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NATIONAL CLIMATE
CHANGE ADAPTATION
PLAN (NAP) **FOR GRENADA,
CARRIACOU AND PETITE
MARTINIQUE**



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We as a small island developing nation are amongst the countries most vulnerable to the projected impacts of climate change. Having experienced several extreme events in the recent past, including drought and flooding, and growing coastal erosion all resulting in significant impacts on the economy, climate change adaptation is no longer a choice but an imperative.

I am confident that the National Climate Change Adaptation Plan (2017-2021) for Grenada, Carriacou and Petite Martinique will contribute significantly to the national sustainable development agenda of Grenada. We have now, for the first time a plan that exemplifies the challenges we face in adapting to climate change and provides concrete steps and solutions on how to address these in a practical manner.

The process of developing the National Adaptation Plan (NAP) has been conducted with the input of more than 160 stakeholders and experts from all climate related fields. Thereby taking advantage of recent studies as well as ensuring alignment with ongoing processes such as the development of Grenada's Second National Communication and the National Sustainable Development Plan 2030.

Our NAP process was stakeholder driven and focused on sectors ranked as highly vulnerable to climate change impacts and also of high economic value for Grenada in terms of attracting investment and creation of jobs. These sectors include agriculture, fisheries, tourism, water, infrastructure and health and the ecosystems that underpin them.

I would like to thank the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) for their financial support, the Permanent Secretary, the Environment Division, National Climate Change Committee and the "Integrated Climate Change Adaptation Strategies (ICCAS) Program team, for their support throughout this process.

As a small country with a small economy, our country is relying on international financial and technical support to manage the additional development burden that resulted from emissions of global greenhouse gases, without diverting scarce domestic resources from ongoing development priorities like education, health and social development.

With the joint effort of our stakeholders and the global community, our beautiful island will continue to develop and prosper in a sustainable way, truly living up to its name - Pure Grenada, the Spice of the Caribbean.

A handwritten signature in black ink, consisting of several horizontal strokes and a long horizontal line extending to the right.

Sen. the Hon. Simon Stiehl

Minister for Climate Resilience, the Environment, Forestry, Fisheries, Disaster Management and Information

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| ASAP | Adaptation for Smallholder Agriculture Programme |
| BMUB | Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety |
| BMZ | Federal Ministry for Economic Cooperation and Development |
| CALC | Climate Action Line of Credit |
| CARDI | Caribbean Agricultural Research and Development Institute |
| CARICOM | Caribbean Community |
| CATS | Caribbean Aqua - Terrestrial Solutions |
| CBO | Community Based Organisation |
| CC4FISH | Climate Change Adaptation in the Eastern Caribbean Fisheries Sector |
| CCCCC | Caribbean Climate Change Community Centre |
| CCORAL | Caribbean Climate Online Risk and Adaptation Tool |
| CDB | Caribbean Development Bank |
| CDM | National Comprehensive Disaster Management |
| CDRRF | Community Disaster Risk Reduction Fund |
| C-FISH | Caribbean Fish Sanctuary Partnership Initiative |
| CIF | Climate Investment Fund |
| CIMH | Caribbean Institute for Meteorology and Hydrology |
| CPM | Carriacou and Petite Martinique |
| CRIP | Caribbean Regional Indicative Programme |
| DAE | Direct Access Entity |
| DETC | Economic and Technical Cooperation Division |
| DFID | Department for International Development |
| DRM | Disaster Risk Management |
| EbA | Ecosystem-based Adaptation |
| ECMMAN | Eastern Caribbean Marine Managed Areas Network |
| EDF | European Development Fund |
| EIA | Environmental Impact Assessment |
| GCCA | Global Climate Change Alliance |
| GCEPC | Gravel & Concrete Emulsion Production Corporation |
| GCF | Green Climate Fund |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GFDRR | Global Facility for Disaster Reduction and Recovery |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| GoG | Government of Grenada |

