean (Worldbank, 2005)

	GDP per Capita (US$)	Human Development Index Ranking 1/	Life Expectancy at Birth	Voice and Accountability 2/	Poverty Rate
Caribbean	5,366	78	69	68	28
ECCU	5,633	73	72	74	27
Non-ECCU	5,189	81	68	65	29
Dominica	**3,554**	**95**	**73**	**81**	**33**

Source: World Bank.

1/ Out of 174 countries.

2/ Percentile ranking.

When examining table 3 which lists the social indicators and Dominica's ranking amongst Caribbean ECCU and Non-ECCU countries, we note that Dominica scores relatively low on GDP per capita. However, Dominica scores the highest on the Human Development Index (HDI) ranking, the life expectancy at birth and voice and accountability rate. Dominica scores the lowest on poverty rates among the different countries, as stated above: rural poverty is a large problem in the country.

According to the IMF (2005), Dominica's recent growth performance has been much weaker than the other ECCU countries. Dominica's output growth has kept pace with its neighbouring countries in the 1980s, while the situation reverses for much of the 1990s. Dominica also experienced the sharpest recession following the 9/11 attacks. Listed below are a number of possible explanations for this difference, listed by the IMF (2005).

- The dominant role of agriculture. Agriculture (banana production, in particular) plays a much larger role in Dominica than in the other ECCU countries, and the 1990s were a relatively difficult time for the sector.

Reflecting the uncertainty regarding the future of the preferential trade arrangements for bananas, a trend decline in the banana export price, and the higher productivity of other producers, acreage, employment and investment in the sector has been declining since the early 1990s.

- Agricultural difficulties were compounded by the government's liquidity constraints in 2001-02. While the other ECCU countries also attempted to counteract the 1990s growth slowdown through expansionary fiscal policies, only in Dominica did the liquidity constraint become binding. This seems to reflect concerns about the country's growth prospects. With few beaches at hand, the scope to diversify economic activity away from agriculture to traditional tourism activities as in the other neighboring islands was limited.

- Migration. With per capita income at the low-end in the region, emigration (and consequent loss of human capital) from Dominica has not just been to the OECD countries but also to the richer countries in the region.

From this we can conclude that there has been an unequal pattern of (economic) growth across the island with several sectors benefiting more than others. The challenge for the government lies in steering away from the single-oriented economy to a more diversified one.

Conclusions

Dominica continues to be an agriculture-based economy with a weak transport infrastructure network that is highly vulnerable to hurricanes and other hazards. Decisions regarding economic development over the last 40 years have mostly ignored the impacts of disasters and there is a need to diversify into more resilient productive activities. Some diversification has occurred which reduces reliance on one expert crop, but this has occurred mainly within the agriculture sector, and there has been little deliberate effort to reduce the overall hazard vulnerability of Dominica's economy (Benson et al. 2001). Furthermore, Dominica continues to suffer from the underinvestment in road infrastructure during the colonial era. An important increase in capital expenditure in the 1980s following Hurricane David was needed to rehabilitate roads, but also because the country's infrastructure was already in a poor condition due to years of inadequate maintenance and low investment. This increase in expenditure deepened levels of already existing debt and caused for structural problems in Dominica's infrastructure. The roads that were constructed during the period 1950s-1960s were not built to withstand hurricanes, and therefore pose a risk to creating a sustainable infrastructure.

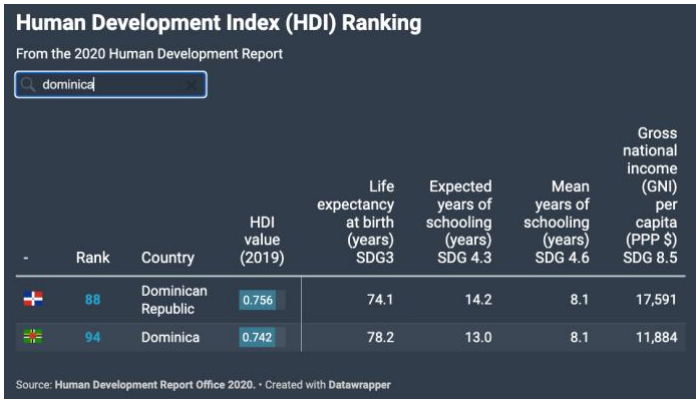
7.3 Social characteristics

Introduction

This chapter aims to establish the correlation between the previously mentioned economic indicators and/or performance (or lack of), and Dominica's ranking on the Human Development Index. Here, we take into account a number of social indicators including life expectancy, unemployment rate, population growth and poverty rate. Following this, an elaboration will be provided which zooms into the more vulnerable ethnic groups of Dominica that are among the poorest in the country. Current issues of these ethnic minority groups will be discussed and lastly an excerpt of the National Resilience Strategy will be provided to demonstrate what the government of Dominica intends to do regarding improving the socio-economic status of these minority groups.

Social indicators

According to the Human Development Index for 2020, Dominica ranked first in life expectancy in the Caribbean and the third in the world among countries offering citizenship by investment (Anichi Development , 2021). This is not surprising, seeing its vulnerable economic position and need for external investment. The life expectancy at birth for 2020 was set at 78.2 years, as can be seen in figure 15 below. The expected years of schooling remains rather low, at merely 13. The mean years of schooling is even lower, equalling to only 8. Dominica scores 94th place in the total Human Development Index, consisting of 190 countries. Dominica has an astonishing unemployment rating of 23% (WorldData, 2021), as can be seen in figure 14 within the previous chapter.



Human Development Index (HDI) Ranking

From the 2020 Human Development Report

dominica

-	Rank	Country	HDI value (2019)	Life expectancy at birth (years) SDG3	Expected years of schooling (years) SDG 4.3	Mean years of schooling (years) SDG 4.6	Gross national income (GNI) per capita (PPP $) SDG 8.5
	88	Dominican Republic	0.756	74.1	14.2	8.1	17,591
	94	Dominica	0.742	78.2	13.0	8.1	11,884

Source: **Human Development Report Office 2020.** • Created with **Datawrapper**

Figure 15: Human Development Index (HDI) ranking by the UNDP

Selected basic indicators, Dominica, 2008–2010.

Indicator	Value
Population 2010 (thousands)	72.9
Poverty rate (%) (2009)	28.8
Literacy rate (%) (2008)	86.0
Life expectancy at birth (years) (2010)	76.0
General mortality rate (per 1,000 population) (2010)	8.1
Infant mortality rate (per 1,000 live births) (2010)	13.9
Maternal mortality rate (per 100,000 live births)	…
Physicians per 1,000 population (2009)	1.7
Hospital beds per 1,000 population (2009)	3.8
DPT3 immunization coverage (%) (2009)	100.0
Births attended by trained personnel (%) (2009)	100.0

Figure 16: Social indicators for Dominica 2008-2010 (HIA, 2012)

Kalinago population in Dominica

"The indigenous Caribs (Kalinago) who are a minority in Dominica are unique in being the last community in the Caribbean that claims direct descent from the indigenous Kalinago who originally populated the entire region before the arrival of European colonizers" (UNHCR, 2008).

As stated before in chapter 4, "the most vulnerable are often those who are most dependent on natural resources for their livelihoods". This proves to be true for the case of Dominica, where the indigenous Kalinago population remains very dependent on natural resources for their livelihoods.

