

## Article

# Planning for Climate Change in Small Island Developing States: Can Dominica's Climate Resilience and Recovery Plan Be a Model for Transformation in the Caribbean?

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**Abstract:** In response to a series of historical and contemporary extreme weather events, Dominica, a small island developing state (SIDS) in the Caribbean, is pursuing an objective of climate resilience by 2030. In 2018, the Government developed the Climate Resilience and Recovery Plan 2020–2030 (CRRP) in the context of its National Resilience Development Strategy. These policy responses have been hailed as transformational. In this paper, we focus on the CRRP and investigate its quality. To achieve this, we conduct a desk-based qualitative assessment of the CRRP's (1) information base; (2) vision, goals and objectives; (3) priorities and options; (4) actions and implementation; and (5) monitoring and evaluation. We find that the CRRP is strongest on (1) and (3), which is not uncommon for similar policies. We also discuss whether it can be a model for transformation in the Caribbean, given the region's long history with trying to recover from and build resilience to disasters. We conclude that, in order for it to be used as a model, there are three key factors that other jurisdictions would need to consider. The first consideration is developing mechanisms for equitably sharing any benefits derived from the blue economy. The second consideration is centering Indigenous perspectives in environmental policy- and decision-making. The third consideration is adequately accounting for exogenous, unexpected risks. Given these three considerations, we see this study as contributing to discussions about what constitutes good policy in a SIDS context, which is an underexplored area in the existing academic literature.

**Keywords:** climate change; Dominica; hurricane; resilience; risk; small island developing states (SIDS); transformation



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## 1. Introduction

Small island developing states (SIDS) are a special grouping of 58 small islands and low-lying coastal countries located across three main geographic regions—(1) the Atlantic, Indian Oceans, Mediterranean and South China Seas; (2) the Caribbean; and (3) the Pacific. The SIDS categorization, formalized in the outcome of the 1992 United Nations Conference on Environment and Development, fosters a strong awareness of the shared environment and development challenges that these countries face, including managing climate change risk. Chapter 29 (Small Islands) of Working Group II's contribution to the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), which was released in 2013, expressed very high confidence in the detection and attribution of sea-level rise consistent with global means to climate change. It also expressed high confidence in the detection and attribution of coral bleaching in small marine environments. Though it expressed very high confidence in the detection of casualties and damage during extreme events, the Chapter concluded that, due to insufficient data, there was low confidence in the attribution of these events to climate change. Despite this, attribution science is advancing significantly, and there is now consensus that climate change is intensifying hydrometeorological hazards such as hurricanes. As climate-amplified events, they serve

to jeopardize the ecologically fragile marine ecosystems on which lives and livelihoods in SIDS rely. Additionally, because of their high degree of exposure and vulnerability to hazards, SIDS must plan for and make the necessary adjustments to account for observed and expected climate and its effects.

Dominica, like other SIDS in the Caribbean, has had a long history with extreme weather events. The two most significant storms that made landfall during the last 20 years were Tropical Storm Erika in 2015 and Hurricane Maria in 2017. While Dominica experienced other significant storms in the 2000s such as Hurricane Dean in 2007, Tropical Storm Erika represented the most devastating storm since Hurricane David in 1979, which took the lives of at least 31 people [1]. Damage from Tropical Storm Erika represented approximately 90% of Dominica's 2015 gross domestic product (GDP), or US \$483 million; additionally, heavy rainfall, flooding and landslides left 30 people dead and displaced thousands [2,3]. Just two years later, Hurricane Maria was even more catastrophic (see Figures 1 and 2 below)—damage from the hurricane represented 226% of Dominica's GDP, or US \$1.313 billion, and affected every individual resident of the island in some way [4,5]. An estimated 80% of the population (approximately 56,800 people) was impacted directly; over 90% of homes were damaged or destroyed, and 65 lives were lost [5]. Hurricane Maria is now seen as the most profoundly devastating disaster in global history in terms of percentage of GDP in loss and damage [5].

Five days after Hurricane Maria made landfall in Dominica, the country's Prime Minister, Roosevelt Skerrit, delivered a powerful speech at the 72nd Session of the United Nations General Assembly in New York, detailing the country's plight and reinvigorating its commitment to climate resilience. Skerrit noted that, "[Dominica] as a country . . . did not start this war against nature . . . We in the Caribbean . . . have made no contribution to global warming that can move the needle. However, yet, we are among the main victims . . . on the frontline!" [5] (p. i). Skerrit declared that Dominica had no choice but to rebuild itself as the first climate-resilient nation [4].



**Figure 1.** Aerial view of part of Roseau, the capital of Dominica, on 20 September 2017 after the passage of Hurricane Maria (source: Russell Watkins/Department for International Development under Attribution 2.0 Generic License, CC BY 2.0).



**Figure 2.** View of a street in Roseau on 20 September 2017 after the passage of Hurricane Maria (source: Russell Watkins/Department for International Development under Attribution 2.0 Generic License, CC BY 2.0).

In June 2018, nine months after Hurricane Maria devastated the island and after Skerit's United Nations speech, the Government released the National Resilience Development Strategy (NRDS). The NRDS, which is built on the country's 2002 National Climate Change Adaptation Policy, its 2012 Low-Carbon Climate-Resilient Development Strategy, and its 2014 Growth and Social Protection Strategy, expresses the Government's larger policy framework that explicitly incorporates climate considerations into development, and specifies seven development objectives that together constitute 'resilience' [4,5]. The Climate Resilience and Recovery Plan 2020–2030 (CRRP) is a roadmap for achieving resilience and is meant to operationalize the NRDS by specifying targets, defining initiatives to be implemented between 2020 and 2030, and outlining the financial resources and strategic and operational partnerships required to achieve those objectives [5]. This policy response to the devastating extreme weather events in Dominica is timely and could also be important for establishing a benchmark of good policy practice in and for Caribbean SIDS.

Dominica's CRRP has been hailed as transformational—in the Caribbean context, this framing recognizes the need for long-term change that challenges political, economic, and social norms for the betterment of people [6]. Given the wide-ranging scope of the CRRP's overarching objective, we conducted a desk-based qualitative assessment of its quality. To do this, we first conceptualize extreme hurricane events as climate-amplified events, recognizing the risk they pose as the result of the confluence of the hazard, exposure and vulnerability to which national governments and other actors must adapt. We also conceptualize climate change adaptation as a subset of disaster risk reduction, sharing the overarching goal of reducing the impacts of extreme events and increasing resilience. We explain this framing in Section 2 of this paper, where we also provide more details about the NRDS and the CRRP. We also describe our analytical framework—the recently developed Adaptation Policy Assessment (A-PASS) framework [7] that we use to assess the quality of the CRRP based on its (1) information base; (2) vision, goals and objectives; (3) priorities and options; (4) actions and implementation; and (5) monitoring and evaluation. The results of our application of A-PASS are presented in Section 3. In Section 4, we discuss our results. Additionally, given that this paper is part of a Special Issue on 'Transformations for a Sustainable Future', we specifically discuss whether the CRRP can be a model for transformation in the Caribbean. In Section 5, we offer our conclusions.

## 2. Materials and Methods

### 2.1. Climate Risk: Hazard, Exposure, and Vulnerability

According to the AR5, climate risk results from the interaction of a hazard, exposure, and vulnerability, where risk is defined as ‘the potential for consequences when something of value is at stake and where the outcome is uncertain’ [8] (p. 1772). This definition marks a shift from the Fourth Assessment Report, which focused on exposure, sensitivity, and adaptive capacity as determinants of vulnerability, to one where vulnerability is independent of exposure and hazards [9]. In the updated framing, risk takes shape when vulnerable systems are exposed to hazards. Mitigating the risk a particular hazard poses, therefore, involves simultaneously reducing the vulnerability of the system in question and reducing exposure to that hazard, in addition to understanding the mechanics of the hazard in question. Thus, a thorough understanding of all three components and how both climatic and socio-economic processes impact them (and through them, the associated risk) is necessary in order to minimize the risk [10].