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| GPRS | Growth and Poverty Reduction Strategy |
| ICCAS | Integrated Climate Change Adaptation Strategies in Grenada Programme |
| IDB | Inter-American Development Bank |
| IFCIz | International Forest Carbon Initiative |
| IICA | Inter-American Institute for Cooperation on Agriculture |
| IKI | International Climate Initiative |
| INDC | Intended Nationally Determined Contributions |
| J-CCCP | Japan-Caribbean Climate Change Partnership |
| JICA | Japan International Cooperation Agency |
| KfW | Kreditanstalt für Wiederaufbau |
| LADA | Land degradation Assessment in Dry land Areas |
| LDC | Least Developed Countries |
| M&E | Monitoring and Evaluation |
| MCPMLG | Ministry of Carriacou and Petite Martinique Affairs and Local Government |
| MMA | Marine Managed Areas |
| MNIB | Marketing and National Importing Board |
| MoALFFE | Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment |
| MoFPEDTEC | Ministry of Finance, Planning, Economic Development, Trade, Energy and Cooperatives |
| MoH | Ministry of Health |
| MoSDH | Ministry of Social Development and Housing |
| MoT | Ministry of Tourism, Civil Aviation and Culture |
| MPA | Marine Protected Area |
| MTEF | Medium Term Expenditure Framework |
| NaDMA | National Disaster Management Agency |
| NAMA | Nationally Appropriate Mitigation Actions |
| NAO | National Authorising Officer |
| NAP | National Adaptation Plan |
| NaWaSA | National Water and Sewage Authority |
| NCCC | National Climate Change Committee |
| NCCPAP | National Climate Change Policy and Action Plan |
| NDA | National Designated Authority |
| NDC | Nationally Determined Contributions |
| NGO | Non-Governmental Organisation |
| NSDP | National Strategic Development Plan |

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| ODI | Overseas Development Institute |
| OECS | Organisation of Eastern Caribbean States |
| PoA | Programmes of Action |
| PPCR | Pilot Programme for Climate Resilience |
| PPF | Project Preparation Facility of the GCF |
| PPIAF | Public Private Investment Advisory Facility |
| PPP | Public-Private Partnerships |
| PPU | Physical Planning Unit |
| PS | Permanent Secretary |
| PSIP | Public Sector Investment Programme |
| RRACC | Rallying the Region to Action on Climate Change Programme |
| SCCF | Special Climate Change Fund |
| SGP | Small Grants Programme of the GEF |
| SGU | St. George's's University |
| SIDS | Small Island Developing State |
| SNAP | Stocktaking for National Adaptation Planning |
| SNC | Second National Communication |
| SWRO | Salt Water Reverse Osmosis |
| TAMCC | T.A.Marryshow Community College |
| TCF | Technical Cooperation Facility |
| TNC | The Nature Conservancy |
| UNDP | United National Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USAID | United States Agency for International Development |
| WMO | World Meteorological Organisation |
| XCD | Eastern Caribbean Dollars |

As a small island developing state (SIDS), Grenada has inherent characteristics that make it vulnerable to the adverse impacts of climate change. Given that its economy depends on a relatively limited number of economic activities and outputs that are largely climate-dependent and climate-sensitive, Grenada can be disproportionately impacted by any change in its economic activities.

The negative impacts of climate change pose an additional financial burden for the tri-island state with adverse effects on the country's economic and social development.

Climate change adaptation is a priority for the Government of Grenada. The function of the National Adaptation Plan (NAP) is to provide a strategic, coordinating framework for building climate resilience in Grenada, recognising the need to develop the enabling environment for climate change adaptation as well as programmatic priorities.

The NAP will guide the stakeholders in Grenada in understanding relevant vulnerabilities to risks from climate change and on appropriate responses that they should take. It will signpost stakeholders to existing data and information to guide climate resilient decision-making. It is also intended to help development partners identify resilience building activities to support, and to mobilise climate finance from a range of sources. While additional investment is required to build climate resilience in Grenada, it must not divert scarce local resources from ongoing development priorities like education, health and social development. The NAP will provide the basis for more detailed project proposals and for discussions with donors. The majority of proposed NAP actions should be financed through external sources.

The NAP will be one of Grenada's main mechanisms for accessing external climate finance and will play a crucial role as a vehicle for strategic investments in Grenada's climate-resilient development. Furthermore, the NAP will provide the framework for further integration of climate change considerations into planning and budgetary processes to "climate-proof" public and private investments, ensuring efficient spending of scarce financial resources.





The NAP will also be the overall political umbrella document to coordinate and guide external financing and donor contributions on adaptation to climate change. The National Climate Change Committee (NCCC) will be the forum to validate and access international contributions that link to climate adaptation.

Since 2015, the development of the NAP has gone through a very broad consultation process. More than 160 persons from various GoG ministries, departments and agencies as well as non-state actors (e.g. NGOs, CBOs, citizens, companies, research institutes) have provided input on the NAP. This process was guided by the 2012 UNFCCC 'Technical guidelines for the national adaptation plan process'.