Historians suggest that the indigenous Kalinago population lived mainly in small, dispersed settlements, close to fertile land and relatively sheltered from hazards (Burke and Lovell 2000), locations that would also have afforded better protection from hurricanes (Schwartz 2015). However, the French and English colonizers shifted the settlements to locations with good external trading routes and strategic and "defensive advantages" (Barclay, et al., 2019). Currently, the Kalinago population is located on the northeastern part of the island, thereby being greater at risk to rising sea levels and strong winds. This is problematic, as the livelihood of this Kalinago community is based on the fisheries and agricultural sector (NRDS, 2020), which creates a certain dependency on these dangerous and hazardous coastal locations.

There have also been issues regarding land ownership and trespassing on the Carib Territory. According to the World Directory of Minorities and Indigenous Peoples (2008), one of the major issues facing the indigenous Kalinago (Carib) in Dominica is the continuing trespassing on their territory by farmers in those zones where the reservation boundaries are still not clearly delineated. Moreover, the increasing population density within the community itself reduces the availability of viable land. Another issue that the Carib population is facing is difficulty in obtaining bank financing. Since all Carib Territory land is communally held, the individuals seeking loans are unable to use land as collateral.

In summary, we can conclude that some of the unique challenges facing Dominica's indigenous population contribute to their vulnerability. Among these are the communal ownership of land which poses an impediment to accessing credit and the incidence of poverty which is above the national average. Fortunately, the government of Dominica recognizes the vulnerable position of the Caribs/Kalinago population and identifies the structural dependency on livelihoods across the coastline. The Government of Dominica also has already opted for a regional risk management strategy which will be piloted in these two most vulnerable regions/districts. The following excerpt is taken from the National Resilience Strategy published by the Government of Dominica:

"Government recognizes that the Kalinago people have persistently remained the most significantly disadvantaged group in Dominica after the establishment of a 'Carib Reserve' in 1903 and the reaffirmation of the boundaries in 1978. This material condition has been attributed to the historical effects of colonization and the unavailability of access to commercial financing against communal possession of lands. This has resulted in a number of disproportionate factors like low educational attainment, unemployment and poverty. However, there is evidence of several poverty reduction initiatives undertaken in the areas of education, livelihood, child protection, social protection, and housing. The Territory accounts for roughly 5% of the nation's population but approximately 50% of the Kalinago population was still considered poor after the poverty assessment in 2009."

Ethnic groups and poverty rates

As mentioned before, the Carib (Kalinago) population is one of the oldest, indigenous populations of the Caribbean. The Carib Territory is among the poorest districts in Dominica and unemployment in the Territory is higher than in rest of the country. Incomes are lower than the national average. Furthermore, the Carib (Kalinago) population was overrepresented among the poor accounting for 49.8% compared to the national average of 28.8%. The causes of poverty are attributable to external factors, including the continued reduction in protection for banana exports, the surge in food and energy prices and the global economic crisis, reduction in remittances and the scourge of natural disasters. Most men and women in the Kalinago community are involved in subsistence farming and fishing as their primary occupation (UNDP, 2009). In the Dominican context, farmers and fisherfolk are very vulnerable to weather related events as their livelihoods are extremely dependent on the natural resources and infrastructure which are often destroyed by disasters. Kalinago-Caribs farm their land collectively and have developed handicrafts for the tourist market.

In 2014, the Commonwealth of Dominica published a resettlement policy framework in which the Growth and Social Protection Strategy is named, aimed at "reinforcing the view that poverty reduction is the focus of the Government's economic and social policy, and that the pursuit of strong economic growth, and the employment that will be generated as a result, is the main route to poverty reduction" (Commonwealth of Dominica, 2014). More on this can be read in chapter 8, which lists the adaptation strategies and policy frameworks set for the next decade.

Gender and correlation with vulnerability

"Contextual factors – ideologies, cultural beliefs, social norms, economic and power systems, institutional cultures, governance structures and processes, and the framing of problems and solutions – influence vulnerability and resilience to environmental risk" (Stockholm Environment Institute, 2014). One of the facets

of susceptibility that was included in the vulnerability risk framework by Jackson, McNamara & Witt (2017) involves some of the cultural aspects and/or characteristics. For this sub-topic, I have chosen to investigate gender and its correlation with an increased level of vulnerability in Dominica.

Firstly, according to the ODM (Office for Disaster Management, 2014), the situation of vulnerable people is now aggravated by evolving, complex threats such as climate change, new patterns of marginalisation, unplanned urbanisation, high levels of violence, migration, emerging infectious disease and the growing burden of non-communicable disease, environmental degradation and lastly insecurity of access to food, water, and natural resources. In 2009, United Nations Development Programme (UNDP, 2009) issued a Country Assessment Report for the Commonwealth of Dominica, in which the report "provides insight on the extent to which governance mechanisms for risk management effectively incorporate gender considerations".

Furthermore, the country report states that women, children, and youth are among the most vulnerable in Dominica. "Poverty data indicates that more than half of Dominica's children and youth live in poor households (52.1%)" (UNDP, 2009). Numerous sources reinforce that generally "Women bear the brunt of any disaster because the gender-based inequalities interact with social class, race, ethnicity, and age, putting them at high risk." Several reports found no significant gender disparity in poverty, however these reports do state that particularly poor women faced higher levels of unemployment than men (UNDP, 2009). What can be concluded from the findings is that poverty rates and gender gaps can exacerbate vulnerability for communities in Dominica. As stated before, women, children, and youth are among the most vulnerable in the country and carry the largest burden post-disaster events.

Conclusions

The structural problems that are known to exist amongst the indigenous Carib Kalinago groups including high poverty rates and high unemployment levels are strongly linked to their vulnerable position within the economy, relying on natural resources for their livelihoods. The location of the Carib settlements along the coastline that can be attributed to decisions made in the British-Caribbean colonial period have placed these populations at an even greater risk to hurricanes, storms and wind surges. Furthermore, the socio-economic status of many communities in Dominica can be attributed to a stagnating economy, which can be linked to a lack of the agricultural sector and other sectors, development of infrastructure (as can be read in previous chapters) and external investments. What this thesis has aimed at so far is establishing a link between colonial history and location of assets, economic and social/cultural factors.

This sub-chapter will be followed by another sub-chapter on institutional characteristics, providing an introduction for the adaptation strategies and how these are organized (within a web of internal and external stakeholders). The (lack of) institutions in Dominica play a vital role in its high degree of vulnerability to external shocks. The thesis is structured according to a chronological order, first exploring the historical trajectory of Dominica, followed by examining its current characteristics and statistics, and lastly by analyzing the government's future projections, policies and/or strategies created to increase its national resilience.

7.4 Institutional characteristics

This sub-chapter aims to explore and uncover the existing legislation frameworks supporting the preparedness, disaster response and reconstruction efforts in Dominica. Additionally, the level and efficiency of coordination and communication among actors that are responsible for disaster management, the degree of public participation and awareness, as well as available risk transfer mechanisms that are embedded in socioeconomic, cultural and political structures.

Most vulnerability studies focus on the physical or the social dimension, whereas research focusing on how institutions influence the vulnerability of the society to natural hazards is still scarce. The reason for this may be that institutional vulnerability often overlaps other vulnerability dimensions such as social, economic and cultural. It is important to note that institutional vulnerability relates to the way institutions influence vulnerability to natural hazards rather than on the vulnerability of the institutions themselves.