AR5 defines a hazard as ‘the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources’ [8] (p. 1766). Hurricanes are one example of a particularly destructive hazard that is acutely influenced by anthropogenic climate change. While most studies exploring global hurricane frequency have found that, thus far, the overall number of worldwide tropical cyclones has remained steady, despite the impact of global warming [11], Holland and Bruyère [12] observed that trends in individual basins have shifted while maintaining the overall threshold; specifically, there has been an increase in the annual tropical cyclone frequency in the North Atlantic and a decrease in the western North Pacific. Moreover, one study examining state-of-the-art climate models concluded that, given projected 21st-century radiative forcings and sea-surface temperatures, the annual number of tropical cyclones may also increase, especially as the century draws to a close [13].

Exposure is defined in AR5 as ‘the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected’ [8] (p. 1765). The IPCC’s conceptualization of exposure has often been understood as being spatial in nature, meaning that exposure is a spatial attribute of a particular system [14]. The Caribbean, as a spatial unit, is highly exposed to hurricanes—they are a common hazard in the region. The North Atlantic hurricane season lasts from 1 June to 30 November each year and the more than twenty SIDS in the region are located in the ‘Hurricane Alley’, which is a section of warm water in the Atlantic Ocean that spans from the west coast of Northern Africa to the east coast of Central America and the Gulf Coast region of the southern United States. The warmth of the sea-surface temperatures (approximately 26 °C or 78.8 °F) supports the formation of these systems. As a result, over 300 hurricanes have affected the region since 1950 [15]. Three Caribbean countries—Puerto Rico, Haiti, and Dominica—are among the ten countries that have been most affected over the past two decades [16]. The 2017 North Atlantic season, in particular, has gained much attention as an especially active year. There were six major hurricanes (>Category 3 on the Saffir–Simpson scale with maximum sustained wind speeds > 111 mph), two of which were Category 5 (Irma and Maria). It is the only season with three hurricanes having an accumulated cyclone energy over 40. This is especially important to note, given that strong hurricanes are statistically rare occurrences [17,18].

There is now consensus that climate change is increasing the speed of hurricane formation and their intensity [19]. In the past 15 years, the five costliest hazards affecting the US Earth system have all been hurricanes—Katrina (2005), Sandy (2012), Harvey (2017), Irma (2017), and Maria (2017). These extreme weather events first passed through the Caribbean, causing billions of dollars in damage. The ability of SIDS governments to recover from and build resilience to these climate-amplified events is also shaped by countries’ vulnera-

bility, which AR5 defines as the ‘propensity or predisposition to be adversely affected . . . [encompassing] a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt’ [8] (p. 1775). Crucially, vulnerability is a ‘pre-existing state’ that is not dependent on hazards or exposure, but of which sensitivity and adaptive capacity are constitutive aspects [10]. Sensitivity is ‘the degree to which a system or species is affected, either adversely or beneficially by climate variability or change. The effect may be direct . . . or indirect’ [8] (p. 1772). Adaptive capacity is ‘the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences’ [8] (p. 1758). Thus, the lack of adaptive capacity increases vulnerability while low sensitivity decreases it [14]. The factors that shape vulnerability in SIDS are multiple in nature, interconnected, and linked to wider development concerns [20–22]. Socioeconomic inequality, in addition to population growth, rapid urban development, international financial pressures, governance failures (e.g., corruption, mismanagement), and environmental degradation, exacerbate vulnerability in these countries [9,21]. The confluence of hazard, exposure, and vulnerability in Dominica, when considering the occurrence of climate-amplified hurricanes, generates a substantial amount of climate risk for the country, its people and their livelihoods.

## 2.2. *Situating Climate Change Adaptation within Disaster Risk Reduction*

In this paper, we conceptualize climate change adaptation as a subset of disaster risk reduction [23]—both share the overarching goal of reducing the impacts of extreme events and increasing resilience [24]. Kelman et al. [25] are among the scholars who have argued that situating climate change adaptation within disaster risk reduction has a positive impact on the promotion of wider development goals and agendas, a particularly useful relationship given the multifaceted nature of Dominica’s desire to develop and to become the world’s first climate resilient nation. Solecki et al. [24], writing earlier than Kelman et al. [25], suggested that the linkage between climate change adaptation and disaster risk reduction can promote synergies and yield better coordinated planning and communication that can inherently build capacities. Indeed, the Sendai Framework for Disaster Risk Reduction 2015–2030 and its predecessor, the Hyogo Framework for Action 2005–2015, specifically emphasize the importance and relevance of climate change and sustainable development for the wider field of disaster risk reduction. Climate change is a known threat magnifier that alters hazard parameters [23]. Crucially, however, climate change is but one of many contributors to disaster risk [25], and adaptation efforts can neither exist in a vacuum, nor be divorced from other methods of and strategies for disaster risk reduction.

## 2.3. *Dominica’s National Resilience Development Strategy (2018) and Its Climate Resilience and Recovery Plan (2020–2030)*

In response to a series of historical and contemporary extreme weather events, including Tropical Storm Erika in 2015 and Hurricane Maria in 2017, the NRDS outlines the Government of Dominica’s priorities for achieving sustainable economic growth in light of the climatic, climate-amplified and non-climatic challenges, including hurricanes; sustainable growth is viewed through the lens of the United Nations Agenda 2030 and its 17 Sustainable Development Goals (SDGs) [4]. Thus, the NRDS is defined by three major concepts—the SDGs, resilience building, and people-centered development. These concepts support three strategic elements rooted in sustainability and resilience—environmental protection, social development, and economic development and transformation [4]. The concepts are also used to define 43 people-centered resilience goals that align in a myriad of ways with the SDGs [4]. Further, the NRDS requires that any climate-resilient national plan is based on three pillars of resilience: climate-resilient systems, prudent disaster risk management, and effective disaster response and recovery [4]. The Climate Resilience Executing Agency of Dominica, a government agency that was established by the Cli-

mate Resilience Act in December 2018, later built out the climate-resilient national plan, referenced in the NRDS, into the CRRP [5].

The major adaptations to climate-amplified risks underway in Dominica are given shape by the CRRP, the overarching objective of which ‘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’ [5] (p. 13). The CRRP builds upon the three pillars of resilience outlined in the NRDS, expanding them into six results areas and 20 corresponding climate resilience targets to be achieved by 2030 [3]. Ten of these targets are identified as ‘critical high-impact resilience initiatives’, which must be realized ‘as a matter of immediate priority’ [5] (p. iii). These 10 initiatives are listed below:

1. Enhanced Social Safety Net.
2. Community Emergency Readiness.
3. Resilient Housing Scheme.
4. Koudmen Domnik.
5. Resilient Dominica Physical Plan:
  - a. Infrastructure Risk/Condition Assessment.
  - b. Hydrological Survey and Flood/Landslide Risk Mitigation Plan.
  - c. Standards for Resilient Infrastructure and Housing.
  - d. Sector Master Plans.
  - e. Asset Maintenance and Continuity Plan.
  - f. Legislative and Institutional Plan, and Funding and Prioritization Strategy.
  - g. Roseau and Portsmouth Urbanization Plan.
  - h. Resilient Modern Information and Communications Technology Network.
6. Innovative Insurance Solutions.
7. Dominica as a Global Centre for Agriculture Resilience.
8. Revised Public Sector Investment Program Allocation Methodology, and Enhanced Public Sector Performance Management Framework.
9. Centre of Excellence for Data in Resilience Decision.
10. ResilienSEA Triple Bottom Line Blue Economy Investment Fund.

The CRRP itself has six sections and four annexes in addition to an executive summary and introduction, totaling 115 substantive pages. The sections detail Dominica’s specific context and projected costs of climate inaction, the development and construction of the CRRP, existing and prospective climate resilience programs, plans for implementation of initiatives, and an outline for financing CRRP objectives, including an estimation of the current financing gap. The document, which focuses most of its attention on the implementation of the CRRP, also specifies avenues for the promotion of gender equality and the inclusion of vulnerable groups (e.g., the Indigenous people – the Kalinago) within the country’s larger development framework.

