



THE JOURNAL OF CARIBBEAN ENVIRONMENTAL SCIENCES AND RENEWABLE ENERGY presents

the OPEN ISSUE

2020

July, Volume 3: Issue 1

doi.org/10.33277/cesare/003.001



Adapting to Climate Change at the National Level in St. Vincent and the Grenadines

by authors Clint Todd Lewis, Ming-Chien Su

THE OPEN ISSUE **2020**
Volume 3, Issue 1

Online Resource: www.cesarejournal.org/publications-v3i1

Copyright (c) 2020 CESaRE



Adapting to Climate Change at the National Level in St. Vincent and the Grenadines

Authors: Clint Todd Lewis, Ming-Chien Su

Department of Natural Resources and Environmental Studies, National Dong Hwa University, Hualien, Taiwan

The Journal of Caribbean Environmental Sciences and Renewable Energy

Vol. 3, Issue 1, 2020 doi.org/10.33277/cesare/003.001/01

ABSTRACT

Small island developing states (SIDS) are distinctively more vulnerable to the impacts of climate change than other developing countries. The focus of this paper is the Caribbean region that is described as one of the most vulnerable regions in the world and highly affected by the impacts of climate change. This paper applies a case-study approach and focuses on the island of St. Vincent and the Grenadines (SVG). With limited efforts to understand the adaptation, vulnerabilities, and challenges at the national level in these SIDS, this paper helps to fill this gap and has two main aims. First, it identifies SVG's main focus on climate change adaptation. Second, it identifies the barriers to climate change adaptation in SVG. To fulfil the aims of this paper, content analysis, and semi-structured interviews with 32 stakeholders from the public and private sector were applied. This paper finds that SVG is mainly adapting to changes in hurricane, rainfall, drought, and soil and coastal erosion patterns. It also finds that many factors are limiting national-level adaptation. The three main reported barriers are a lack of financial, human resources, and technical capacity. These findings are important for the government of SVG and international donors and agencies. This will help them to identify and fill the gaps in their adaptation actions and prioritising finance. This paper's findings also highlight the importance of mainstreaming climate change adaptation in sectoral plans and work programs and improving SVG's access to international climate change adaptation funding.

Keywords: climate change adaptation, small island developing states (SIDS), vulnerabilities, St. Vincent, and the Grenadines.

1.0 INTRODUCTION

Climate change is an imposing challenge and an existential threat to small island developing states (SIDS) [1]. The most vulnerable countries around the world, especially SIDS, are already experiencing the impacts of climate change [1]. SIDS are distinctively more vulnerable to the impacts of climate change than other developing countries. Though SIDS vary in physical features and socioeconomic characteristics, they all have a comparative degree to the threats of climate change [1]. They are physically exposed to such impacts while struggling to achieve sustainable development which together give rise to extreme vulnerability to climate change [2,3]. Over the years, SIDS have been exposed to numerous climate change impacts including changing precipitation patterns, sea-level rise, increased sea and air temperatures, decreased availability of freshwater sources, and increased intensity of tropical storm - well illustrated by Hurricanes Irma and Maria (2017) in the Caribbean [4] and Winston (2016) in the Pacific [5]. The annual damages caused by hurricanes in the Caribbean is estimated at \$835 million [6]. While the increased intensity of tropical storms is an imminent threat to SIDS, various studies have shown that sea-level rise is apparently the most imposing challenge facing SIDS, especially those whose majority of the population are along the coastal zone [7,8]. According to the UNWTO [9], approximately seventy percent of the Caribbean population live in coastal cities, towns, and villages. Apart from large coastal population, one has to consider the vulnerable groups that include the elderly, women, children, and impoverished communities [10]. The vulnerabilities faced by SIDS can be further compounded by poor development planning and maladaptation [11].



As a result, policies that are developed mustn't further hamper the vulnerable groups and to a more significant extent, the country's adaptive capacity.

SIDS vary in their vulnerabilities and adaptive capacities for effective climate change adaptation and resilience-building [12]. According to Nurse et al. [1], the high level of vulnerability of small islands to multiple stressors, both climatic and non-climatic exist due to the inherent physical characteristics of these islands. For this paper, vulnerability is adopted from the International Panel on Climate Change (IPCC) and is defined as “the propensity or predisposition to be adversely affected” [13]. The vulnerabilities faced by SIDS have comprised of economic, social, environmental, and political domains [14]. These vulnerabilities are inevitably linked to adaptive capacity, defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences” [13]. With the need for effective and sustainable adaptation on SIDS becoming increasingly critical [1, 15], adaptation is an imperative component for the sustainable development of SIDS [16].

Adaptation is most likely best understood as “the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects” [13]. Hence, at the national level, governments and other stakeholders have to work together to achieve the required adjustments across multiple sectors [17, 18].

The nation of St. Vincent and the Grenadines (SVG) is equally vulnerable to the impacts of climate change as the rest of the wider Caribbean [19]. To understand how SVG is adapting to climate change and identify the barriers to climate change adaptation, the Second

National Communication (SNC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) is analysed. The United Nations [20], Article 4 (b) states that all Parties signatory to the Convention are required to “formulate, implement, publish and regularly update national and where appropriate, regional programmes to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change” and 4 (j) that parties are required to “communicate to the Conference of the Parties information related to implementation, in accordance with Article 12”. The communication tool applied by the Convention is the National Communications. Breidenich [21] expressed that National Communications is the Convention’s essential platform for Parties to provide updated information on the progress made on the implementation of targets. SIDS are encouraged to include information on their vulnerabilities to the impacts of climate change, their uncertainties, and their adaptation strategies in their National Communications [22]. Therefore, in accordance with Gagnon-Lebrun and Agrawala [23], National Communications are viewed as an essential source of data at the national level. As policy documents, National Communications are vital to assess the government’s progress on their adaptation actions [22]. Hence, it provides a comprehensive dataset that can be used to analyse and compare the vulnerabilities, uncertainties, priorities, and actions towards climate and climate-induced risk and impact across SIDS.

A qualitative content analysis, as described by Elo and Kyngas [24], was applied to identify national-level climate change adaptation actions reported in the document.