Grenada's NAP is a 5 year plan (2017-2021) with different multi-sectoral programmes of action. It is an umbrella document, based mainly on prioritised climate change adaptation activities taken from existing sectoral and local area plans that were already developed through larger consultative processes in the past months and years. The NAP is a living document which will be updated and revised regularly to provide strategic and programmatic guidance for Grenada's adaptation process. The NAP vision is: A resilient nation that continuously adapts to climate change by reducing its vulnerability through comprehensive adaptation strategies. The NAP consists of 12 programmes of action with 14 the corresponding goals, and 20 indicators.

The goals of this NAP are in line with the UNFCCC guidelines and follow on from Grenada's national strategic development targets. They also support CARICOM's Climate Change Implementation Plan (2011-2021) ;are in line with Grenada's Climate Change Policy and with Grenada's National Determined Contributions (NDCs). The total estimated budget is USD260 million dollars.

¹CARIBBEAN COMMUNITY CLIMATE CHANGE CENTRE (2011) –

² Within the adaptation section, the following objectives have been listed:

- 1) Enhancing institutional framework,
- 2) Building coastal resilience,
- 3) Improve water resource management
- 4) Building the resilience of communities.

* An asterisk marks all indicators from Grenada's M&E framework for Implementation Plan of the Regional Climate Change Framework (2009-2021) *

| PoA | Goals | Indicator(s) |
|---|---|--|
| PoA01: Institutional arrangements | 1. The institutional structure to support coordination, integration & implementation of climate change adaptation action is strengthened. | 1.1 At least 12 Ministries/Agencies have active CC Focal Points. 1.2 Evidence that National Climate Change Committee meets on a regular basis and is functioning at the national level, involving the private sector, CBOs and NGOs (with specific attention given to youth and gender groups). |
| PoA02: Integration | 2. Climate Change Adaptation is reflected in the process of the National Sustainable Development Plan 2030 formulation and implementation. | 2.1 Climate Change Adaptation is a cross-cutting topic in the National Sustainable Development Plan 2030. |
| | 3. Climate change is systematically considered and budgeted for in new government projects. | 3.1 All new Public Sector Investment Programme (PSIP) projects undergo the CCORAL screening. 3.2 50% of new PSIP projects that have ranked as "high climate change relevance" integrate adaptation considerations into the project design by 2021. |
| PoA03: Water availability | 4. A climate-responsive water governance structure is established. | 4.1 55% of institutional mechanisms taken to improve planning, management and efficient use of water resources. |
| PoA04: Food security | 5. The foundation is laid for food availability, stability, access, and safety amidst increasing climate change risks. | 5.1 60% of agriculture officers are advising farmers to implement climate-smart agriculture (CSA) practices. |
| PoA05: Ecosystem resilience | 6. The management and conservation of protected areas and other key ecosystems areas has improved. | 6.1 Protecting and sustainably managing 20% of Grenada's marine, coastal and terrestrial ecosystems by 2021. |
| PoA06: Integrated coastal zone management | 7. The institutional, professional and technical capacity for integrated coastal zone management is built. | 7.1 A Coastal Zone Management unit is established by 2020. |
| PoA07: Resilient infrastructure & sustainable land management | 8. Selected infrastructure is located, planned, designed and maintained to be resilient to climate change, including increasingly extreme weather events; land is managed sustainably. | 8.1 All ministries and government agencies with the mandate for land management have the capacity to use spatial data to inform decisions on sustainable land management. 8.2 Climate variability and change is integrated into policies and guidelines for physical planning and development. |