The NRDS and its CRRP are just two examples of resilience strategies developed by a Caribbean SIDS. However, similar strategies in the region have largely focused on specific domains or sectors. Two examples include Belize’s National Climate Resilience Investment Plan, and Guyana’s Climate Resilience Strategy and Action Plan. Other countries are also in the process of developing similar policies. For example, through the Resilience Island program, The Nature Conservancy is working with communities and governments in the Dominican Republic, Grenada and Jamaica to integrate ecosystem-based adaptation strategies into national policies (see: <https://www.nature.org/en-us/about-us/where-we-work/caribbean/stories-in-caribbean/caribbean-resilient-islands-program/>, accessed on 22 January 2022). Considering this, Dominica can be seen as a leader, especially in view of its earlier climate change adaptation and disaster risk reduction policies. Therefore, by assessing the quality of the CRRP, we are able to identify lessons for other Caribbean SIDS as well as to contribute to discussions about what constitutes good policy in a SIDS context. This is an underexplored area in the existing academic literature.

#### 2.4. The Adaptation Policy Assessment Framework

In order to assess the quality of the CRRP, we apply the Adaptation Policy Assessment (A-PASS) framework, which was recently developed by Robinson et al. [7]. It provides policy- and decision-makers with an opportunity to rapidly assess their climate adaptation policies and plans. As we conceptualize climate change adaptation as a subset of disaster risk reduction, A-PASS can provide useful insights on the CRRP.

A-PASS builds on previous work, including Baker et al. [26], Morgan et al. [27], Pittcock [28], Pittcock et al. [29], Robinson [20,22], and Sinclair and Smith [30]. As Table 1 below shows, it has five dimensions: (1) information base; (2) vision, goals and objectives; (3) priorities and options; (4) actions and implementation; and (5) monitoring and evaluation [7]. The 'information base' dimension has three sub-dimensions that explore evidence of climate- and non-climate-related vulnerabilities being adequately understood in the context of various population groups, sectors, and natural and human systems. It also interrogates whether links are established between climate change and national/sustainable development, disaster risk reduction, resilience, and transformation. The second dimension, 'vision, goals and objective', features four sub-dimensions that explore evidence of high-level support for the policy, long-term vision, short- to medium-term goals, and SMART (specific, measurable, attainable, relevant [to the country context], time bound) adaptation goals [7]. The 'priorities and options' dimension has four sub-dimensions that center on evidence of stock-taking of community-, sector- and national-level efforts, clarity of national priorities and consideration of climate risks and available options [7]. The fourth dimension, 'actions and implementation', has six associated sub-dimensions that focus on evidence of implementation plans and actual implementation, an existing body that coordinates action, vertical and horizontal coordination across government, consideration of required resources, and broad, multilevel stakeholder engagement [7]. The 'monitoring and evaluation' dimension comprises three sub-dimensions that examine evidence of systems that may adjust priorities and review actions over time [7]. Through these five dimensions and 20 sub-dimensions, A-PASS is a useful tool for conducting rapid qualitative assessments of national-level climate change adaptation and/or disaster risk reduction policies.

We each read the CRRP twice and manually coded it according to the guidance outlined in Robinson et al. [7]. We first applied a three-point scale (yes, to some extent, no) to check for the presence, partial presence or absence of evidence to support each of the twenty sub-dimensions of A-PASS. We considered the scores for each sub-dimension and applied a five-point scale (high, medium-high, medium, low-medium, and low) for the overarching dimensions based on the sub-dimension scores. This scoring matrix resulted in the CRRP receiving five overall scores, corresponding with the five dimensions of A-PASS. A third coder served as arbitrator when there was a discrepancy between the scores of the first and second coders [28]. This is also consistent with the guidance outlined in Robinson et al. [7]. Inter-coder reliability was 91%.

**Table 1.** Overview of the A-PASS framework.

Dimension	Sub-No.	Sub-Dimension	Extent of Evidence (Check One Box)	Synthesis of Evidence and Final Score (Check One Box; Also Include Examples from Policy)
1. Information base	1.1	Does the policy contain evidence to suggest that actual and expected climate-related vulnerabilities are adequately understood? - Various groups in the population - Various sectors - Various localities/communities - Different systems (human/natural) - Different ecosystems (marine/terrestrial)	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	1.2	Does the policy contain evidence to suggest that actual and expected non-climate-related vulnerabilities are adequately understood? - Various groups in the population - Various sectors - Various localities/communities - Different systems (human/natural) - Different ecosystems (marine/terrestrial)	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	1.3	Does the policy contain evidence to suggest that the links between domains are adequately understood? - Climate change and national/sustainable development - Climate change and disaster risk reduction - Climate change and resilience - Climate change and transformation	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
2. Vision, goals and objectives	2.1	Does the policy contain evidence of high-level support? - President/Prime Minister - Minister - Included in political manifestos	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	2.2	Does the policy contain evidence of a clear long-term vision (>30 years) for adequate adaptation to climate change?	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low



Table 1. Cont.

Dimension	Sub-No.	Sub-Dimension	Extent of Evidence (Check One Box)	Synthesis of Evidence and Final Score (Check One Box; Also Include Examples from Policy)
	2.3	Does the policy contain evidence of clear short- to medium-term goals for adequate adaptation to climate change?	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	2.4	Does the policy contain evidence of SMART (specific, measurable, attainable, relevant and time-bound) adaptation objectives?	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
3. Priorities and options	3.1	Does the policy contain evidence to suggest that stock has been taken of existing adaptation efforts? - National level - Community level - Various groups in the population - Various sectors - Different systems (human/natural) - Different ecosystems (marine/terrestrial)	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	3.2	Does the policy contain evidence to suggest that the country's national priorities for adaptation are clear? - Prioritization processes are transparent - Considers priorities in other key documents (e.g., sector policies) - Considers the local/community level	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	3.3	Does the policy contain evidence to suggest that the climate risks to national priorities have been adequately considered?	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low

Table 1. Cont.

Dimension	Sub-No.	Sub-Dimension	Extent of Evidence (Check One Box)	Synthesis of Evidence and Final Score (Check One Box; Also Include Examples from Policy)
	3.4	<p>Does the policy contain evidence to suggest that adaptation options have been adequately considered?</p> <ul style="list-style-type: none"> <li>- "Soft" vs. "hard" options</li> <li>- Infrastructure- vs. ecological- vs. social protection-based options</li> <li>- Existing adaptation and/or risk reduction projects</li> <li>- Cost analyses, including total costs and cost effectiveness</li> <li>- Environmental implications of options</li> <li>- Social implications of options were considered, including implications for women and marginalised groups</li> <li>- Options were evaluated for their short-, medium-, and long-term efficacy</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
4. Actions and implementation	4.1	Does the policy contain evidence to suggest that an implementation plan has been developed?	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	4.2	Does the plan contain evidence to suggest that priority adaptation actions are <i>actually</i> being implemented?	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	4.3	<p>Does the policy contain evidence to suggest that an authoritative body has been tasked with adaptation coordination?</p> <ul style="list-style-type: none"> <li>- Established</li> <li>- Has a clear mandate</li> <li>- Has appropriate membership</li> <li>- Meets and communicates regularly</li> <li>- Reports regularly</li> <li>- Adequate resources have been provided for coordination activities</li> <li>- Is evaluated regularly</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low

Table 1. Cont.

Dimension	Sub-No.	Sub-Dimension	Extent of Evidence (Check One Box)	Synthesis of Evidence and Final Score (Check One Box; Also Include Examples from Policy)
	4.4	<p>Does the policy contain evidence to suggest that key services, sectors, or activities where coordination may be needed for successful adaptation have been identified?</p> <ul style="list-style-type: none"> <li>- Vertical coordination (international–regional–national–community) needs have been considered</li> <li>- Horizontal coordination (across sectors, government departments, etc.)</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	4.5	<p>Does the policy contain evidence to suggest that adequate consideration has been given to the resources that will be required for successful adaptation?</p> <ul style="list-style-type: none"> <li>- Financial resources</li> <li>- Human resources</li> <li>- Technical resources</li> <li>- Other resources</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	4.6	<p>Does the policy contain evidence to suggest that a broad range of stakeholders are adequately engaged in adaptation policy development and implementation?</p> <ul style="list-style-type: none"> <li>- Government</li> <li>- Civil society</li> <li>- Non-governmental organizations, including churches</li> <li>- Private sector</li> <li>- Regional organizations</li> <li>- International organizations</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low

Table 1. Cont.