The process included thoroughly reading through the chapters related to climate change adaptation and using manual open coding procedures to understand what is being adapted to (climate-induced and non-climate-induced vulnerabilities), which sectors are adapting, and what are the barriers to adaptation. These three key questions allow for the ‘unpacking’ of the critical elements of adaptation in SIDS [25,26].

This study aims to gain an understanding of climate change adaptation in SVG. Through a qualitative content analysis of the SNC, supplemented by semi-structured interviews from policy-makers, experts, and stakeholders from the public and private sectors, this paper identifies the way SVG is adapting to climate change and it identifies the barriers to climate change adaptation in SVG.

2.0 METHODOLOGY

2.1 SELECTING THE DOCUMENT

SVG’s SNC submitted to the United Nations Framework Convention on Climate Change (UNFCCC) was selected for this study because it is a national scale policy document that focuses on the adaptation actions, vulnerabilities, and the barriers to adaptation. National Communications are regarded as official policy documents and are essential for understanding the country’s vulnerabilities to climate change, their adaptive capacities, and their adaptation actions implemented [22]. This document was further vetted by the policy-makers, experts and other stakeholders who participated in the interview based on the fact that the document was under the guidance of a steering committee.

2.2 SELECTING PARTICIPANTS AND INTERVIEW STRUCTURE

The study uses SVG as a unit of analysis. The 32 interviewees selected by purposive sampling [27] met four criteria: (1) head of a climate change, environment and/or development portfolio in a national government ministry, department or agency, (2) head of a climate change, environment and/or development project under a national government ministry, department or agency, (3) had ten or more years of experience and (4) confirmed to be a part of the interview. Taking into consideration the climate change niche of SVG, the total number of interviews is considered sufficient for ascertaining interviewees’ expertise and represents a broad spectrum of personnel within the fields of climate change, environment, and/or development. Therefore, interviewees were sampled to exhaustion to obtain valid and quality data.

Interviews were semi-structured; this allowed for a more conversational setting [28]. A key benefit is that participants are more likely to be more comfortable in expressing their points of view [29].

2.3 ANALYSING SNC AND INTERVIEW RESPONSES

A summative content analysis was applied to analyse the SNC. First, the relevant chapters were read three times. Second, the adaptation actions implemented at a national level were manually coded and counted according to the vulnerabilities and sectors described. GraphPad prism (SD, CA, USA) and Microsoft Excel software were used to analyze the data, while descriptive statistics generated graphs that facilitated the explanation of the findings.



The same technique was also applied to the relevant chapters of the SNC to analyse the climate change adaptation barriers in SVG. First, each related chapter was read three times. Second, the occurrence of the word 'barrier' in regards to one or more of the seven keywords which include 'adapt', 'risk', 'constrain', 'limit', 'threat', 'obstacle' and 'hinderance' was counted. GraphPad prism (SD, CA, USA and Microsoft excel software were also used to analyze the data while descriptive statistics generated graphs that facilitated the explanation of the findings.

Conventional content analysis was applied to analyse the data from the interviews. First, each interview was listened to twice. Second, initial interpretive and descriptive classifications were established. Third, these classifications, comprising initial manual codes, were utilized to recognized further patterns in the data. Fourth, broad themes were distinguished from grouping a single interviewee's responses. Fifth, these broad themes were examined across all interviews.

2.4 LIMITATION OF METHODS

The selected methods have two main limitations. First, using National Communications as the primary source of data to analyse and understand how SVG is adapting to climate change and their challenges and barriers is not ideal because the Report may be prone to under and/or over-reporting. Despite the limitation, National Communications are presently the most consistent source of nationally reported adaptation actions across SIDS [22]. Second, the SNC and interview data were manually coded and analysed – manual coding is more prone to human error [30]. Data triangulation and within-method triangulation of the SNC and interview data collected were used to increase the quality and comprehensiveness of the research findings [31].

2.5 DATA VALIDATION

To ensure the robustness and credibility of the research findings, two measures were employed: (1) data triangulation (2) within-method triangulation. Data triangulation [31] was used where the sources of data came from the SNC and Semi-structured interviews. After the interview data was analysed, the data was then sent back to the interviewees to ensure that my interpretations of the dataset were understandable and not misleading. For the SNC, after the data was analysed it was sent to a focus group comprised of 10 members from within the selection of the participants from the interview to confirm the interpretation of the data. On the other hand, within-method triangulation [31], was used when analysing the data, where both summative and conventional content analysis was used.

3.0 RESULTS

The results of this paper are divided into two parts. The first part of the results looks at the climate change adaptation trends in SVG, while the second part looks at the barriers faced by SVG to adapt to the impact of climate change. Climate change adaptation trends incorporate both climate-induced and non-climate-induced vulnerabilities. The results from the interviews are relevant to both the first and second part of the results. Therefore, it is included holistically in the overall scope of the results.