| PoA | Goals | Indicator(s) |
|--|--|--|
| PoA08: Disaster risk reduction & disease prevention | 9. Funding for the implementation of actions focusing on reducing the risk posed by extreme weather events, as part of NaDMA's 5 year Country Programme (2014-2019) is mobilised. | 9.1 At least two project proposals are submitted annually, to potential donors and/or investors, commencing in 2017. |
| | 10. Climate-sensitive human disease surveillance and control is established. | 10.1 Climate information has been included in national disease surveillance system to strengthen the analysis and use of climate-sensitive disease data. |
| PoA09: Climate and sea-level rise data and projections | 11. Institutional arrangements for the collection, analysis and provision of climate-related data for use in decision-making are strengthened. | 11.1 The Meteorological Office has established a central repository for climate-related data that is operational with information being shared among agencies by 2020. |
| | | 11.2 The National Hydrological and Meteorological service is established and operationalised to collect climate-related data from all available sources by 2021. |
| PoA10: Sustained public education and participation | 12. An informed public that will demand and support public policies aimed at building national resilience to climate change. | 12.1 Compared to the 2016 OECS survey, results of a repeated KAP (Knowledge, Attitudes and Practices) survey on Climate Change demonstrate improved results for Grenada by 2021. |
| PoA11: Climate financing | 13. Successful project applications ensure external climate finance support to Grenada's adaptation process. | 13.1 The GCF has granted Grenada financial support for readiness activities by 06/2017. |
| | | 13.2 At least 2 project proposals to finance implementation of selected NAP activities are submitted to potential donors and/or investors annually, starting in 2017. |
| | | 13.3 At least 1 proposal for funding of PoA 3 has been submitted to the GCF and/or other potential sources of financing by 12/2017. |
| PoA12: Monitoring and evaluation | 14. The implementation of proposed NAP measures is documented. | 14.1 Assessment reports on the implementation of the NAP measures are released every 2 years and make recommendations on possible adjustments to the implementation process and for the update of the NAP document 2022-2027. |

→ The indicators 1.1, 3.1, 3.2, 6.1, 9.1, 10.1 and 13.2 are directly linked to Grenada's M&E framework for Implementation Plan of the Regional Climate Change Framework (2009-2021).

Grenada's³ people, economy and environment are highly vulnerable to a variable and changing climate.

Grenadians have been impacted by extreme climatic events such as tropical storms, hurricanes, coastal and inland flooding and drought. They are also at risk from future extreme events and creeping change such as sea level rise and increases in average temperature.^{4,5,6}

In response to this, the Government of Grenada (GoG), Non-Governmental Organizations (NGOs), Community Based Organizations (CBOs), citizens, companies and others are taking concrete action to build Grenada's resilience to these types of events and change. For example, the GoG has been implementing priority risk reduction investments (e.g. retrofitting schools that serve as emergency shelters to improve their disaster and climate resilience) and building capacity for better management of spatial data (e.g. to produce disaster/climate change exposure maps).⁷

Over 29 community groups have also been awarded up to US\$50,000 each since November 2014 to implement local adaptation activities such as improving community water storage and conducting disaster and climate change awareness-raising activities.⁸

While action to build climate resilience and adapt to climate variability and change is underway, Grenada needs an up to date stock take of its situation and overarching strategic framework to ensure efficient and effective use of available resources. In this context, Cabinet endorsed the update of the 2007-2011 National Climate Change Policy and Action Plan (NCCPAP)⁹ and provided a mandate for the development of a National Adaptation Plan (NAP) in May 2015.¹⁰ The Environment Division has led both processes.¹¹

This document falls under the Policy and presents Grenada's National Climate Change Adaptation Plan, addressing issues of climate resilience and adaptation. This is complemented by Grenada's Nationally Determined Contributions (NDCs) which presents the country's climate change mitigation plan, addressing low carbon development, reduction of greenhouse gas emissions and highlighting key areas for adaptation.¹² It covers a 5 year period (2017-2021) and is a living document which will be updated and revised regularly to provide strategic and programmatic guidance for Grenada's adaptation process.

As articulated by the United Nations Framework Convention on Climate Change (UNFCCC) Least Developed Countries (LDC) Working Group, resilience and adaptation planning is a process. The process will include specific outputs at given points in time, including this NAP document.¹³

Since 2015, the development of this NAP document has gone through a very broad consultation process. The plan was developed with detailed input from more than 160 Grenadian stakeholders (60% male/40% female participation) from various ministries, private sector, TAMCCC, SGU as well as NGOs and CBOs including women and youth groups. Annex 12 outlines the steps and Figure 1 presents the steps taken and the entities with responsibility for each step. This process was guided by the 2012 UNFCCC 'Technical guidelines for the national adaptation plan process'.¹⁴

³ Grenada is a tri-island state which consists of Grenada, Carriacou and Petite Martinique.

⁴ Government of Grenada. (2000)

⁵ Caribsave. (2012)

⁶ UN and Government of Grenada. (2012)

⁷ World Bank. (2015)

⁸ Government of Grenada. (2015), Climate change project awards.

⁹ Government of Grenada. (2007).

¹⁰ Government of Grenada. (2015). Cabinet Conclusion of 11th May 2015. Preparation by Grenada to Access Climate Change Financing through the Green Climate Fund.