Dimension	Sub-No.	Sub-Dimension	Extent of Evidence (Check One Box)	Synthesis of Evidence and Final Score (Check One Box; Also Include Examples from Policy)
5. Monitoring and evaluation	5.1	<p>Does the policy contain evidence to suggest that there is a system in place for reviewing and adjusting adaptation priorities over time?</p> <ul style="list-style-type: none"> <li>- A time period and process have been set for revisiting priorities</li> <li>- Wide and inclusive stakeholder participation is considered and encouraged</li> <li>- The institution that leads prioritisation reports to an appropriate authority</li> <li>- Prioritization decisions are enforceable</li> <li>- Resources have been allocated to support convening and other prioritisation costs</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	5.2	<p>Does the policy contain evidence to suggest that there is a system in place for reviewing adaptation actions?</p> <ul style="list-style-type: none"> <li>- A time period and process have been set for revisiting actions</li> <li>- Wide and inclusive stakeholder participation is considered and encouraged</li> <li>- The institution that leads reviews reports to an appropriate authority</li> <li>- Review decisions are enforceable</li> <li>- Resources have been allocated to support convening and other review costs</li> </ul>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
	5.3	<p>Does the policy contain evidence to suggest that either prioritisation or action reviews are <i>actually</i> taking place?</p>	<input type="checkbox"/> Yes <input type="checkbox"/> To some extent <input type="checkbox"/> No	<input type="checkbox"/> High <input type="checkbox"/> Medium-high <input type="checkbox"/> Medium <input type="checkbox"/> Low-medium <input type="checkbox"/> Low
-	-	What are the policy considerations going forward?		

Overview of the A-PASS framework (source: Robinson et al. [7], Electronic Supplementary Materials 1, reproduced with permission).



Table 2. Cont.

A-PASS Dimension	Critical High-Impact Resilience Initiatives													
	1	2	3	5	5a	5b	5c	5d	5f	5h	6	7	9	10
2.4	T	Y	Y	Y	T	Y	T	T	Y	N	T	Y	Y	N
3.1	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
3.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3.4	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4.1	T	T	T	T	T	T	T	T	T	T	T	T	T	T
4.2	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4.3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4.4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	T	T	T	T	T
5.1	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5.2	T	T	T	T	T	T	T	T	T	T	T	T	T	T
5.3	N	N	N	N	N	N	N	N	N	N	N	N	N	N

### 3.1. Information Base

*High:* We find that Dominica's CRRP is clearly informed by the actual and expected climate and climate-related effects. Indeed, the plan itself begins with a description of the damage wrought by Hurricane Maria in 2017, the weather system that spurred the nation onto its path to become the first climate-resilient nation. The CRRP offers a broad overview of climate change impacts and even estimates the cost that taking no action would levy on the nation. It identifies three pillars of resilience that it is aiming to achieve—climate-resilient systems, prudent disaster risk management systems, and effective disaster response and recovery [5] (p. i). To accomplish these aims, the CRRP identifies 10 'critical high-impact climate resilience initiatives' that are an 'immediate priority' [5] (p. iii). In the document, these individual adaptations are consistently accompanied by 'rationales', which lay out each initiative's role in reducing vulnerability. When discussing the Global Centre for Agricultural Resilience initiative (# 7), for example, the CRRP explains that the 'reduction of the impact of climate change on the agriculture and fisheries economies is critical given the extensive losses suffered as a result of Hurricane Maria, and growing threats of extreme weather events in the future' [5] (p. 48). The CRRP also consistently lays out the different domains that will be engaged in major adaptations through its 'key delivery entities' section. For example, the Resilient Modern Information and Communication Technology Network (# 5h) is meant to augment telecommunications infrastructure across the country. The Ministry of Public Works and the Digital Economy, the Ministry of Economic Affairs, Planning, Resilience, Sustainable Development, Telecommunications and Broadcasting, Dominica State College, and private sector companies—Digicel and Flow—are identified as key stakeholders [5] (p. 60).

### 3.2. Vision, Goals, and Objectives

*Medium:* All the planned actions outlined in the CRRP exhibit widespread high-level support. In fact, the whole weight of the Government appears to be behind its drive for climate resilience, as evidenced by the foreword signed by the Prime Minister alongside the 2018 Climate Resilience Act that undergirds and established the agency that wrote the CRRP—the Climate Resilience Executing Agency of Dominica. All ministries and other arms of the national government appear to be at the disposal of this singular goal, which is

evidenced in the wide variety of ministries working towards the individual initiatives and adaptations. However, Dominica's current plan is to become climate resilient by 2030. This precludes any long-term vision beyond that point in time. Indeed, all of the adaptations that were either implicitly or explicitly linked to hurricane resilience did not provide any evidence of planning beyond 2030. Nevertheless, every initiative identified short- and medium-term goals for hurricane adaptations. In fact, many of the initiatives serve as the short-term goal. The Community Emergency Readiness Initiative (# 2), for instance, is a short-term goal on the path toward building the 'strong communities' necessary to realize the three pillars of resilience that the CRRP outlines [5] (p. ii). Others, like the Resilient Dominica Physical Development Plan (# 5), separated out a short-term goal of putting together a comprehensive proposal and a medium-term goal of implementing that agenda [5] (p. 61). In terms of evidence of SMART (specific, measurable, attainable, relevant [to the country context], time bound) adaptation objectives related to climate change and hurricanes, seven of the 10 initiatives have clear SMART objectives while six have semi-clear SMART objectives, and one fails to pinpoint a single SMART objective. Many of the objectives are, however, immeasurable, and it was fairly difficult to assess their attainability. The Innovative Approach to Insurance (# 6), for example, described '[facilitating] a dialogue between insurance companies and credit unions/cooperatives to explore the development and introduction of affordable home insurance instruments that are targeted at low-income households' [5] (p. 57). It is unclear how the dialogue, and its success would be measured.

### 3.3. Priorities and Options

*High:* Most of the adaptations examined appeared to, often implicitly, build off of existing adaptation efforts, thus suggesting that stock had been taken of this pre-existing work undertaken at the national and subnational levels. One of the objectives of the Global Centre for Agricultural Resilience (# 7), for instance, is described as '[improving] capacity for data and information management, and risk profiles for main hazards affecting the agriculture sector' [5] (p. 48). This adaptation appears to call for an update to the risk profiles for primary hazards, a pre-existing assessment of adaptation, indicating that the authors recognized the existence of the earlier adaptation efforts in order to facilitate its further development. All of these initiatives also clearly state their rationale and many specifically trace their genesis to the new national priority of achieving climate resilience. For example, the rationale given for the Community Emergency Readiness Initiative (# 2) is 'based on the experience from Hurricane Maria, some communities were cut off from central emergency responders, and unable to cope with their most basic needs, resulting in physical and mental stress that could have been avoided had they been better prepared' [5] (p. 43). This description also explores how the risk that hurricanes pose, and how that risk is being heightened by climate change, is central to the initiatives being outlined in the CRRP. The Resilient Housing Scheme (# 3) makes a similar, but less explicit connection as its rationale is that 'a significant portion of Dominicans live in homes that are not safe, let alone likely to withstand any major climatic events in the future' [5] (p. 46). While not outright labelling hurricanes as a potential threat, given the destruction wrought by Tropical Storm Erika in 2015 and Hurricane Maria in 2017, it is clear that extreme weather events are being considered.