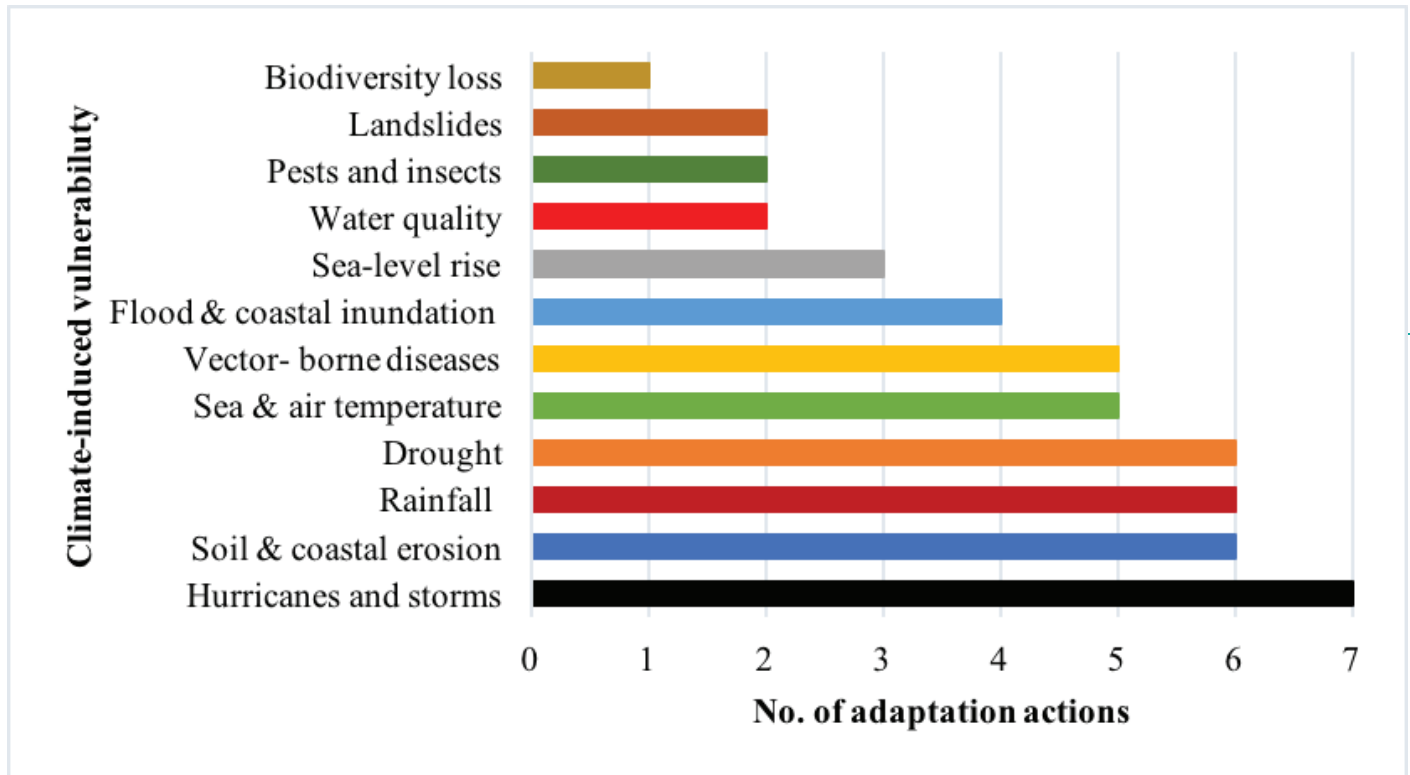


Figure. 1 Number of adaptation actions by climate-induced vulnerability addressed in SVG.

3.1 SVG’s Climate change adaptation trend

Using SVG as the case study for this paper, seventy-three national-level adaptation actions (49 climate-induced vulnerabilities and 24 non-climate-induced vulnerabilities) were counted from the SNC. Figure 1, above, shows a count of climate-induced vulnerabilities addressed by SVG. SVG reported to taking action on twelve different types of climate-induced vulnerabilities. The four main climate-induced vulnerabilities for which most action was reported are changes in hurricanes and storms (14%), soil and coastal erosion, rainfall and run-off, and drought (12% each). Biodiversity loss accounted for the least number of adaptation actions for climate-induced vulnerabilities.

Figure 2 contains the count of non-climate-induced vulnerabilities addressed by SVG. SVG reported to taking on ten different types of non-climate-induced vulnerabilities. The four main non-climate-induced vulnerabilities addressed by SVG are economic constraints (25%), energy (17%), food security and the impacts of development and infrastructure (13% each). Pollution and waste, deforestation, overfishing, and land-use change had the least amount of adaptation actions for non-climate-induced vulnerabilities with 4%. Figure 3, below, shows the count of adaptation actions by sector in SVG. The sectors taken into consideration from the reports of the SNC are the agriculture, coastal zone, water, health, economic, and tourism sectors.

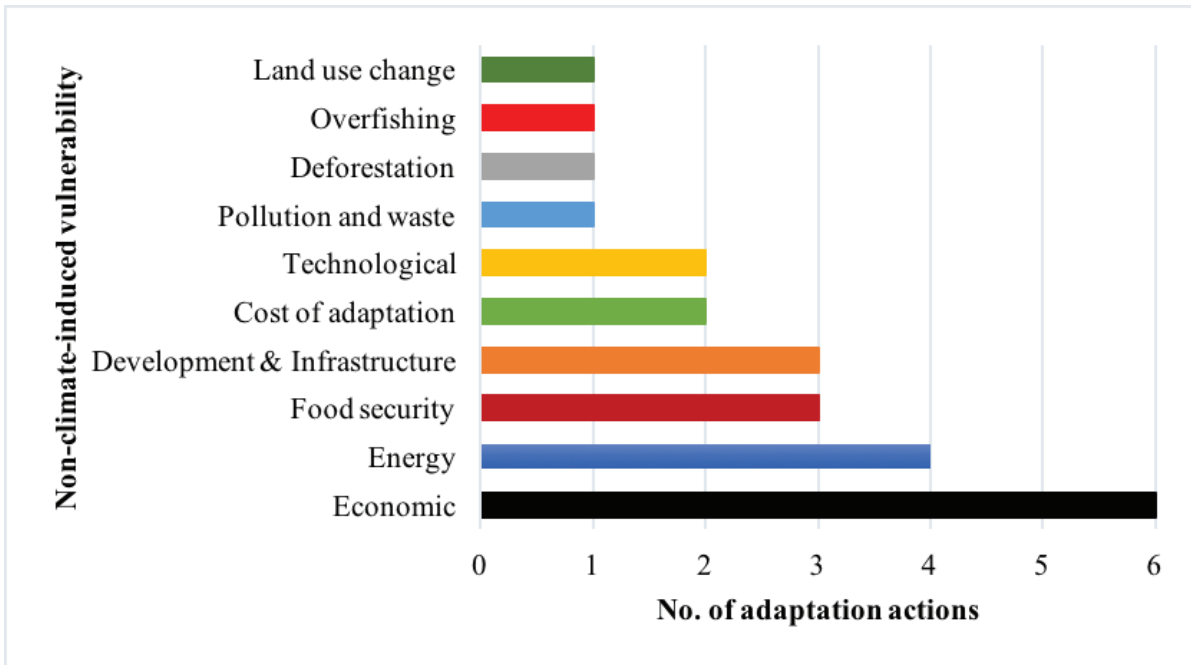


Figure. 2 Number of adaptation actions by non-climate-induced vulnerability addressed in SVG.