In the case of Dominica, after independence, a more proactive, cyclical approach to preparing for hurricanes and storms began to emerge in Dominica. The government set up a National Office of Disaster Management (ODM) within the Ministry of Communications, Works and Housing (Barclay, et al., 2019). In 1996, a National Disaster Plan was finally published, with a detailed set of actions and responsibilities for disaster preparedness and emergency response. But this plan did not directly address the need to reduce levels of exposure and economic vulnerability over the longer term—and despite frequent disasters and devastating impacts (including Hurricane Allen in 1980, Hugo in 1989, three tropical storms in 1995, and Hurricane Lenny in 1999), little thought was given in post-disaster response and recovery to reducing future risk (Barclay, et al., 2019).

Currently, Dominica is heavily reliant on external aid when disasters occur, and this creates inefficiencies in disaster response and recovery. Delays in aid disbursement due to limited local administrative capacity and inability to meet funding requirements severely affected the government's capacity to respond effectively (Benson et al. 2001).

Public Financial Management

Part of the institutional characteristics involve the government efficiency and performance. This can be measured by means at looking at the public financial management of a country. Effective institutions and systems of public financial management (PFM) play a critical role in the preparation and response to disasters. Strong public financial management ties together often scarce available resources with their appropriate and sustainable use to ensure that governments can function reasonably well even in times of disasters. Figure 17 on the next page shows the extent to which disaster resilience and recovery considerations are integrated into key public financial management functions and processes.

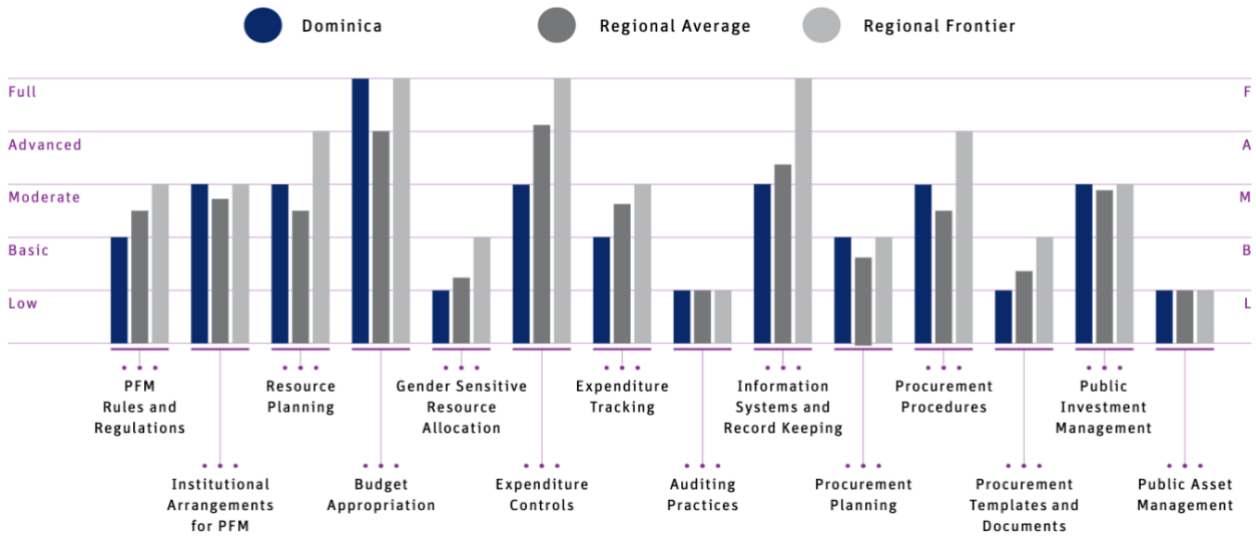


Figure 17: Extent to which disaster resilience and recovery considerations are integrated into key PFM functions and processes (CRF, 2019)

As seen in figure 17, Dominica scores moderate to low on most key indicators, especially in comparison to the regional average. Gender sensitive resource allocation is scored particularly low for Dominica, along with procurement templates and documents and auditing practices. Public asset management, which involves the discipline of sustaining public infrastructure such as bridges, waterways, electric grids, ports, railways and roads is also something Dominica scores very low on, however this seems to be quite low for the entire region. This last statement fits within my other findings that elaborate on the lack of infrastructure that has been present in Dominica for many years. The indicator which Dominica seems to score high on is the budget appropriation, indicating that the government of Dominica has its authorization granted by its own legislature to make (public) expenditures. This is is strongly related to structural adjustment policies of the 1980s. However, we must not forget that the country has been indebted for decades, making growth in the public sector ever more difficult.

Conclusions

To summarize, the short-sighted policy decisions taken by the government, along with a weak institutional framework, an indebted economy and a weak public financial management system have created a higher level of susceptibility for this country throughout the previous decades. The reliance on external aid and institutions post-disaster response stems from a period of dependency in the colonial era. The lack of funding, knowledge and strong institutional power and agency is visible in the insufficient disaster response management that is distinctive for Dominica.

8. Adaptation strategies and/or policies in Dominica

Introduction

This chapter focuses the adaptation strategies the government of Dominica wishes to implement in the coming decade. A number of policy documents have been published, including the National Resilience Development Strategy (NRDS), the Climate Resilience and Recovery Plan for 2020-2030 and lastly the Climate Resilience Act. Part of the data gathering phase of this thesis was reading and analyzing each document. Firstly, a description of the content of each document will be provided by means of listing its main objectives and key elements. The objectives set for the next decade in the policy documents are to be implemented by the Climate Resilience Execution Agency for Dominica, also referred to as CREAD. CREAD's mission statement and main objectives can be found on page 44 of this chapter.

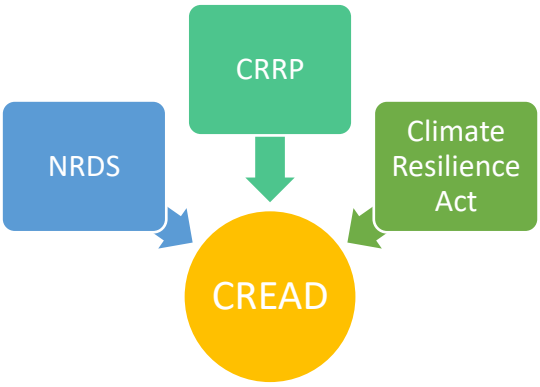


Figure 18: Mapping of implementation of resilience strategies and/or published policy documents

Dominica Climate Resilience and Recovery Plan 2020-2030

In 2018, the Government of the Commonwealth of Dominica released its National Resilience Development Strategy 2030. The National Resilience Development Strategy articulates the high level policy approach of the Government in its pursuit of a development agenda that will allow for:
a) the achievement of the 2030 Development Agenda (seventeen Sustainable Development Goals);
b) transformation of Dominica into the first climate-resilient country in the world; and
c) development that is visionary and people-centered.