### 3.4. Actions and Implementation

*Medium-Low:* All of the adaptation initiatives have at least a basic plan, but these plans do not articulate exactly how major deliverables will be realized. The Resilient Modern Information and Communication Technology Network (# 5h), for instance, promises the creation of widespread telemedicine services with advanced communication equipment but does not specify how this new service would be implemented [5] (p. 60). While each initiative has multiple, step-like outputs that would contribute to the overall adaptation, these iterative products are not accompanied by an implementation plan. Furthermore,

there is no evidence provided, or even a method given, to evaluate whether these initiatives are truly being implemented. Despite the fact that some of the deliverables should have already been achieved, such as the Ende Domnik smartphone application, which is part of the Community Emergency Readiness Initiative (# 2) and was meant to be finished by the end of 2020, it was impossible to find any mention of their progress in the document or on the worldwide web [5]. Nevertheless, each initiative contains clear references to the authoritative bodies that were tasked with coordinating the development of the adaptation. The Centre of Excellence for Data in Resilience Decision Making (# 9), for example, was outlined as being delivered through the Ministry of Economic Affairs, Planning, Resilience, Sustainable Development, Telecommunications and Broadcasting, the Climate Resilience Executing Agency of Dominica, the Ministry of Public Works and the Digital Economy, and the Central Statistics Office [5]. The observation here is not the absence of an authoritative body, but the plethora of administrative arms that are involved and the lack of a clear leader or coordinator among them, which could lead to confusion and administrative deadlock. Despite this, the specificity of the organizations involved does suggest that the key services, sectors, and activities necessary for coordinating the successful development of the adaptation have been clearly identified. For example, the ResilienSEA Blue Economy Triple Bottomline Investment Fund (# 10) brackets three specific government ministries, one association and one broad swathe of relevant entities that share involvement in the implementation of the initiative [5].

Overall, each initiative comes equipped with a list of costs associated with different aspects of the adaptation, indicating that significant consideration of the potential resources needed had been given. The Community Emergency Readiness Initiative (# 2), for instance, lays out both an estimation of the capital and infrastructure costs associated with its implementation [5]. However, there does not appear to be any indication of how these figures were estimated, a kind of transparency which might make it easier to evaluate the accuracy of the numbers or, at the very least, critically examine the methodology behind their determination. Each initiative also contains a note explaining the impact of the adaptation on the nation's collective consciousness. For the most part, the impacts are rated relatively unsatisfactorily at either 'low' or 'medium', indicating that there may not be a broad range of stakeholders engaged in the work. The Resilient Dominica Physical Plan: Infrastructure Risk/Condition Assessment (# 5a), for example, rates its collective consciousness as 'low' [5] (p. 62).

### 3.5. Monitoring and Evaluation

*Low:* None of the 10 initiatives provide any evidence that there is a system in place for reviewing and adjusting the adaptation priorities over time. This is an important consideration for whether the CRRP can be a model of transformation in the Caribbean. Indeed, due to the limited temporal nature of the CRRP, there is simply no apparent recourse for climatic changes beyond 2030. Even within this timespan, there does not appear to be any mandates given to the involved ministries and agencies to examine whether adaptation ought to be adjusted at any point in the process. Perhaps these mandates are implicit in the tasking of different governmental entities, but, even if so, this raises the possibility that evaluation may have been overlooked. In fact, this potential of implicit review created by the delegation of initiatives to different sectors is the only reason that all 10 have any evidence that suggests that there is a system in place for reviewing adaptation actions. However, there is no evidence in any of the initiatives contained in the CRRP indicating that prioritization or action reviews are *actually* taking place.

## 4. Discussion

In assessing Dominica's CRRP, we found that the policy's 'information base' and 'priorities and options' are the strongest dimensions, while 'action and implementation' and 'monitoring and evaluation' are the weakest. These results coincide with the results of other studies such as Woodruff and Regan [33] and Robinson et al. [7]. Woodruff and Regan [33]



(p. 53), in particular, found that adaptation plans are often ‘weaker in the articulation of implementation and monitoring measures’. A lack of sufficient monitoring and evaluation invites ineffective policy frameworks, irrespective of domain, sector, or geographic location [29,34,35]. Considering our conceptualization of climate change adaptation as a subset of disaster risk reduction, and that the Sendai Framework for Disaster Risk Reduction 2015–2030, and its predecessor the Hyogo Framework for Action 2005–2015, specifically emphasize the importance and relevance of climate change and sustainable development for the wider field of disaster risk reduction, the transformational ‘power’ of the CRRP and similar policies rests in their quality. As a model of transformation in the Caribbean, there are three important considerations for other jurisdictions in the region—(1) developing mechanisms for equitably sharing any benefits from the blue economy; (2) centering Indigenous perspectives in environmental policy and decision making; and (3) adequately accounting for unexpected risks and complications. These are discussed below.

#### *4.1. Developing Mechanisms for Equitably Sharing the Benefits from the Blue Economy*

In the CRRP, the ResilienSEA Blue Economy Triple Bottomline Investment Fund (# 10) is positioned as a mechanism for furthering Dominica’s ambitions of climate resilience by leveraging private sector investment. Indeed, the CRRP explains that ‘developing businesses in a sustainable way is essential for protecting [Dominica’s marine ecology] and the jobs that depend on it’ [5] (p. 79). However, while it highlights how sustainable blue growth can help protect coastal assets against climate change, it does not fully engage with the difficulties inherent in ensuring that benefits from the blue economy are equitably shared across communities. The concept of blue growth encapsulates all activities centered on the ocean, including shipping, cruises and tourism, and traditional pursuits and is meant to be ‘an adaptable framework’ that can be altered to fit specific contexts and maximize stakeholder benefit [36] (p. 376). Authors such as Gerhardinger et al. [37] and Keen et al. [38] have noted the need to center the aggregate economic gains delivered by the blue economy to local communities, and to ensure that benefits trickle down to the community level. This is meant to enhance the sustainability of ocean-based economic activity while also delivering ‘triple bottom line wins’ that improve the community’s financial, social, and environmental health [36] (p. 375). However, the blue economy often emphasizes economic growth at the expense of detailing how aggregate economic benefits will reach local communities, an example of the ‘people–policy gap’ [39]. Cisneros-Montemayor et al. [40] argue that the utility in the blue economy approach stems from the explicit prioritization of social benefits and equity along with environmental and economic considerations. The authors criticize many pre-existing discourses of the blue economy as perpetuating a kind of ‘business-as-usual’ approach that fails to replace economic orientation with a social-ecological perspective that focuses on human well-being [40] (p. 1). This would need to be addressed in future iterations of the CRRP and other plans developed by other SIDS in the Caribbean region.

The CRRP also establishes that the ResilienSEA Blue Economy Triple Bottomline Investment Fund (# 10) will provide social, environmental, and financial benefits but neglects to articulate how these gains will be distributed at the community level. The CRRP does not provide an in-depth explanation for how social equity will be achieved through the blue economy or engage in sectoral review to identify how social equity could be enhanced via the blue economy. Campbell et al. [39] argue that a shift from the blue economy to blue communities will better center marine aquaculture growth on community well-being and bring enhanced benefits to coastal communities. The authors note an emerging discourse of opportunity surrounding marine aquaculture whereby investment will result in aquaculture expansion and lead to aggregate economic growth that will enhance livelihoods in coastal communities via job creation, economic stimulus, infrastructure enhancement, and seafood security [39]. Therefore, a reorientation from the blue economy toward blue communities is likely to be an integral part of solving the

‘people–policy gap’ and guaranteeing the flow of financial and social benefits to local communities [38–40]. This should also be a consideration for future iterations of the CRRP.

#### 4.2. Centering Indigenous Perspectives in Environmental Policy-Making

Given that climate change will have disproportionate impacts on minority communities, it is important to center Indigenous perspectives in environmental policy- and decision-making in SIDS, especially in the interest of justice and sustainability [41–43]. AR5 recognized that Indigenous knowledge serves as a major resource for climate change adaptation. Across the Caribbean, historically, Indigenous peoples included the Kalinago of the Lesser Antilles (including Dominica), the Taíno, and the Guanahatabey of western Cuba—current populations are small because of centuries of colonization. In Dominica today, the Kalinago population has been estimated to be approximately 2000 people (or approximately 3% of residents) [3]. A 2009 poverty assessment found that approximately 50% of the Kalinago population fell below the poverty line [5], and the Kalinago Territory experiences high endemic unemployment [3]. In light of these facts, the CRRP notes the need for a ‘climate- and gender-sensitive’ Kalinago Territory Development Strategy [5] (p. 42). Goals of this Strategy include reducing unemployment to 30% by 2025 and to 15% by 2030 and increasing emergency shelter capacity [5]. Further, the Each One Reach One youth resilience initiative designed to give school-age children opportunities to augment their creativity, fitness and confidence is being piloted in the Kalinago Territory to cultivate more resilient children.