Figure 3, below, shows that the agriculture sector reported the highest number of adaptation actions with 44 %. This was followed by adaptation actions in the coastal zone sector (15%) and the health sector (12%). There were no adaptation actions reported for the social sector.

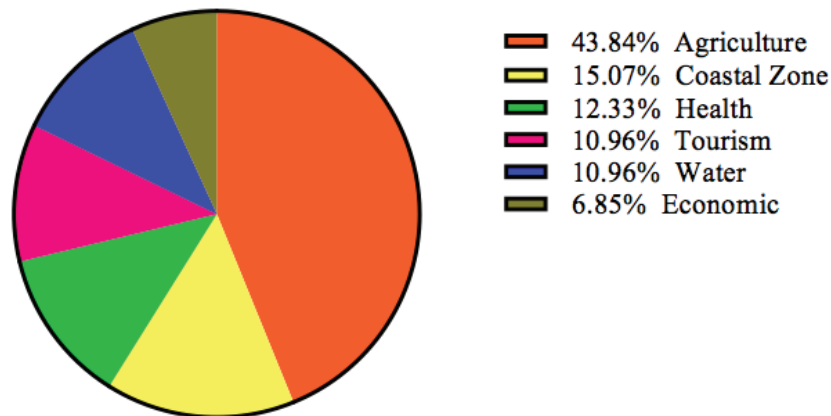


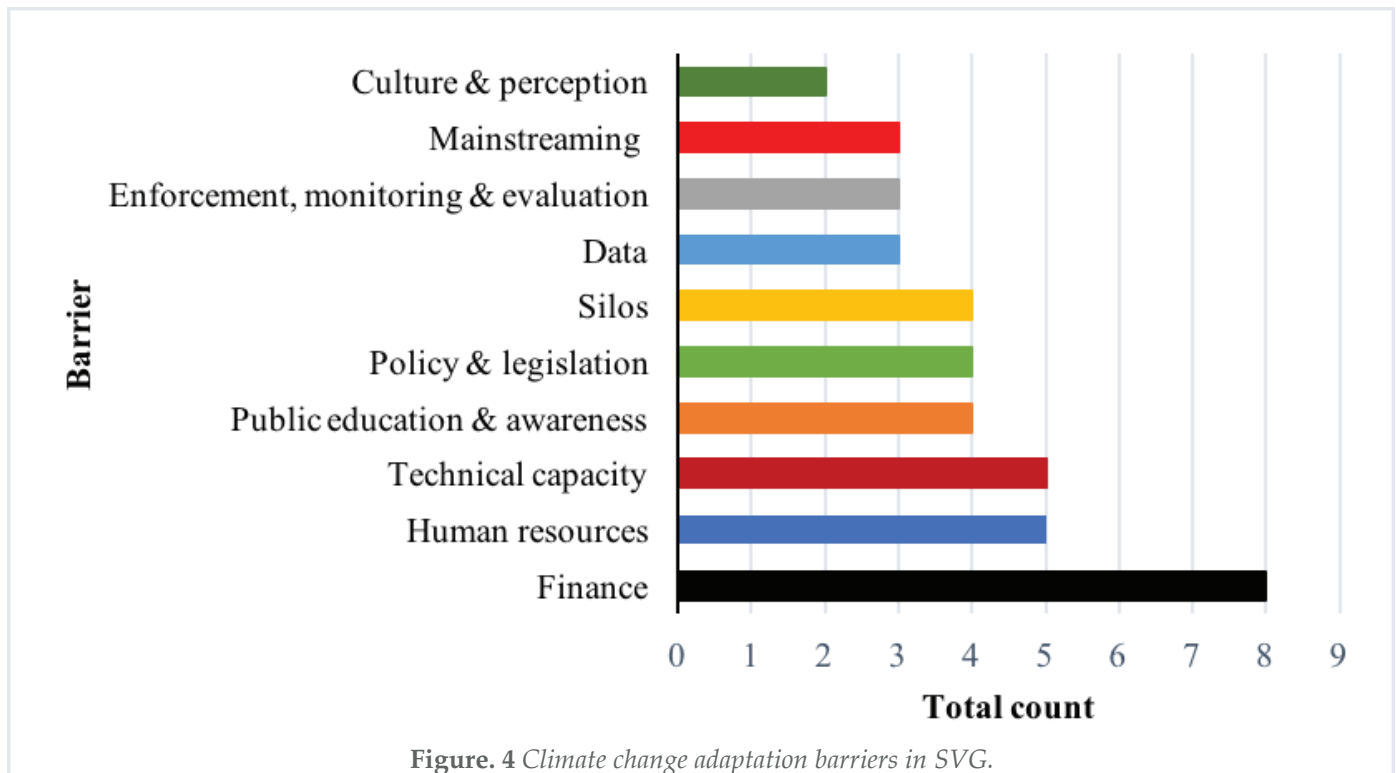
Figure. 3 Number of adaptation actions by sector in SVG.



When asked about the way SVG is adapting to the impacts of climate change, 70% of the interviewees mentioned stakeholder workshops and consultations, 50% indicated public education and awareness, and 20% said risk and impact assessments. The interviewees who mentioned stakeholder workshops and consultation stated that if there is a project in a community that there will be meetings held in the community. Also, a lot of workshops were held at different levels to build capacity, share information, and obtain feedback for those invited. In terms of public education and awareness, interviewees listed examples which included, interfaces with primary and secondary school (e.g., clean-up campaign), interface with the general public (e.g., photo competition), TV and radio campaigns, and capacity building. In regards to risk and impact assessment, interviewees alluded to the need for updated laws and policies so that Environmental Impact Assessments can be done before any major development takes place. Also, the need to develop climate change policies and integrate climate change into sectoral policies.