The main objective of the CRRP is to translate Dominica's vision of becoming the world's first climate resilient nation into specific activities that can be shared with key stakeholders, all of whom have a critical part to play in helping the country achieve its bold aspiration

Dominica's Climate Resilience and Recovery Plan (CRRP) was developed by the Government of the Commonwealth of Dominica, under the leadership of the Climate Resilience Execution Agency for Dominica (CREAD), which is mandated under the Climate Resilience Act 2018, in consultation with the CREAD Policy Board. According to the CRRP, fundamentally, the vision of building a climate resilient Dominica is about significantly reducing the impact of, and time to recover from, climatic and other natural shocks, as well as **boosting the overall socioeconomic development trajectory of the country** (Government of the Commonwealth of Dominica, 2020).

Dominica released a climate resilience policy framework to guide its recovery journey in the form of the National Resilience Development Strategy 2030 (NRDS). The NRDS articulates the overall policy framework of the Government and outlines 43 resilience goals aimed at ensuring that development is people-centered. The NRDS

specifies that, at the highest level, the Climate Resilience and Recovery Plan (CRRP) should reflect three pillars of resilience, namely:

Figure 19: Three pillars of resilience of the Climate Resilience and Recovery Plan (CRRP)

The CRRP expands these three pillars into six results areas for a climate-resilient Dominica, namely:

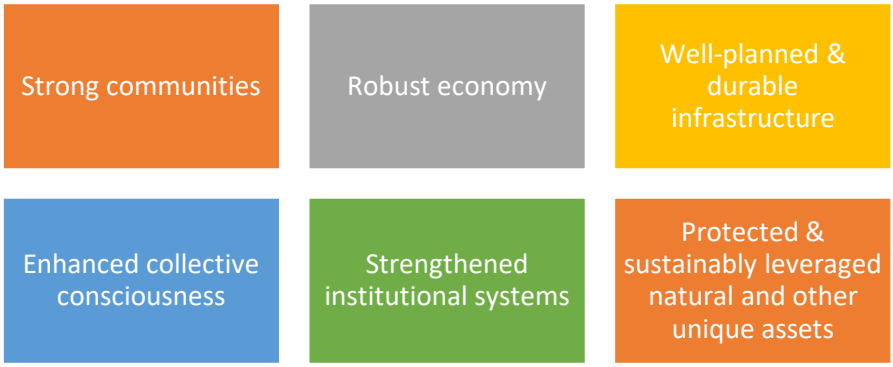


Figure 20: Six results areas for a climate resilient Dominica, according to the CRRP

Figure 21: Resilient homes developed by the Government in Bellevue Chopin

Ongoing climate resilience initiatives

The Government already has several critical initiatives that support the Climate Resilience agenda. Major investments in all sectors of the economy are underway to restore normal life and livelihoods following tropical storm Erika and hurricane Maria. These investments are critical to achieving the resilience vision and contribute to the sustainable development of Dominica. Alongside ongoing investments are several high-impact resilience initiatives, such as:

1. Housing Revolution Initiative – construction of houses in safe locations, using high quality material and appropriate technologies, and built to resilience standards;
2. Renewable energy solutions - encourages shifting to domestic renewable energy sources to reduce dependence on fuel imports, as a climate change mitigation mechanism (by cutting carbon emissions), including the construction of Geothermal Domestic Plant to supply electricity;

3. Construction of SMART schools and health centres - design, renovate or reconstruct schools and health centre structures to provide an optimal environment and make them longer-lasting and self-sustaining in order to achieve a healthier and higher performing population;
4. Establishment of regional disaster emergency centres – multipurpose buildings that provide emergency shelter for men and women, children, elderly and persons with disabilities, and bulk storage of basic emergency supplies to allow remote communities to effectively respond to emergencies and disasters on their own;
5. Upgrading and expansion of road network – making transportation infrastructure more resilient to future shocks involves revising designs to consider the changing frequency of climatic events and using materials that are more resistant to the effects of landslides, rock falls, and floods;
6. Restoration of waterways – river dredging activities to minimize flood risks and preserve aquatic ecosystems;
7. Ban on single use plastics – notably following a disaster, the proliferation of plastic waste, especially when the waste collection system is overwhelmed, causes significant damage to the environment, clogs sewerage systems and small waterways, increasing the risk of flooding in certain areas, as well as damages the marine environment with long-term effects;
8. Developing a more resilient agriculture sector – focusing on selecting resilient crops and farming practices, and on rebuilding the livelihoods of farmers and fisherfolk by providing inputs and tools, as well as reconstructing farm buildings and fish storage facilities.
9. Waste management – collection, compression and disposal of hazardous and dangerous waste, particularly metals from vehicles and appliances that were discarded and/or poorly disposed of following Hurricane Maria; and,
10. Slope stabilization – measures to reduce erosion through the application of grey and green technologies such as the construction of retaining walls and tree planting.

CREAD

The Climate Resilience Execution Agency for Dominica (CREAD) leads and coordinates strategic initiatives across sectors in the Commonwealth of Dominica with the goal of making the country the world's first climate resilient nation. CREAD acts to strengthen the ability of the business community, public services, and social sector partners to build strong and resilient communities, develop adaptive infrastructure, accelerate economic growth, strengthen institutional systems, enhance Dominicans' capacity to respond to the local impacts of global climate change, and set an example for the rest of the world on how to respond to the challenges of a changing climate (CREAD, 2022).

Mission statement:

- To make Dominica more resilient to future natural disasters, able to withstand future hurricanes or earthquakes with a minimum of damage to lives and livelihoods.
- Continue to ensure that recovery from the impact of Hurricane Maria will be as swift, transparent and cost-effective as possible, and all reconstruction will be 'built back better' to the extent possible.
- To assist all public institutions, private sector and civil society in becoming better equipped to manage disasters and recovery from disasters in the future.

CREAD will:

Figure 22: Activities by CREAD (Climate Resilience Execution Agency for Dominica)

CREAD states that to become truly resilient, Dominica must focus on *building strong communities*, a *sustainable economy* and *well-planned, durable infrastructure*, supported by the pre-conditions of *Valuing Resilience*, *Financing Resilience* and *Institutionalizing Resilience*. These elements are all critical for achieving success over the long-term.