These plans, however, are lacking detail about the mechanisms through which they will center Indigenous perspectives in this work. While the CRRP does identify certain key delivery entities such as the Kalinago Council and the Ministry of the Environment, Rural Modernisation and Kalinago Upliftment, it does not adequately explore how these entities will interact with other government ministries in a way that ensures the Indigenous population has a significant role in shaping and delivering the programs. Ensuring that representation is not simply a tokenistic effort is essential to achieving climate resilience in a procedurally just manner. Indeed, AR5 noted that Indigenous knowledge is often not integrated into adaptation efforts, exacerbating concerns that Kalinago and wider Indigenous involvement in the CRRP could lead to symbolic participation that is disconnected from formal environmental policy- and decision-making. There is also a lack of explanation as to what entities will be monitoring and evaluating the success of these initiatives, and whether or not they will pay due diligence to the effects of the programs on the Kalinago community.

#### 4.3. Adequately Accounting for Unexpected Risks and Complications

Much like climate change, there is overwhelming evidence to suggest that the COVID-19 pandemic is disproportionately affecting countries and communities in the Global South [44,45] and that many national-level policies and plans created before 2019, the CRRP included, did not adequately account for unexpected risks and complications of which the COVID-19 pandemic risk is emblematic. It is thus worth exploring what resilience and recovery might look like against the backdrop of globally disruptive events [46,47].

When the World Health Organization declared COVID-19 a pandemic in March 2020, actors and systems at all levels were unprepared. The declaration signaled the first pandemic in recent history to have both unexpected and unprecedented social, economic and political impacts across the globe. To put this into context, the World Health Organization has declared six Public Health Emergencies of International Concern since 2009 [48]. Two of these were epidemics (i.e., diseases occurring at the community or regional level): Zika virus (2015–2016) and Kivu Ebola (2018–present); and two were pandemics (i.e., epidemics that spread over a large area or worldwide): H1N1 (2009) and COVID-19 [49]. There were close to 61 million cases of H1N1 in 2009 and, in the first year of circulation, the virus took 151,000–575,000 lives worldwide, or between 0.001% and 0.007% of the world’s population [50]; up to 16 January 2022, there were over 327 million COVID-19 cases and deaths tallied over 5.5 million worldwide [51], or approximately 0.07% of the world’s

population. Yet, experience with H1N1 did not seem to either raise the importance of effectively preparing for and responding to pandemics in development planning, or result in the creation of national-level policies and plans that would insulate a country from the social, economic and political impacts of COVID-19.

The CRRP is no different—developed before the onset of the pandemic, the document does not comprehensively address resilience and recovery in the context of non-climate-related exogenous shocks. Admittedly, the NRDS and its CRRP were created in response to the devastation caused by Tropical Storm Erika in 2015 and Hurricane Maria in 2017. Additionally, the COVID-19 pandemic is an exogenous shock of an unprecedented proportion. It is for similar reasons that authors such as Menoni and Schwarze [47] emphasize the importance of and need for a risk management approach to planning that comprises three main dimensions. The first dimension is ensuring that a scenario approach that is different from an emergency approach is at the core of recovery [47]. This approach should be developed by a multidisciplinary team. The second dimension is also having the multidisciplinary team develop advanced and innovative mitigation strategies [47]. The third dimension is ensuring that there are clear channels to communicate risks and that they are improved over time [47]. We believe that these dimensions should be embedded in resilience and recovery plans across the region, given its vulnerability not only to climate and climate-related risk but also other risks exemplified by the COVID-19 pandemic.

From our perspective, it is important for governments to respond quickly to crises, mitigating unexpected risks and addressing complications. In the case of the CRRP, there is evidence to suggest that the document and its three pillars of resilience—climate-resilient systems, prudent disaster risk management, and effective disaster response and recovery—served as a premise for mounting a swift response that either did not or did little harm to the development progress that the country had already made. Here, we offer three examples of the Government of Dominica's responsiveness to the impacts of COVID-19. First, the Government acted quickly to request emergency financial assistance, albeit from the International Monetary Fund. The request was approved in April 2020 [52]. The disbursement (US \$14 million) supported essential health-related expenditures, and measures to help employees and households, including income support to the unemployed, tax relief, and providing cash transfers to the most vulnerable and affected [52]. This spending contributed to the country having relative 'success' in constraining the spread of the virus and mitigating deaths. The country's borders were also reopened in August 2020, much earlier than others in the region [53].

Second, to facilitate the revival of tourism, the Government created the 'Safe in Nature' tourism program that included a 'certified managed experience'. To participate, travelers were required to obtain a negative polymerase chain reaction test of less than 72 h before arriving in Dominica. They would complete an online questionnaire, and receive an email from the Ministry of Health, permitting them to travel to Dominica. Upon arrival, fully vaccinated travelers would be given a rapid test at the airport and be transferred to a certified property by a certified taxi driver. Unvaccinated travelers were required to submit to a six-day 'Safe in Nature' quarantine at a certified property. They were allowed to participate in activities during this initial period in accordance with the property's certification. These activities included, for example, day tours with certified guides, and snorkeling and diving with certified partners. Unvaccinated travelers were required to be polymerase chain reaction tested on Day 5, and if negative (generally on Day 7), be medically cleared. Up to 16 January 2022, there were 7957 COVID-19 cases and 48 deaths in Dominica [51].

Third, in March 2021, the Government launched the Work in Nature (WIN) Extended Stay Visa program that would allow families, digital nomads, remote workers, and those interested in rejuvenating self-discovery to relocate to Dominica for up to 18 months renewable. The program is meant to offer a superior work–life balance and includes opportunities for impact tourism, the education of children brought with families, and coworking within a digital nomad community. While participating in the WIN program,

people stayed in pre-approved accommodations with high-speed internet and engaged with local communities through projects that aimed to make meaningful contributions towards the sustainability of tourism in Dominica.

## 5. Conclusions

Dominica's Climate Resilience and Recovery Plan 2020–2030 (CRRP), developed as part of the 2018 National Resilience Development Strategy (NRDS) and in response to the devastation caused by Tropical Storm Erika in 2015 and Hurricane Maria in 2017, has been hailed as transformational. In the Caribbean context, this framing recognizes the need for long-term change that challenges political, economic and social norms for the betterment of people. The major adaptations to climate-amplified risks underway in Dominica are given shape by the CRRP, the overarching objective of which "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" [5] (p. 13). The CRRP builds out the three pillars of resilience outlined in the NRDS—climate-resilient systems, prudent disaster risk management, and effective disaster response and recovery—and expands them into six results areas and 20 corresponding climate resilience targets to be achieved by 2030 [5]. Given the wide-ranging scope of the CRRP's overarching objective, we conducted a desk-based qualitative assessment of its quality that contributes to a conversation about what constitutes good policy in a SIDS context, which is underexplored in the academic literature.

In our study, we first positioned extreme hurricanes as climate-amplified risks, and conceptualized them as being the result of the confluence of the hazard, exposure and vulnerability to which national governments and other actors must adapt. We used the recently developed Adaptation Policy Assessment framework to assess the CRRP's (1) information base; (2) vision, goals and objectives; (3) priorities and options; (4) actions and implementation; and (5) monitoring and evaluation. We found that the CRRP is strongest with respect to (1) and (3) and weakest with respect to (4) and (5). These results are not dissimilar from others in the literature. However, in sum, while the CRRP's (and the NRDS', by extension) three pillars of resilience—climate-resilient systems, prudent disaster risk reduction, and effective disaster response and recovery—can be seen as underpinning Dominica's response to the unexpected risks posed by the COVID-19 pandemic, it would serve the country well to codify such actions within the CRRP itself. As climate change risk is inherently multidisciplinary and spans several domains and sectors, efforts to adapt to climate change must follow suit. Laying out a defined process of steps to be taken along with resources that can be drawn on to ensure that climate change remains a high policy priority despite any emerging, unexpected risks is an integral missing aspect of the CRRP that ought to be reconciled. This is also a clear lesson for the other Caribbean SIDS that are in the process of developing similar climate change adaptation and/or disaster risk reduction policies.