When asked about the sector in which most adaptation is done in SVG, there was an overwhelming majority (90%) of the interviewees who agreed that most adaptations were being undertaken in the agriculture, tourism, and coastal zone sectors. Many interviewees cited that they believe these are the most vulnerable sectors, especially to hurricanes and tropical storms, and they think that's why the focus is placed on those sectors to reduce climate vulnerability. Also, several interviewees stated that those sectors are the main economic sectors of the country. In terms of climate-induced vulnerabilities, most interviewees identified the intensity of hurricanes and storms as the most critical climate change impact for SVG (80%). Interviewees cited the extent of the effects of hurricanes and storms on the economy, health,

livelihoods, housing, and the general safety of the public. Other interesting focus were sea-level rise (50% of the interviewees), drought (45%), and coastal erosion (40%). Interviewees pointed to the fact that each of these climate-induced vulnerabilities has significant implications on the country. Interviewees were able to give insights on the adaptation actions that were implemented to adapt to hurricanes and tropical storms. According to these interviewees, projects implemented include slope and riverbank stabilization in various parts of the country, satellite warehouses built in rural areas for decentralization purposes and to have readily availability of supplies in areas most affected in the event of natural disasters. In the case of coastal erosion, Interviewees were able to give insight on projects implemented such as coastal defenses in various parts of the country, passing of legislation to ban sand mining in various parts of the country, monitoring of reef conditions, legislations passed so that coastal development need to provide environmental impact assessment, and also the rehabilitation of mangrove ecosystems. In terms of drought, interviewees were able to provide information on projects implemented. Such projects include watershed management for the Cumberland and Perseverance watersheds which include among other things reforestation under the European Union Global Climate Change Alliance. Under the Japan international Cooperation Agency (JICA) project, on the Grenadines island of Mayreau, projects for drought include fifty 1000 gallons water tanks given to residence on the island and installation of ten 1000 gallons water tanks to increase the communal water tank system capacity from 80,000 gallons to 90,000 gallons. Also, under the same project, within the Agriculture sector, there is the rehabilitation of the Langley Park irrigation scheme where farmers are provided with solar panel water pumps and tanks. Other implementation includes drought-resistant plants and animals.



On the other hand, in terms of non-climate induced vulnerabilities, all interviewees agreed that SVG faces multiple issues that include economic, environmental, and social issues that hinder the country’s adaptation plans and ultimately, the country’s sustainable development goals.

3.2 SVG’S BARRIERS TO CLIMATE CHANGE ADAPTATION

Base on SVG’s SNC, forty-one national-level climate change adaptation barriers were counted. The three main national-level adaptation barriers reported by SVG are finance (20%), human resources and technical capacity (12% each). Culture and perception were the

least commonly reported national-level adaptation limits and challenges (5%). Figure 4, above, contains the full results of the barriers to climate change adaptation in SVG.

The majority of the interviewees (80%) agreed that finance and the lack of communication between government sectors are the two major barriers to climate change adaptation in SVG. Interviewees cited that while the majority of funding for climate change adaptation in SVG is from international donors, the lack of communication between sectors leads to duplication of efforts and like-minded projects that can be integrated to maximise the limited finance better. Interviewees also mentioned that since the government budget has to service all sectors,



priorities are not given to climate change adaptation which leads to more dependency on international funding to implement projects on the ground. Although there is an inherent financial barrier, interviewees noted the effort of the government in its readiness preparation to have the Ministry of Finance, Economic Planning, Sustainable Development, and Information Technology accredited under the Green Climate Fund. Therefore, for example, more of the monies allocated would be used for implementation instead of paying third parties. Also, interviewees were able to give insight on a more integrated approach to climate change adaptation across sectors, where projects are screened in an attempt to avoid duplication, and maximize the funding by pooling projects together with similar objectives and deliverables.

Fifty percent of the interviewees mentioned a lack of technical capacity in-country. Three interviewees noted that while there are a lot of people employed within the public sector, there are not enough specialized personnel with the capacity to help with the issues of the impacts of climate change. Other interviewees noted that brain-drain compounds the problems because of a lot of the trained individuals who go off to study usually stay in the country of their studies or migrate to another country in search of better opportunities.

Another factor raised by the interviewees (44%) was the lack of political will exhibited by those with the power to effect change. These interviewees cited the fact that the political machinery is every five years, hence the focus is mainly placed on short term goals with immediate impact to maximise voters. Another important factor mentioned by the interviewees is the mindset of the people. They stated that climate change is not a household name, so the mindset of the people is still one of which they see it as a government problem, which leads to environmental degradation.

On the other hand, thirty percent of interviewees noted that finance is not a major issue, instead, it's the lack of institutional organization that is causing the problem at a national level. Interviewees cited that climate change needs to be mainstreamed in workplans so that the already overwhelmed public servants wouldn't see it as additional work but as an integral part of their work plans. Also mentioned was the lack of climate change entity or mechanisms to track climate change projects, among other things that will help to avoid duplication of efforts, help with the integration of climate change policies into sectoral plans, and help to prioritize the country's adaptation focus.

These views suggest that non-finance-related factors such as poor governance, lack of political will, lack of communication among sectors, and the mindset of the people are potentially playing an equal or more significant role in limiting adaptation in Caribbean SIDS.

4.0 DISCUSSION

St. Vincent and the Grenadines is used in this study to investigate and analyse the national-level climate change adaptation focus, its vulnerabilities, challenges, and barriers to the impact of climate change. The discussion is divided into two parts to include the importance of climate change adaptation in national and sectoral plans, and to improve the country's access to international climate change adaptation funding.



4.1 THE IMPORTANCE OF MAINSTREAMING CLIMATE CHANGE ADAPTATION IN NATIONAL AND SECTORAL PLANS

In this paper, mainstreaming adaptation refers to the incorporation of climate change adaptation objectives into national and sectoral policies and plans [32]. Mainstreaming climate change into national policies, plans, and development projects contributes to (1) a reduction in vulnerability to climate impacts and variability, (2) an increase in adaptive capacity of communities and national activities facing climate impacts, and (3) ensuring sustainable development and avoiding decisions that will generate maladaptation [33].