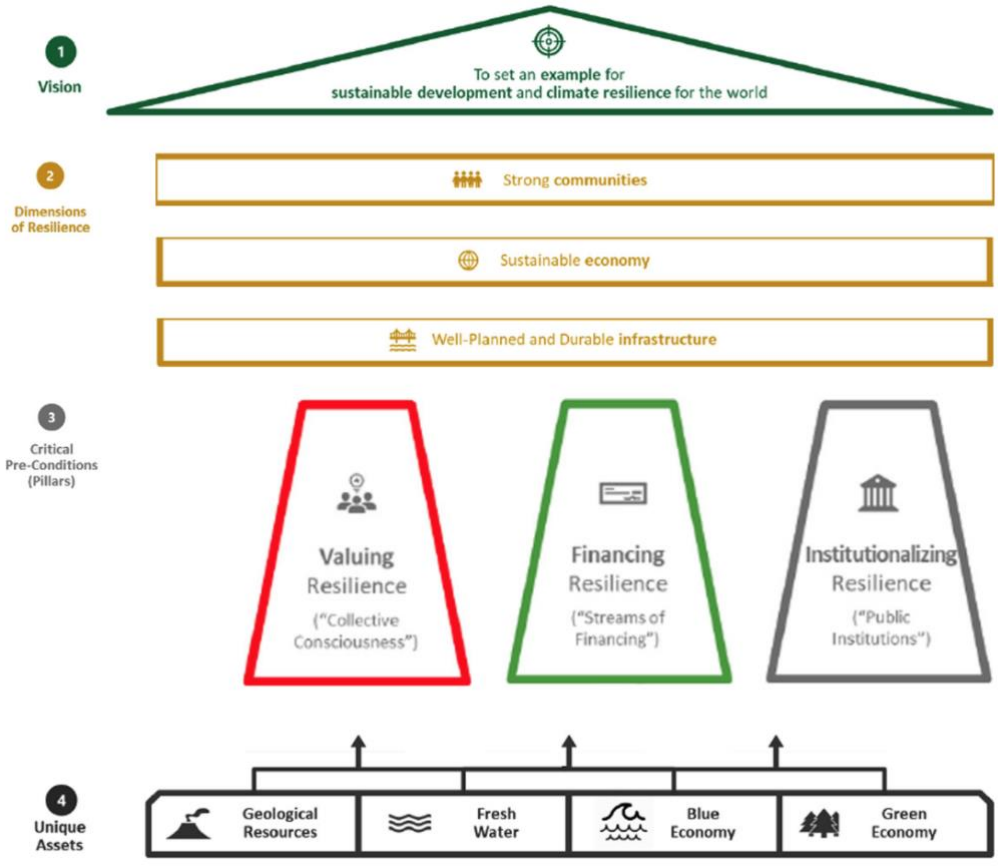


Figure 23: Visual representation of the goals set by CREAD

Climate Resilience Act 2018 - An act to provide for the establishment of the climate resilience execution agency for Dominica (CREAD) and to provide for matters related thereto.

Key elements of the Climate Resilience Act:

1. To promote the swift and cost-effective recovery of Dominica from climate-related disasters.
2. To ensure that any physical and other infrastructure damaged or destroyed during a climate related disaster is reconstructed or restored to a state that is better than its state before the occurrence of that disaster.
3. To ensure that Dominica will be more resilient to natural hazards and better able to respond to climate-related disasters.
4. To assist the public and private sectors and civil society to be better equipped to manage and recover from climate-related disasters.
5. To ensure the climate resilience of the physical and other infrastructure of Dominica.
6. To coordinate recovery action following a climate related disaster, including the construction, reconstruction or restoration of physical or other infrastructure and the execution of projects aimed at building national climate resilience.
7. To prioritize and accelerate projects and, where necessary, to ensure that projects are properly sequenced.
8. To avoid duplicity and maximize economies of scale.
9. To identify and reduce critical gaps in funding.
10. To support Government Ministries to enable them to implement climate resilient policies and priority recovery projects.

9. Critical discussion of the adaptation strategies

This chapter aims to critically assess the beforementioned strategies that are to be implemented in Dominica in the period of 2020-2030. After gathering the data, I have critically assessed all policy documents and chose to focus on the National Resilience Development Strategy as this document is leading in mentioning the resilience strategies planned for the coming years. Part of this assessment included examining the feasibility on some of the strategies mentioned and seeing how the strategies have been formulated and/or framed in a wider context of a globalized world, keeping in mind some of the existing critiques on the term 'development' and other current existing (international) frameworks for post-disaster recovery.

The National Resilience Development Strategy starts by stating that Dominica "has traversed a long way since the formulation of its first Growth and Social Protection Strategy (GSPS), a single, overarching document containing Government's goals and strategies to achieve its socio-economic development objectives" (Commonwealth of Dominica, 2018). The GSPS and the three iterations which followed were created in an environment of economic turbulence and uncertainty locally, regionally and internationally. Locally, Dominica grappled with its own economic crisis which necessitated a structural adjustment programme of the International Monetary Fund (IMF) between 2002 and 2006. On an international level, all countries faced the effects of the most turbulent global economic and financial crisis in 2008 with many states being on the brink of bankruptcy. In addition, there was a period of rising world prices predominantly driven by rising oil prices. Amidst this difficult environment in which Dominica and its people have had to navigate, "the Government made hard policy decisions to ensure that every citizen was safe, secure and assured that basic human needs were met" (Commonwealth of Dominica, 2018).

What can be deducted from the numerous policy documents is that current policy is led by an economistic view of free, suggesting that rational individuals should operate in a 'free' marketplace. This assumption is based on the fact that Dominica desperately wishes to increase its economic stability and position within in an international market, however the country remains critically dependent on agricultural exports and especially on the threatened banana trade (as stated in previous chapters). This argument is substantiated by the National Resilience Strategy, where it is stated that "Productive enterprises are one of the main drivers of growth, development and employment. Many of these enterprises though embedded within traditional structures of ownership, technology and product, they must be modernized to become regionally and internationally competitive" (Commonwealth of Dominica, 2018). The country wishes to compete in an international environment by improving its productive enterprises. Also, the government wishes to improve its agricultural sector in order to compete in international markets: "By 2030, the Government aims to make the country food-secure. To achieve the thrust to provide a sustainable supply of food for the country, efforts will be undertaken to develop a highly productive agricultural sector that is modernized and regionally and internationally competitive, generates sustainable jobs and incomes for producers, and guarantees production despite weather conditions" (Commonwealth of Dominica, 2018).

However, the decline in production and exports since the mid-1990s has caused for an unstable national economy. The free-market economic point of view that fits within the current context of globalization is problematic when formulating a resilience/development strategy because it fails to take into account the historical impacts of colonialism. Examples of strategies that do achieve this goal are possibly: applying for (international) debt relief regulations, implementing educational systems that take historic impacts into account, thereby increasing community awareness at a later age, implementing geographic planning strategies (spatial planning, where can villages be relocated to that poses a lesser risk to external shocks such as natural hazards) and lastly the implementation and enforcement of obligatory DRR building codes.

Furthermore, the large amount of public debt mentioned in previous chapters poses a large challenge for the economic growth of the country. The study by Benson, Clay, et. al (2001) highlighted the tension caused by the

wide range of demands made on public finance, including for funding to reduce physical vulnerability to disasters (in the form of both initial capital investment and maintenance resources). The study further states: "The GoCD (2000) identifies two issues of particular relevance in seeking to establish sustainable growth and alignment with the liberalized global market: first, the strengthening of macro-economic fundamentals, particularly the structure of the fiscal and external accounts, and second, the need to expedite the establishment of the infrastructure required to support the expansion of private investment. Such goals are unlikely to be attained without improved hazard risk management." (Benson, Clay, Michael, & Robertson, 2001)

This research has shown that addressing the root-causes of vulnerability is essential in developing a sustainable growth or resilience strategy. The main point of critique I wish to address on the current National Resilience Development Strategy by the Government of Dominica is the lack of addressing these root-causes of vulnerability, there is no mention of the impacts of its colonial past and how this has caused for a decreased level of resilience. This claim corresponds with earlier mentioned findings that this view remains unexplored in other available bodies of research. As an example, the NRDS mentions that Dominica has been classified among the world's most vulnerable countries and continues that "Vulnerabilities include not only economic shocks but also the impacts of climate change and climate variability, creating the need to build in resilience in the management of the country." The social, root-causes of the country's vulnerabilities remain unaddressed. A possible reason behind this could be the dependency on international (Western) nations for future investments, knowledge and development aid.