Despite some of the deficiencies we identified in the CRRP, we believe that it can be a model of transformation in the Caribbean. However, there are three important considerations for other jurisdictions in the region. The first consideration is developing mechanisms for equitably sharing any benefits from the blue economy. While the CRRP highlights how sustainable blue growth can help protect coastal assets against climate change, it does not fully engage with the difficulties inherent in producing equitable benefits from the blue economy for and across communities. Addressing this will require a reorientation from the blue economy toward blue communities. This will be an integral part of solving the 'people-policy gap' and guaranteeing the flow of financial and social benefits to local communities.

The second consideration is centering Indigenous perspectives in environmental policy- and decision-making in SIDS. The CRRP notes the need for a 'climate- and gender-sensitive' strategy for its Indigenous population, the goals of which include reducing unemployment and increasing emergency shelter capacity. However, while the CRRP identifies certain key delivery entities, it does not adequately explore how these entities

will interact so as to ensure that the Indigenous population has a significant role in the programs themselves. Given that climate change will have disproportionate impacts on minority communities, it is important to center Indigenous perspectives in environmental policy and decision making, especially in the interest of justice and sustainability.

The third consideration is adequately accounting for exogenous, unexpected risks. It is imperative that the CRRP as well as future plans engage in explicit discussions of what resilience and recovery might look like against the backdrop of globally disruptive events. These discussions should involve multidisciplinary teams, and cover scenario-based approaches, advanced and innovative mitigation strategies, and effective risk communication. In our view, Dominica benefited greatly from the responsiveness of the Government through its request for emergency financial assistance, and its establishment of both the “Safe in Nature” tourism program and the WIN program. Here, undoubtedly, responsiveness is a key component of planning for climate change in SIDS.

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## References

- Destin, D.C.S. *The Atlantic Hurricane Season Summary—2015*; Antigua and Barbuda Meteorological Service Climate Section: St. Johns, Antigua and Barbuda, 2015. Available online: [http://www.antiguamet.com/Climate/HURRICANE\\_SEASONS/HurricaneSeason2015.pdf](http://www.antiguamet.com/Climate/HURRICANE_SEASONS/HurricaneSeason2015.pdf) (accessed on 2 December 2021).
- Gibbens, S. Dominica Is Working to Become World’s First Hurricane-Proof Country. National Geographic. 2019. Available online: [www.nationalgeographic.com/science/article/dominica-on-track-to-be-worlds-first-climate-resilient-nation](http://www.nationalgeographic.com/science/article/dominica-on-track-to-be-worlds-first-climate-resilient-nation) (accessed on 21 December 2021).
- Government of Dominica. *Third National Communication to the United Nations Framework Convention on Climate Change of the Commonwealth of Dominica*; Government of Dominica: Roseau, Commonwealth of Dominica, 2020.
- Government of Dominica. *National Resilience Development Strategy*; Government of Dominica: Roseau, Commonwealth of Dominica, 2018.
- Government of Dominica. *Dominica Climate Resilience and Recovery Plan 2020–2030*; Government of Dominica: Roseau, Dominica, 2020.
- Saxena, A.; Qui, K.; Robinson, S.-A. Knowledge, attitudes and practices of climate adaptation actors towards resilience and transformation in a 1.5 °C world. *Environ. Sci. Policy* **2018**, *80*, 152–159. [CrossRef]
- Robinson, S.-A.; Bouton, E.; Dolan, M.; Meakem, A.; Messer, A.; Lefond, I.; Roberts, J.T. A new framework for rapidly assessing national adaptation policies: An application to small island developing states in the Atlantic and Indian Oceans. *Reg. Environ. Chang.* **2022**, *22*, 37. [CrossRef]
- IPCC (Intergovernmental Panel on Climate Change). Annex II: Glossary. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; Barros, V.R., Field, C.B., Dokken, D.J., Mastrandrea, M.D., Mach, K.J., Bilir, T.E., White, L.L., Eds.; Cambridge University Press: Cambridge, UK; New York, NY, USA, 2014; pp. 1757–1776.
- Robinson, S.-A. Climate change adaptation in SIDS: A systematic review of the literature pre and post the IPCC Fifth Assessment Report. *Wiley Interdiscip. Rev. Clim. Chang.* **2020**, *11*, e653. [CrossRef]
- Thomas, K.; Hardy, R.D.; Lazrus, H.; Mendez, M.; Orlove, B.; Rivera-Collazo, I.; Roberts, J.T.; Rockman, M.; Warner, B.P.; Winthrop, R. Explaining differential vulnerability to climate change: A social science review. *Wiley Interdiscip. Rev. Clim. Chang.* **2019**, *10*, e565. [CrossRef]
- Bhatia, K.T.; Vecchi, G.A.; Knutson, T.R.; Murakami, H.; Kossin, J.; Dixon, K.W.; Whitlock, C.E. Recent increases in tropical cyclone intensification rates. *Nat. Commun.* **2019**, *10*, 635. [CrossRef]
- Holland, G.; Bruyère, C.L. Recent intense hurricane response to global climate change. *Clim. Dyn.* **2014**, *42*, 617–627. [CrossRef]