The results from the analysis of this study show that SVG is primarily adapting to the changes in hurricanes from a climate-induced perspective, and economic constraints from a non-climate induced perspective. SVG, like the rest of the Caribbean region, is vulnerable and exposed to the impacts of climate change. In recent years, extreme weather events have devastated the region, and single handily wiped out the economy of several countries. Antigua and Barbuda, for example, suffered losses and damages over US\$222 million as hurricane Irma wreaked havoc. At the same time, Dominica sustained approximately US\$ 1.3 billion in losses and damages after Hurricane Maria devastated the small island state. This accounted for 224% of Dominica's gross domestic product (GDP) [34]. SVG's economy is heavily dependent on the climate-sensitive sectors of tourism and agriculture. To build resilience to the impacts of climate change at a national level in SVG, there is a need for the country to mainstream national-level climate change adaptation into national and sectoral plans. According to Huq and Reid [35], mainstreaming climate change is one of the primary governance approaches to increase countries' ability to adapt to climate change effectively. SVG's national

economic and social development plans 2013-2025 [36] paves the way for the mainstreaming of adaptation in the national and sectoral plans. However, progress has been very slow. Sixty percent of the interviewees stated the need for the integration of climate change adaptation into work plans. One interviewee applauded the government's effort in establishing the sustainable development unit (SDU), under the umbrella of the Ministry of Finance, Economic Planning, Sustainable Development, and Information Technology; however, it was pointed out how understaffed the unit is.

Mainstreaming climate change adaptation into national and sectoral planning has several expected benefits that include the avoidance of policy conflict, the reduction of risk and vulnerabilities, improved efficiency as compared with managing adaptation separately, and leveraging more financial flows in sectors affected by the impacts of climate change than the amounts available for financing adaptation separately [37]. Climate change adaptation policies need not develop specific and detailed response options, but rather facilitate their development and implementation as part of existing sectoral policies [38]. Such benefits can help SVG to be a more climate-resilient state to the impacts of climate change. One interviewee cited that climate change adaptation actions are done in an ad-hoc manner, while departments and agencies work in silos. The interviewee went on to point out the lack of technical capacity and mechanisms to facilitate interagency coordination.

Mainstreaming adaptation is perceived as a multi-year, multi-stakeholder activity that exemplifies the role of climate change adaptation in the promotion of well-being, pro-poor economic growth, and the attainment of the Sustainable Development Goals (SDGs) [39]. It also involves working with different stakeholders in the field of development.



Adaptation processes require a regular revisiting of development policies, plans, and projects as climate and socio-economic conditions change [40]. This iterative attribute of mainstreaming makes it a development-oriented approach appropriate for addressing climate change adaptation challenges [41].

Given the points mentioned above, an overarching mechanism to assess the institutional arrangement and capacities to facilitate mainstreaming would be beneficial for the country to build adaptive capacity and resilience to the impacts of climate change, priorities adaptation goals, and maximise adaptation funding.

4.2 IMPROVING ACCESS TO INTERNATIONAL CLIMATE CHANGE ADAPTATION FUNDING FOR SVG

This study finds that finances account for 20% of adaptation limits reported by SVG in its Second National Communications. On the one hand, there is a need for mainstreaming climate change adaptation into national and sectoral plans for its benefits, as mentioned above. On the other hand, however, SVG needs to improve its access to international funding for climate change adaptation. One interviewee cited that the Caribbean is extremely vulnerable and exposed to intense hurricanes that have the potential to wipe out the entire economy. While another stated that SVG appears to not have the technical capacity and mechanisms in place to maximise adaptation funding. With that said, Caribbean SIDS, like SVG, appears to be missing out on principal financing. The results from a study done by Robinson et al. [42], shows OECD DAC members reported that between 2010 and 2014, an estimated US\$2 billion was committed towards international adaptation financing for SIDS which was roughly 6% of the total allocation of funds committed to all developing

countries (US\$35 billion). Robinson et al. [42] further stated that the allocation of funds was highly disproportionate with Cabo Verde, Dominican Republic, Haiti, Guyana, and Timor-Leste receiving the largest commitments. Furthermore, Cabo Verde and the Dominican Republic accounted for 26% of the total commitments [42]. Therefore, in the Caribbean, SIDS, except for the Dominican Republic, Haiti, and Guyana are receiving a disproportionate allotment of the international financing that is allocated globally for SIDS. Studies done on adaptation financing within the Pacific SIDS also highlighted the same conclusions [43, 44].

The responses from the interviewees raised the curiosity as to why SVG, and by extension, the wider Caribbean have been allocated disproportionate international funding for climate change adaptation. Could it be that some countries are more climate-ready to secure financing? For example, five interviewees mentioned that SVG alluded to the fact that SVG is now putting measures in place to access the Green Climate Fund, that has the potential for the country to be able to get more international funding, but on the other hand, they indicated that the procedures to access those funds are very rigorous and a lot of capacity building will be needed. One interviewee mentioned that climate change is relatively a new term in the Caribbean; however, it's a 'sexy topic', so everyone wants to do something to get funding". This brings forth the next point, on the readiness of some countries to access funding. As several interviewees highlighted the government's step in the right direction with the establishment of the Sustainable Development Unit, they also noted that it is poorly staffed. Therefore, climate change adaptation on the national level needs good institutional arrangements and good mechanisms in place to prioritise and secure funding.



Another important point that came out of the interviews is the economic classification of SIDS in the Caribbean. SVG is classified as an upper-middle-income economy with a per capita gross national income (GNI) of between US\$4,036 and \$12,475 [45], which makes it ineligible to access some funding sources. However, the economy of SVG is very vulnerable as it is highly dependent on climate-sensitive sectors such as tourism and agriculture. One interviewed pointed to the fact of the devastation that was caused to the Caribbean islands of Dominica, Antigua and Barbuda, and Puerto Rico by hurricane Maria and Irma. Another interviewee highlighted the fact that SVG has high public debts, and it is very difficult to secure concessional financing because it is very limited for middle-income countries and non-existent for high income Caribbean SIDS. Studies done in the Caribbean shows that most of the Caribbean SIDS are highly indebted [46]. While per capita income has been demonstrated to absolutely correspond with the volume of aid received [47], the interrelated and complex nature of the vulnerabilities of SIDS should be considered in allocation decisions as opposed to basing these fundamentally to national incomes.

Therefore, from the points mentioned above, SVG needs to focus on its institutional arrangement and equip the SDU with the human resources and technical capacity to prioritise the adaptation pathway and capitalize on the international funding sources available.