Following this, in no particular order, other points of critique are listed below regarding the National Resilience Development Strategy document published by the Government of Dominica:

- **Technical/engineering sciences oriented perspective**

The technical or engineering sciences oriented perspective views disaster vulnerability as the amount of damage caused to a system by a particular hazard. The social sciences oriented perspective view vulnerability as a state that exists within a system before it encounters a hazard. The NRDS is written within a technical/engineering oriented perspective, as it neglects to critically assess the current state of the country pre-disaster. As an example, embedded socio-political structures and vulnerabilities of communities are expressed through 'raw data' as the NRDS mentions the high levels of poverty but fails to express the root causes of this poverty and how these levels have exacerbated through history. As we could see in the example of the high poverty and unemployment rate of the Carib/Kalinago population, the NRDS mentions its ambitions to improve the socio-economic status of this indigenous group, but fails to address how they intend to do so (move the settlements to a less vulnerable location, the creation of jobs which makes the population's livelihoods less dependent on natural resources?).

- **External factors cannot be influenced – dependency on global economic situation**

There is still a large degree of dependency on Western markets. The NRDS mentions within its first paragraph the influence of Brexit on trade between the two countries as being a former colony of Britain. This dependency on (Western) nations framed the policy document in such a way that any critique on the West regarding colonialism and plantation logics in Dominica remains absent.

"This current development strategy is set against the backdrop of the most unusual and challenging time this country has faced as a result of the passage of category 5 Hurricane Maria. In addition, since the last revision of the GSPS in 2014, the Dominican economy has faced a number of economic and environmental shocks which undoubtedly have had negative impacts with short-term and long-term implications. These shocks include international developments such as Brexit, and in respect of local developments, the passage of Tropical Storm Erika in August 2015" (Commonwealth of Dominica, 2018). Furthermore, the document mentions that on an international level, all countries faced the effects of the most turbulent global economic and financial crisis in 2008 with many states being on the brink of bankruptcy. In addition, there

was a period of rising world prices predominantly driven by rising oil prices. Dominica remains dependent on the global financial situation, being a former colony of Britain.

The NRDS mentions the attainment of significant and steady progress in several socio-economic spheres such as: robust and equitable macro-economic growth; low inflation; significant increases in the output of productive enterprises and productivity; growth in the services sector; protection and enhancement of the environment; strengthening and improvement of infrastructure, etc. However, not all of these factors can be influenced by Dominica itself, and the country must rather see itself as a mechanism operating within a global economy, with fluctuating prices and a very volatile market. On a more positive note, the government is aware that climate change will affect many different economic sectors both directly and indirectly, and the characteristics of Dominica's social and economic systems will play an important role in determining their resilience, amidst other development challenges. "Therefore, addressing climate impacts in isolation is unlikely to achieve the desired equitable, efficient or effective outcomes of small island developing states such as Dominica" (NRDS, 2020). Furthermore, the government of Dominica recognizes that there are some "imponderable factors or risks that may hinder NRDS progress, such as: expected resources not being available; spikes in global oil prices which will push inflation up; regional and international political instability; tradebarriers not being brought down at the required time frame; outbreak of diseases and natural disasters, both climatic and non-climatic. Government is confident that it could withstand such challenges. After all, the strategy is grounded in addressing resilience, albeit the NRDS will be adjusted to accommodate "new" realities as they emerge" (NRDS, 2020)

- **Government calls on a collective (public) response – strong leadership and long-term policy is needed**

"There is a dire need for a collective response in which each citizen is willing to contribute to the rehabilitation and reconstruction of this country with a focus to build back better and more resilient, thereby providing an opportunity for each citizen to be an active participant in and reaping the benefits of a more modern, peaceful and prosperous Dominica" (NRDS, 2020). The Government calls for a collective response, however policy decisions made top-down are most influential in this case in order to ensure a lower poverty rate, to increase Dominica's position in an international market and to increase resilience. According to Benson, Clay, et. al (2001), in the immediate aftermath of a disaster, both government and the private sector face choices between the pursuit of rapid recovery and a reduction in longer-term hazard vulnerability. In Dominica, effectively by default, the emphasis has been on quick recovery because the political impetus and associated financial incentives for investing in mitigation and changes in land use have been insufficiently strong. Therefore, political reformations and restructuring seem more effective than calling on collective (public) response in face of disaster mitigation and/or implementing risk reduction measures .

- **NRDS and SDGs**

The 2030 Agenda for Sustainable Development was universally adopted in September 2015 by Member States of the United Nations. The agreement officially came into effect on January 01, 2016 and all of the prescribed goals must be achieved by 2030. The Government of Dominica reaffirms its commitment to achieving the SDGs, and will contribute to the regional plan to address some of the pressing challenges facing the Caribbean to attain a sustainable development pathway. This National Resilience Development Strategy (NRDS) 2019-2030 provides an opportune time to mainstream these SDG indicators in national and sub-national development frameworks.

"Government is conscious that efforts to achieve the SDGs necessitate majormobilization and management of resources including additional spending and increase in government revenues; integrated planning and joint implementation of policies"

- **Dependency on external stakeholders and/or institutions**

"We have concluded, like other countries in a similar situation that we need a dedicated agency to lead the recovery. This specialized agency will focus not just on the physical reconstruction but also on establishing climate resilient systems, for example, in the energy, food production and transport sectors." The government of Dominica relies on external stakeholders to facilitate in this, such as CREAD (the Climate Resilience Execution Agency for Dominica). Without appropriate (external) knowledge and research funding, the government seems unable to effectively implement the strategies and visions that are created to improve the current state of Dominica and increase resilience in the country.

- **'Build Back Better' strategy**

In the National Resilient Development Strategy, it is mentioned that Dominica has no choice but to rebuild Dominica as a climate resilient nation and 'Build Back Better' the damage wrought by Maria. Build Back Better signifies an ideal reconstruction and recovery process that delivers resilient, sustainable, and efficient recovery solutions to disaster-affected communities. The motivation behind the Build Back Better concept is to make communities stronger and more resilient following a disaster event (Mannakkara, Wilkinson, & Francis, 2014). However, as an example I draw on natural hazard vulnerability reduction concerns which have apparently not been factored into plans for diversification more generally nor, at least in earlier years, into diversification within the agricultural sector in the case of Dominica. According to Benson, Clay, et al. (2001), there has apparently been little deliberate effort to reduce the overall hazard vulnerability of Dominica's economy. The other point of critique I wish to express on this slogan is that it perceives disasters as a 'natural phenomena' rather than to understand disasters as a part of a socio-political process which is embedded in history. As Chmutina & Cheek (2021) state: "Build Back Better has unrightfully become a set of best practices for international frameworks for post-disaster recovery. The goal is not to alleviate the original conditions that created a crisis, but rather to quickly move past the crisis without altering the underlying political, economic, and societal structures" (Chmutina & Cheek, 2021).

- **Decentralized approach**

On a positive note: the decentralized approach for the use of implementing DRR seems beneficial.
According to the NRDS, regions/districts are used as administrative spatial parameters to administer services by the state through many of its extension agencies. Each region/district is defined spatially comprising of a group of settlements and population. Some services are further decentralized to the community level taking them much closer to the population. For example local government bodies represent sub-regions and sometimes single communities (NRDS, 2020). Effective DRR measures can be implemented at community level, in regions where vulnerability is the highest (communities residing along the coastline). The heterogeneity of each region requires a different approach and through this decentralized approach, tailor-made DRR measures are implemented. In Dominica, disaster management has always been decentralized but with limited scope and attention. The NRDS mentions that this regional disaster risk management concept can be piloted in two of the most vulnerable regions/districts in Dominica: the East and South East. These regions/districts suffer the most damage from natural disasters, especially hurricanes.