13. Bhatia, K.; Vecchi, G.; Murakami, H.; Underwood, S.; Kossin, J. Projected Response of Tropical Cyclone Intensity and Intensification in a Global Climate Model. *J. Clim.* **2018**, *31*, 8281–8303. [[CrossRef](#)]
14. Sharma, J.; Ravindranath, N.H. Applying IPCC 2014 framework for hazard-specific vulnerability assessment under climate change. *Environ. Res. Commun.* **2019**, *1*, 051004. [[CrossRef](#)]
15. UN-OCHA (United Nations Office for the Coordination of Humanitarian Affairs). Natural Disasters in Latin America and the Caribbean, 2000–2019. 2020. Available online: [https://reliefweb.int/sites/reliefweb.int/files/resources/20191203-ocha-desastres\\_naturales.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/20191203-ocha-desastres_naturales.pdf) (accessed on 22 January 2022).
16. Hambleton, I.R.; Jeyaseelan, S.M.; Murphy, M.M. COVID-19 in the Caribbean small island developing states: Lessons learnt from extreme weather events. *Lancet* **2020**, *8*, 1114–1115. [[CrossRef](#)]
17. Knutson, T.; Camargo, S.J.; Chan, J.C.L.; Emanuel, K.; Ho, C.; Kossin, J.; Mohapatra, M.; Satoh, M.; Sugi, M.; Walsh, K.; et al. Tropical Cyclones and Climate Change Assessment: Part I: Detection and Attribution. *Bull. Am. Meteorol. Soc.* **2019**, *100*, 1987–2007. [[CrossRef](#)]
18. Shultz, J.M.; Kossin, J.P.; Hertelendy, A.; Burkle, F.; Fugate, C.; Sherman, R.; Bakalar, J.; Berg, K.; Maggioni, A.; Espinel, Z.; et al. Mitigating the Twin Threats of Climate-Driven Atlantic Hurricanes and COVID-19 Transmission. *Disaster Med. Public Health Prep.* **2020**, *14*, 494–503. [[CrossRef](#)] [[PubMed](#)]
19. Lim, Y.K.; Schubert, S.D.; Kovach, R.; Molod, A.; Pawson, S. The Roles of Climate Change and Climate Variability in the 2017 Atlantic Hurricane Season. *Sci. Rep.* **2018**, *8*, 16172. [[CrossRef](#)] [[PubMed](#)]
20. Robinson, S.-A. Climate change adaptation trends in small island developing states. *Mitig. Adapt. Strateg. Glob. Chang.* **2017**, *22*, 669–691. [[CrossRef](#)]
21. Robinson, S.-A. Adapting to climate change at the national level in Caribbean small island developing states. *Isl. Stud. J.* **2018**, *13*, 79–100. [[CrossRef](#)]
22. Robinson, S.-A. A commentary on national adaptation drivers: The case of small island developing states. *Clim. Chang.* **2019**, *154*, 303–313. [[CrossRef](#)]
23. Kelman, I. Climate Change and the Sendai Framework for Disaster Risk Reduction. *Int. J. Disaster Risk Sci.* **2015**, *6*, 117–127. [[CrossRef](#)]
24. Solecki, W.; Leichenko, R.; O'Brien, K. Climate change adaptation strategies and disaster risk reduction in cities: Connections, contentions, and synergies. *Curr. Opin. Environ. Sustain.* **2011**, *3*, 135–141. [[CrossRef](#)]
25. Kelman, I.; Gaillard, J.C.; Mercer, J. Climate Change's Role in Disaster Risk Reduction's Future: Beyond Vulnerability and Resilience. *Int. J. Disaster Risk Sci.* **2015**, *6*, 21–27. [[CrossRef](#)]
26. Baker, I.; Peterson, A.; Brown, G.; McAlpine, C. Local government response to the impacts of climate change: An evaluation of local climate adaptation plans. *Landsc. Urban Plan.* **2012**, *107*, 127. [[CrossRef](#)]
27. Morgan, E.A.; Nalau, J.; Mackey, B. Assessing the alignment of national-level adaptation plans to the Paris Agreement. *Environ. Sci. Policy* **2019**, *93*, 208–220. [[CrossRef](#)]
28. Pittock, J. National Climate Change Policies and Sustainable Water Management: Conflicts and Synergies. *Ecol. Soc.* **2011**, *16*, 25. Available online: <https://bit.ly/2KBTa2v> (accessed on 22 January 2022). [[CrossRef](#)]
29. Pittock, J.; Hussey, K.; Dovers, S. Ecologically sustainable development in broader retrospect and prospect: Evaluating national framework policies against climate adaptation imperatives. *Australas. J. Environ. Manag.* **2015**, *22*, 62–76. [[CrossRef](#)]
30. Sinclair, A.J.; Smith, D.L. The Model Forest Program in Canada: Building Consensus on Sustainable Forest Management? *Soc. Nat. Resour.* **1999**, *12*, 121–138. [[CrossRef](#)]
31. Yin, R.K. *Case Study Research: Design and Methods*; SAGE Publications: Thousand Oaks, CA, USA, 2002.
32. Yazan, B. Three Approaches to Case Study Methods in Education: Yin, Merriam, and Stake. *Qual. Rep.* **2015**, *20*, 134–152. [[CrossRef](#)]
33. Woodruff, S.C.; Regan, P. Quality of national adaptation plans and opportunities for improvement. *Mitig. Adapt. Strateg. Glob. Chang.* **2019**, *24*, 53–71. [[CrossRef](#)]
34. Brouwer, S.; Rayner, T.; Huitema, D. Mainstreaming climate policy: The case of climate adaptation and the implementation of EU water policy. *Environ. Plan. C Gov. Policy* **2013**, *31*, 134–153. [[CrossRef](#)]
35. Gilmore, E.A.; St Clair, T. Budgeting for climate change: Obstacles and opportunities at the US state level. *Clim. Policy* **2018**, *18*, 729–741. [[CrossRef](#)]
36. Clark Howard, B. Blue growth: Stakeholder perspectives. *Mar. Policy* **2018**, *87*, 375–377. [[CrossRef](#)]
37. Gerhardinger, L.C.; de Andrade, M.M.; Corrêa, M.R.; Turra, A. Crafting a sustainability transition experiment for the Brazilian blue economy. *Mar. Policy* **2020**, *120*, 104157. [[CrossRef](#)]
38. Keen, M.R.; Schwarz, A.-M.; Wini-Simeon, L. Towards defining the Blue Economy: Practical lessons from Pacific ocean governance. *Mar. Policy* **2018**, *88*, 333–341. [[CrossRef](#)]
39. Campbell, L.M.; Fairbanks, L.; Murray, G.; Stoll, J.S.; D'Anna, L.; Bingham, J. From Blue Economy to Blue Communities: Reorienting aquaculture expansion for community wellbeing. *Mar. Policy* **2021**, *124*, 104361. [[CrossRef](#)]
40. Cisneros-Montemayor, A.M.; Moreno-Báez, M.; Voyer, M.; Allison, E.H.; Cheung, W.W.; Hessing-Lewis, M.; Oyinlola, M.A.; Singh, G.G.; Swartz, W.; Ota, Y. Social equity and benefits as the nexus of a transformative Blue Economy: A sectoral review of implications. *Mar. Policy* **2019**, *109*, 103702. [[CrossRef](#)]

41. Hassanali, K. CARICOM and the blue economy—Multiple understandings and their implications for global engagement. *Mar. Policy* **2020**, *120*, 104137. [[CrossRef](#)]
42. Hill, R.; Adem, Ç.; Alangui, W.V.; Molnár, Z.; Aumeeruddy-Thomas, Y.; Bridgewater, P.; Tengö, M.; Thaman, R.; Yao, C.Y.A.; Berkes, F.; et al. Working with Indigenous, local and scientific knowledge in assessments of nature and nature's linkages with people. *Curr. Opin. Environ. Sustain.* **2020**, *43*, 8–20. [[CrossRef](#)]
43. McGregor, D.; Whitaker, S.; Sritharan, M. Indigenous environmental justice and sustainability. *Curr. Opin. Environ. Sustain.* **2020**, *43*, 35–40. [[CrossRef](#)]
44. Bontan, N.; Hoffmann, B.; Vera-Cossio, D. The unequal impact of the coronavirus pandemic: Evidence from seventeen developing countries. *PLoS ONE* **2020**, *15*, e0239797. [[CrossRef](#)]
45. Wang, Y.; Wu, R.; Liu, L.; Yuan, Y.; Liu, C.; Hang Ho, S.S.; Ren, H.; Wang, Q.; Lv, Y.; Yan, M.; et al. Differential health and economic impacts from the COVID-19 lockdown between the developed and developing countries: Perspective on air pollution. *Environ. Pollut.* **2022**, *293*, 118544. [[CrossRef](#)]
46. Di Marco, M.; Baker, M.L.; Daszak, P.; De Barro, P.; Eskew, E.A.; Godde, C.M.; Harwood, T.D.; Herrero, M.; Hoskins, A.J.; Johnson, E.; et al. Opinion: Sustainable development must account for pandemic risk. *Proc. Natl. Acad. Sci. USA* **2020**, *117*, 3888. [[CrossRef](#)]
47. Menoni, S.; Schwarze, R. Recovery during a crisis: Facing the challenges of risk assessment and resilience management of COVID-19. *Environ. Syst. Decis.* **2020**, *40*, 189–198. [[CrossRef](#)]
48. Wilder-Smith, A.; Osman, S. Public health emergencies of international concern: A historic overview. *J. Travel Med.* **2020**, *8*, 1–13. [[CrossRef](#)]
49. Chattu, V.K.; Yaya, S. Emerging infectious diseases and outbreaks: Implications for women's reproductive health and rights in resource-poor settings. *Reprod. Health* **2020**, *17*, 43. [[CrossRef](#)] [[PubMed](#)]
50. CDC (Centers for Disease Control and Prevention). *2009 H1N1 Pandemic (H1N1pdm09 Virus)*; Centers for Disease Control and Prevention: Washington, DC, USA, 2019; Available online: <https://bit.ly/2XntYBU> (accessed on 23 May 2020).
51. JHU (Johns Hopkins University). *COVID-19 Dashboard*; Johns Hopkins University: Baltimore, MD, USA, 2022; Available online: <https://bit.ly/2Tt5DJJ> (accessed on 16 January 2022).
52. IMF (International Monetary Fund). *IMF Executive Board Approves US\$65.6 Million in Disbursements to Dominica, Grenada, and St. Lucia to Address COVID-19 Pandemic*; International Monetary Fund: Washington, DC, USA, 2020; Available online: <https://www.imf.org/en/News/Articles/2020/04/28/pr20192-dma-grd-lca-imf-executive-board-approves-us-million-disbursements-address-covid-19-pandemic> (accessed on 20 January 2022).
53. PR Newswire. *Dominica Welcomes Tourists From August 7 and Announces Entry Protocols*. 2020. Available online: <https://www.prnewswire.com/news-releases/dominica-welcomes-tourists-from-august-7-and-announces-entry-protocols-301095722.html> (accessed on 4 November 2021).