5.0 CONCLUSION

This paper took a case-study approach to achieve two main aims ultimately. They include identifying how SVG is adapting to climate change, and, identifying the barriers to climate change adaptation in SVG. The paper found that seventy-three national-level adaptation actions were reported in the SNC. Forty-nine of those adaptation actions reported addressed climate-induced vulnerabilities while twenty-four addressed non-climate-induced vulnerabilities. The paper also found that SVG is mostly adapting to the changes in hurricanes and storms, soil and coastal erosion, rainfall, and drought from a climate-induced perspective while in terms of non-climate-induced vulnerabilities, it is mostly adapting to economic constraints, energy, food security, and the impacts of development and infrastructure, and the most adaptation measures are being implemented in the agriculture, coastal zone, and health sectors. It further found that the main barriers to climate change adaptation at the national-level are finance, human resources, and technical capacity. The findings of this paper are important for the government and policymakers of SVG and SIDS in the region. These findings can help SIDS in their climate change adaptation aspirations by identifying gaps, making informed decisions, reasons for mainstreaming climate change adaptation into national and sectoral plans, and considerations into their financial mechanisms to access climate change funding.



REFERENCES



- [1] Nurse, L. A., McLean, R. F., Agard, J., Briguglio, L. P., Duvat-Magnan, V., Pelesikoti, N., Tompkins, E. and Webb, A., 2014. Small islands, 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* (Eds Barros, V. R., Field, C. B., Dokken, D. J., Mastrandrea, M. D., Mach, K. J., Bilir, T. E., Chatterjee, M., Ebi, K. L., Estrada, Y. O., Genova, R. C., Girma, B., Kissel, E. S., Levy, A. N., MacCracken, S., Mastrandrea, P. R. and White, L. L.) Cambridge University Press, Cambridge and New York, pp. 1613-1654.
- [2] UN. (2005), *Mauritius strategy for the further Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States*, Document A/CONF.207/CRP.7., United Nations, Port Louis.
- [3] Kelman, I. and West, J.J. (2009). Climate change and small island developing states: a critical review. *Ecological and Environmental Anthropology*, 5(1), 1-16.
- [4] Lutheran World Relief. Situation report no. 2 (2017). *Hurricane devastation in the Caribbean*. <https://reliefweb.int/sites/reliefweb.int/files/re-sources/2017%20Caribbean%20Hurricanes%20Sit%20Rep%20%232.pdf>
- [5] Walsh, K. J. E., McBride, J. L., Klotzbach, P. J., Balachandran, S., Camargo, S. J., Holland, G., & Sugi, M. (2016). Tropical cyclones and climate change. *Wiley Interdisciplinary Reviews-Climate Change*, 7(1), 65–89. doi:10.1002/wcc.371
- [6] Wilkinson, E., Twigg, J., & Few, R. (2018). Building back better: A resilient Caribbean after the 2017 hurricanes. <https://www.odi.org/sites/odi.org.uk/files/resource-documents/12028.pdf>.
- [7] McGranahan, G., Balk, D. and Anderson, B. (2007). The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones. *Environment and Urbanization*, 19(1), 17-37.
- [8] IPCC. (2014), *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, IPCC, Geneva.
- [9] UNTWO. (2008). *Climate change and tourism: Responding to global challenges*. <https://sdt.unwto.org/sites/all/files/docpdf/climate2008.pdf>
- [10] Hashim, J. and Hashim, Z. (2016). Climate change, extreme weather events, and human health implications: the Asia Pacific region. *Global Environmental Change*, 28(2), 85-145.
- [11] Nansen Initiative. (2015). *Disaster-Induced Cross-Border Displacement*. 1, Nansen Initiative.
- [12] Lam, N. S. N., Arenas, H., Brito, P. L. and Liu, K. B., 2014. Assessment of vulnerability and adaptive capacity to coastal hazards in the Caribbean Region. *Journal of Coastal Research*, 70, 473-478. <http://dx.doi.org/10.2112/SI70-080.1>
- [13] IPCC. (2014). Annex II: Glossary. In V.R. Barros, C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, & L.L. White (Eds.) *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* (pp. 1757-1776). Cambridge & New York: Cambridge University Press.



REFERENCES



- [14] UNEP 2014. Emerging issues for Small Island Developing States. Results of the UNEP Foresight Process. United Nations Environment Programme (UNEP), Nairobi, Kenya.
- [15] Mimura, N., Nurse, L., McLean, R., Agard, J., Briguglio, L., Lefale, P., . . . Sem, G. (2007). Small islands. In M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden, & C. E. Hanson (Eds.), *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of working group II to the fourth assessment report of the Intergovernmental Panel on Climate Change* (pp. 688–716). Cambridge, England: Cambridge University Press.
- [16] Robinson, S. (2017). Climate change adaptation trends in small island developing states. *Mitigation and Adaptation Strategies for Global Change*, 22(4), 669-691. <https://doi.org/10.1007/s11027-015-9693-5>
- [17] Berrang-Ford, L., Ford, J.D., & Paterson, J. (2011). Are we adapting to climate change? *Global Environmental Change*, 21(1), 25-33. <https://doi.org/10.1016/j.gloenvcha.2010.09.012>
- [18] Pauw, W.P. (2014). Not a panacea: private-sector engagement in adaptation and adaptation finance in developing countries. *Climate Policy*, 15(5), 583-603. <https://doi.org/10.1080/14693062.2014.953906>
- [19] CCCRA. (2012). Climate change risk profile for Saint Vincent and the Grenadines. <https://www.caribbeanclimate.bz/2009-2011-the-caribsave-climate-change-risk-atlas-cccra/>
- [20] United Nations. (1992). United Nations Framework Convention on Climate Change, Text of the Convention, United Nations, Rio de Janeiro. http://unfccc.int/files/essential_background/background_publications/items/_issue1/ccc/ccc_convention_text.pdf
- [21] Breidenich, C. (2011). Improving Reporting of National Communications and GHG Inventories by Non-Annex I Parties under the Climate Convention, NRDC White Paper, Natural Resources Defense Council, Washington, D.C. <https://www.nrdc.org/globalwarming/files/trackingcarbon-wp.pdf> (accessed November 7, 2014).
- [22] Lesnikowski, A. C., Ford, J. D., Berrang-Ford, L., Barrera, M. and Heymann, J. (2015). How are we adapting to climate change? A global assessment, *Mitigation and Adaptation Strategies for Global Change*, 20(2): 277-293. <http://dx.doi.org/10.1007/s11027-013-9491-x>
- [23] Gagnon-Lebrun, F. and Agrawala, S. (2007). Implementing adaptation in developed countries: an analysis of progress and trends. *Climate Policy*, 7(5): 392-408. <http://dx.doi.org/10.1080/14693062.2007.9685664>
- [24] Elo, S. and Kyngas, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1): 107-115. Available at: <http://dx.doi.org/10.1111/j.1365-2648.2007.04569.x>
- [25] Eisenack, K. and Stecker, R. (2012). A framework for analyzing climate change adaptations as actions. *Mitigation and Adaptation Strategies for Global Change*, 17(3): 243-260. <http://dx.doi.org/10.1007/s11027-011-9323-9>
- [26] Funfgeld, H. and McEvoy, D., (2011). Framing Climate Change Adaptation in Policy and Practice. Working Paper No. 1, Victorian Centre for Climate Change Adaptation Research, Melbourne. http://www.climateaccess.org/sites/default/files/Funfgeld_Framing%20Climate%20Adaptation%20in%20Policy%20and%20Practice.pdf