Conclusions

After having conducted a thorough analysis on the National Resilience Development Strategy (NRDS), there are a number of conclusions that can be drawn regarding the way in which this document is written and the political agenda behind these resilience strategies. Firstly, it is noted that the NRDS is the successor of the previously published Growth and Social Protection Strategy (GSPS) and that this document was composed during challenging economic times (a global economic crisis in 2008). This further indebted the economy of Dominica and presented its challenges in diversifying its economy and creating a sustainable economic growth pattern. The free-market economy that the government of Dominica wishes to achieve with its intention to bring its productive enterprises into international markets, along with upscaling its agricultural production is perceived

as problematic because it fails to take into account the historical impacts of colonialism. By understanding the events that led to the misfunctioning of the economy, including high amounts of government expenditures and public debt, a trade deficit, unequal growth patterns and a failing agricultural production system, only then can we truly formulate resilience strategies that are to future-proof the economy of Dominica and that are to learn from previous faulty policy decisions. Adding to this, Dominica remains to be highly dependent on (British) external funding, as was seen during the Brexit in 2020. The Climate Resilience Execution Agency for Dominica (CREAD) is funded by the British Commonwealth (UKAid), creating a complex level of dependency on external knowledge actors and funding. Furthermore, this critical analysis of the NRDS confirms the statement made by Benson, et al. (2001) stating that "the political impetus and associated financial incentives for investing in mitigation and changes in land use have been insufficiently strong, thereby pursuing a rapid recovery, rather than investing in the reduction in longer-term hazard vulnerability". To conclude, the strategy is much more about mitigating or adapting to 'external' nature than it is about dealing with the island's social and political economic inheritance.

10. Discussion

Introduction

The previous chapters of this thesis have attempted to shed light on the root causes of disaster vulnerability in Dominica in combination with the proposed measures to increase national resilience, due to the growing impacts of climate change and frequency in disasters worldwide. What can be concluded is that my research question forms a juxtaposition between the current (or future) adaptation strategies and with the historical formation of vulnerability of Dominica. This nineth chapter will aim to connect this to the theoretical framework. Building on the interviews and elaborate literature study, this thesis argues that the current formulated adaptation strategies of Dominica have failed to address the country's (structural) root causes of vulnerability, thereby potentially jeopardizing the effectiveness of the desired adaptation strategies. As stated in the previous chapter, for a nation to transition and/or steer away from an economy that faces as many issues as Dominica does, we must learn from history in order to implement effective strategies that can counteract some of the decision-making processes that led to Dominica becoming a vulnerable nation, both economically and geographically.

The research aim of this thesis was twofold. On the one hand, the research aimed to identify several causal factors of vulnerabilities of Small Island Developing States (SIDS). This thesis was geared specifically to Caribbean disasters research, underlining that historical processes are fundamental to understanding not only how conditions of risk emerge, but also how the economic and/or societal stasis causes them to persist over time. On the other hand, this thesis intended to identify several current and future (climate) adaptation initiatives that are (to be) implemented on the island of Dominica. These adaptation measures were listed in the National Development Resilience Strategy, a document published by the government of Dominica. A critical analysis was given on the feasibility of these measures, and how the document failed to address the historical processes that formed the vulnerability in the country throughout the years.

10.1 Linking theory to the results

Furthermore, the findings and results of the research presented a conclusion that can be drawn regarding the structuring of the model by Jackson, McNamara and Witt on disaster vulnerability risk. The framework by McNamara and Witt was chosen initially due to its similarities with the strategies regarding livelihood resilience, mentioned in both the National Resilience Strategy (NRDS) and the Climate Resilience and Recovery Plan, both which were commissioned by the government of Dominica. It therefore seemed evident that this framework would provide a fitting base for analyzing both the causal factors of vulnerability and the livelihood resilience of the country. Based on the evidence I have presented in previous chapters, there are reasons to question this model (or its applicability) and instead I present a different approach: the historical trajectory of a nation should be at the center of all the susceptibility components, as it shapes many processes and societal factors in many ways. Hence, it also indirectly influences disaster preparedness and the degree to which a nation can be harmed by disastrous hazards. This stands in line with the argument mentioned earlier, namely that future critiques of and solutions to vulnerability, disaster and catastrophe in the Caribbean be more attentive to the historical trajectories of imperialism, debt and underdevelopment as mentioned by Gahman, Thongs & Greenidge (2021). A visual representation of this new model design can be found in figure 21 below.

Colonialism

The interview with prof. Webber confirmed that the region continues to be plagued by plantation logics (Best 1968), the Westminster system (Girvan 2015), debt and import dependency (Barry et al. 2020) and heteropatriarchal social relations. The 'stark racial bifurcation' which prof. Webber also referred to corresponded with the literary works I found related to the colonial power dynamics between the indigenous Kalinago population and the British plantation owners. These findings also seem to fit in a wider frame of literature concerning colonialism in the Caribbean region, which articulates that "the logics, practices and debts

of colonial-capitalist development, neoliberal exploitation and post-independence corruption continue to reduce resilience and threaten public health in the region"(Gahman, Thongs, & Greenidge, 2021).

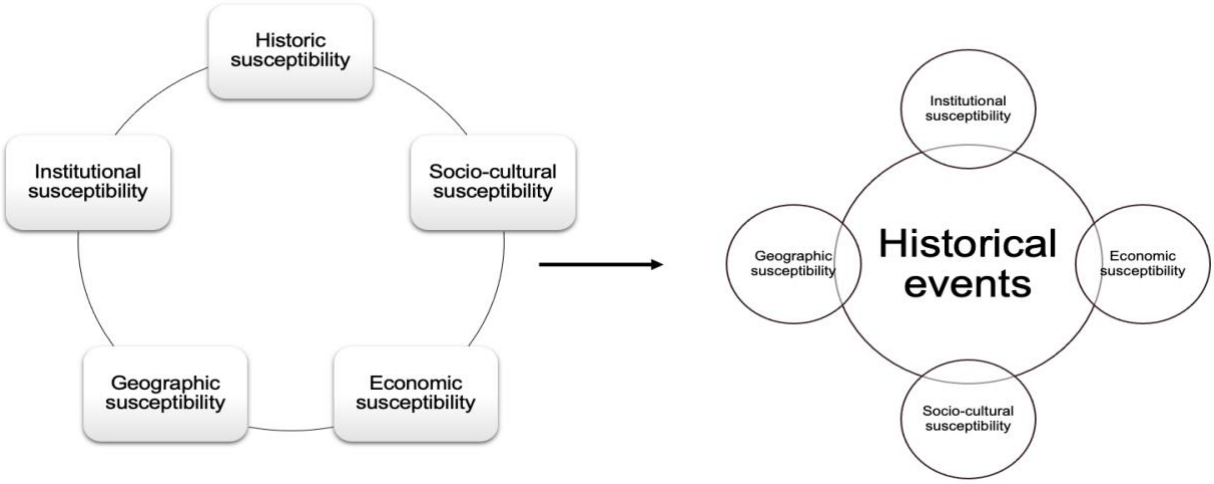


Figure 24: My alteration of the framework produced by Jackson, McNamara and Witt (2017)

Findings and results and its linkages to the dependency theory

The Dependency theory believed the unequal relationship between the coloniser and colonised (or core and satellite) disadvantaged poor countries to such an extent that they were still in a state of dependency when the colonial powers left in the 1950s and 1960s. The ex-colonies were effectively turned into the exporters of low value primary products such as tea, which kept them poor. The evidence provided in previous chapters proves this to be true for the case of Dominica, as its export was centered entirely around the growing and cultivation of bananas, a relatively low valued export crop. Any other meaningful industries did not develop following colonialism and the country was kept in an economic stasis. One could argue that the dependency on export markets that was present even in colonial times, persisted after independence in the 1960s and kept the country reliant on Western countries for economic growth. It therefore fits well within the dependency theory,

However, there are also criticisms on the dependency theory, i.e. the World Systems Theory (WST) suggests that there is evidence that poorer, ex-colonies can develop within the modern world capitalist system. Good examples of ex-colonies which have developed by becoming semi-periphery countries, or manufacturing are India and Mexico.