REFERENCES



- [27] Coyne, I. (1997). Sampling in qualitative research. Purposeful and theoretical sampling; merging or clear boundaries? *Journal of Advanced Nursing*, 26(3), 623–630. doi:10.1046/j.1365-2648.1997.t01-25-00999.x
- [28] Longhurst, R. (2003). Key methods in geography- Semi-structured interviews and focus groups https://books.google.com.tw/books?hl=en&lr=&id=7hcFDAAAQBA-J&oi=fnd&pg=PA143&dq=semi+structured+interviews&ots=TCSQxl0Sdv&sig=nZISv5-dEzv9h0WarAhR8tKuOYk&redir_esc=y#v=onepage&q=semi%20structured%20interviews&f=false
- [29] Flick, U. (2009). *An introduction to qualitative research* (4th ed.). Thousand Oaks, CA: Sage. https://mycourses.aalto.fi/pluginfile.php/551900/mod_resource/content/0/Uwe_Flick_An_Introduction_to_Qualitative_Research.pdf
- [30] Welsh, E. (2002). Dealing with data: Using NVivo in the qualitative data analysis process. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 3(2), 1–9. <http://www.qualitative-research.net/index.php/fqs/article/view/865/1880>
- [31] Hussein A. The use of triangulation in social sciences research: can qualitative and quantitative methods be combined. *Journal of Comparative Social Work*. 2009;1(8):1–2.
- [32] Mogelaard, K., Dinshaw, A., Ginoya, N., Gutierrez, M., Preethan, P. and Waslander, J. (2018). *From Planning to Action: Mainstreaming climate change adaptation into development*. World Resources Institute. <https://www.wri.org/publication/climate-planning-to-action>
- [33] UNDP. (2015). *Mainstreaming Climate Change in National Development Processes and UN Country Programming*. https://www.undp.org/content/undp/en/home/librarypage/environment-energy/climate_change/capacity_development/-mainstreaming-climate-change-guide-English/
- [34] The World Bank. (2017). A 360 degree look at Dominica post Hurricane Maria. <http://www.worldbank.org/en/news/feature/2017/11/28/a-360-degree-look-at-dominica-post-hurricane-maria>
- [35] Huq, S. and Reid, H. (2004). Mainstreaming Adaptation in Development. *IDS Bulletin*, 35(3): 15-21. <http://dx.doi.org/10.1111/j.1759-5436.2004.tb00129.x>
- [36] Government of St. Vincent and the Grenadines. *National Economic and Social Development Plan*. <http://finance.gov.vc/finance/index.php/economic-planning-industry-and-social-development/national-economic-a-social-development-plan>
- [37] Lebel, L., Li, L., Krittasudthacheewa, C., Juntopas, M., Vijjiyan, T., Uchiyama, T. and Krawanchif, D. (2012). *Mainstreaming climate change adaptation into development planning*. Bangkok: Adaptation Knowledge Platform and Stockholm Environment Institute. 32.
- [38] Dovers, S. R. (2009). Normalizing adaptation. *Global Environmental Change*, 13, 4-6
- [39] UNDP-UNEP (2010). *Local governance and climate change. A discussion note*. www.unpei.org/.../LocalGovernanceAndClimateChangeDiscussionNote.pdf
- [40] Organization for Economic Cooperation and Development (2009). *Integrating climate change adaptation into development co-operation policy guidance*. www.oecd.org/publishing/corrigenda
- [41] Oates, N., Conway, D. and Calow, R. (2011). *The 'mainstreaming' approach to climate change adaptation: insights from Ethiopia's water sector*. Background Note. Overseas Development Institute.



REFERENCES



[42] Robinson, S.A. and Dornan, M. (2017). International financing for climate change adaptation in small island developing states. *Regional Environmental Change*, 17:1103-1115. DOI 10.1007/s10113-016-1085-1

[43] Betzold, C., and Weiler, F. (2017). Allocation of aid for adaptation to climate change: Do vulnerable countries receive more support? *International Environmental Agreements: Politics, Law and Economics*, 17(1), 17-36. <https://doi.org/10.1007/s10784-016-9343-8>

[44] Donner, S.D., Kandlikar, M., & Webber, S. (2016). Measuring and tracking the flow of climate change adaptation aid to the developing world. *Environmental Research Letters*, 11(5), 1-9. <https://doi.org/10.1088/1748-9326/11/5/054006>

[45] World Bank (2016). World Bank country and lending groups. World Bank. <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

[46] IMF. (2013). Caribbean Small States: Challenges of High Debt and Low Growth. <https://www.imf.org/external/np/pp/eng/2013/022013b.pdf>

[47] Feeny, S., and McGillivray, M. (2010). Aid and growth in small island developing states. *The journal of development studies*, 46(5), 897-917. <https://doi.org/10.1080/00220381003623889>



Copyright (c) 2020

CESaRE - The Journal of Caribbean Environmental
Sciences and Renewable Energy

www.cesarejournal.org