The dependency theory was mentioned earlier within the theoretical framework chapter of this thesis. Here, I wish to draw on this theory once more and connect the findings and results of the research to this theory. The findings I came across during the course of data gathering, all seemed to fit within the dependency theory 'frame' namely that the 'root cause' of underdevelopment as rich world governments (or nation states) – believed poor countries remained poor following a history of colonialism where powerful countries such as Britain colonized other areas of the globe, for example India and many African countries and took control of these regions politically and economically, running them for their own benefit. This proved to be true for the case of Dominica, as was emphasized during the interview with Oscar Webber.

10.2 Relevance to literature

This case highlights the importance of addressing social, root-causes of vulnerability instead of merely attributing disasters to environmental/geographical factors. It seems to fill a 'research gap' of unexplored social sciences work regarding disaster vulnerability. Fortunately, we notice during the last decades a shift in the understanding of vulnerability from a focused concept (for example limited to physical resistance of engineering structures) to a more holistic and systemic approach. However, currently most literature studies still fail to provide reference to the political/institutional situation and does not account for power relations or the heterogeneity within communities. This research has aimed to achieve the latter by viewing the case study of Dominica in a broader context of Caribbean states, and how its heterogeneity influences future resilience.

10.3 Limitations

Within this section the limitations of this research will be discussed. One of these limitations includes the challenges presented by the COVID-19 pandemic to preforming fieldwork in the year 2021 and 2022. On-the-ground interviews and ethnographic research were not possible within this research scope, and these were made particularly difficult due to travel restrictions and country bans. On the other hand, what was beneficial to this research in particular was the abundance of literature available (both online and offline) on colonialism in the Caribbean, characteristics of Dominica in particular and the many literary definitions and analyses on disaster vulnerability. A quick scan to inventory the available sources and documentation soon revealed that the body of literature is large enough to write a thesis on, while keeping the research aim and knowledge gap in mind.

A limitation that I did not anticipate beforehand was the limited availability of concrete data that was logged by the Government of Dominica, data that would provide some insight in the key characteristics of the country and the some of the impacts of disasters. Most data that I found was rather outdated and not kept up-to-date. The consequence of this was that claims made on certain data would be based on older data, rather than representing the actual situation on the ground currently.

In terms of ethical considerations: as the data consisted of mostly secondary data, there were few ethical considerations to take into account. This was beneficial in a way that the researcher did not need to consider conflicting interests during interviewing, cultural background sensitivities, or any ethical bottlenecks that may have arisen during regular research settings. However, ethical considerations within qualitative research also entailed not taking credit for another author's work. This meant taking good note of any possible plagiarism and referencing correctly.

Another limitation that was formulated at forehand of the research was that the research aims and objectives might have been generated too broadly and not given enough depth and focus. This could negatively impact the research by not providing enough direction to start the data gathering and analysis. In hindsight, I have altered the research questions and scope many times, as it took some time and practice to come up with a narrow research scope and to identify what exactly it was that I wanted to investigate. This caused some frustration, as this forced me to continuously adapt to the newest situation and search for new literature time and time again. However, I feel that throughout the course of writing this thesis I have learnt from this process and it forced me to better specify my research aims.

11. Conclusion

This research has sought to understand and subsequently attempted to shed light on vulnerabilities of Small Island Developing States, also referred to as SIDS. By doing so, a case study was selected to investigate the structural forces exacerbating risk related to disasters in the Caribbean. A number of sub-research questions were devised to focus the data collection by understanding the facets of susceptibility of a nation: what makes a country (more) susceptible to natural hazards and disasters? What influencing factors are there? And more importantly: what role does history play in this? Following this, a number of sub-research questions were created regarding some of the adaptation strategies set for the future of Dominica, in order to make the country 'climate-proof' and more resilient to natural hazards.

I used a holistic approach to analyse the vulnerability of Dominica by looking into multiple facets such as: economic/social/political characteristics and the way this influences the susceptibility of a country such as Dominica to natural hazards. My own research concluded that historical processes are fundamental to understanding how conditions of risk emerge and persist over time. The main driver for this thesis was to uncover the root causes of vulnerability in Dominica, and according to Barclay et al., "uncovering these historical drivers and persistent issues, explicates lessons for pursuing a more resilient development trajectory, including through the promotion of economic restructuring and diversification, and land reform." (Barclay, et al., 2019, p. 1) My findings corresponded with the available literature namely that 'decolonization' in the Caribbean region remains incomplete and this influenced its lack of resilience to natural hazards and disasters. By making use of a historical analysis, I was also able to critically analyze the future trajectories set for the country for 2030. The National Development Resilience Strategy document published by the government of Dominica enlists several ambitious development and growth strategies and the feasibility of these plans was criticized through a social-sciences lens, meaning examining the mentioned strategies alongside a number of theories, including the dependency theory.

There are a number of points I wish to address that encapsulate the main message of my research. Firstly, it should be noted that there is a consensus amongst research scholars that the effects of climate change will not be uniformly felt across the Caribbean region due to heterogeneity across nations or, in other words, underlying differences between island groups. However, the susceptibility (historic/political/economic) of Dominica has not yet been explored in great detail in comparison to the entire region of the Caribbean. After studying the policy documents which enlist the future resilience strategies, it soon became clear that the climate resilience vision adopted by the government of Dominica is "a developmental paradigm which seeks to climate proof (to be resilient against the destructive impacts of extreme weather events) the key pillars of national policy which are economic diversification, sustained sustainable and inclusive growth, employment creation and revenue generation, social development, social protection and poverty reduction, environmental management, and cultural preservation" (NRDS, 2020). The policy documents also revealed that the Government of Dominica has commenced its attempts to transform the island into the world's first climate resilient country and steps have already been taken to enhance public knowledge on resilience as well as formulating this strategy which will govern the islands future attempts at building resilience.

To conclude, Dominica remains continues to be highly vulnerable to the effects of climate change, the impacts of which have already been experienced during hurricane Maria in 2017, Tropical storm Erika in 2015 and many other weather variations in the past (NRDS, 2020). I therefore agree with the argument presented by Gahman, Thongs & Greenidge (2021), namely that future critiques of and solutions to vulnerability, disaster, and catastrophe in the Caribbean be more attentive to the historical trajectories of imperialism, debt and 'underdevelopment'.

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