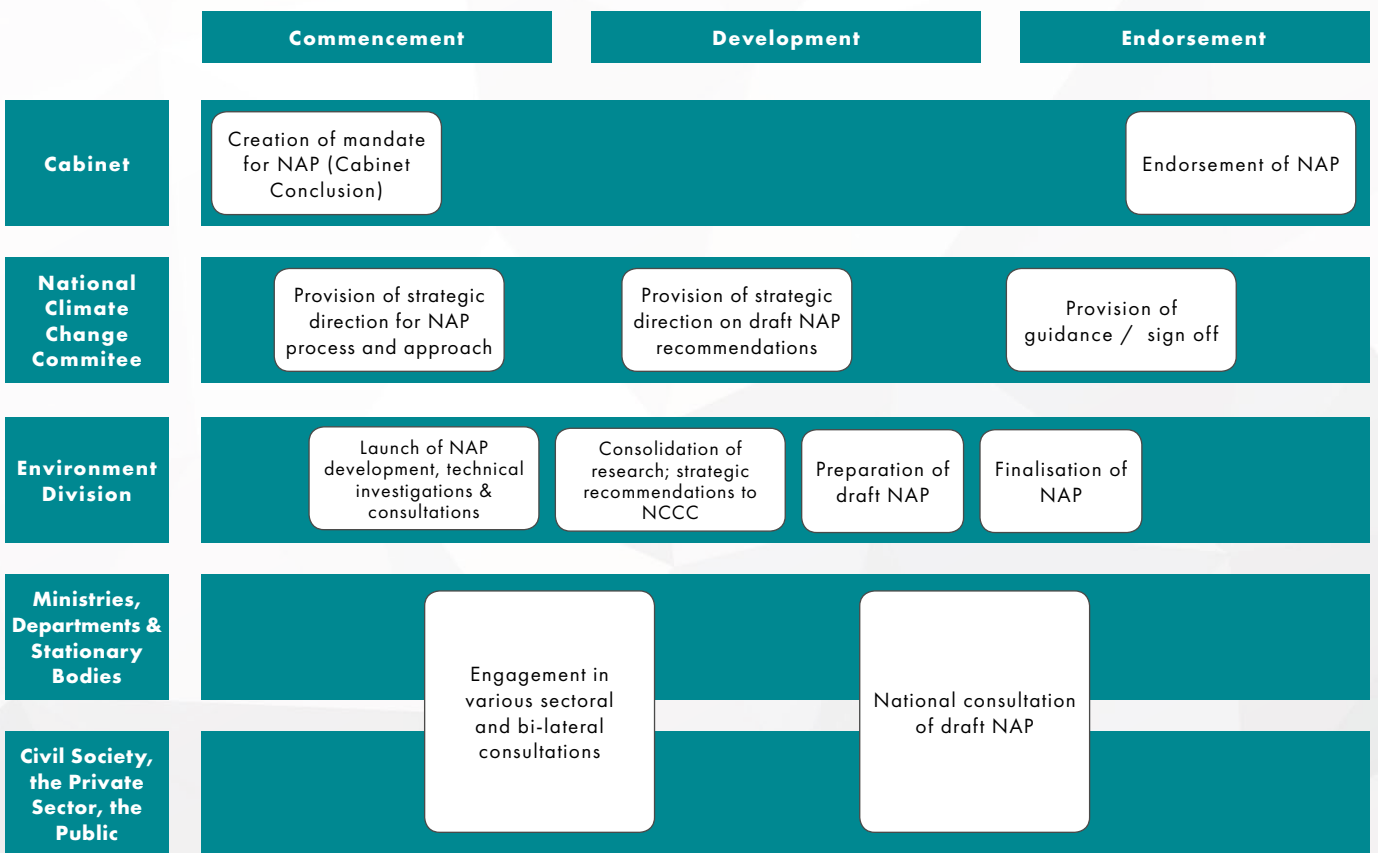
¹¹ Both documents are available at the following website: www.gov.gd

¹² Government of Grenada. (2015). Intended Nationally Determined Contribution (INDC).

¹³ UNFCCC. (2012). National adaptation plans.

¹⁴ Ibid.

Figure 1: Steps of the national adaptation plan (NAP) process - responsibilities for each step



Grenada's 2014-2018 Growth and Poverty Reduction Strategy (GPRS) has the overall aim of pursuing a 'new economy'. The 'new economy' is to comprise of world class tourism and yachting.

Being a marina destination, the new economy must also be complemented by; efficient business, finance and information technology services; along with, an efficient light manufacturing sector a well-diversified agricultural sector focused on 'value added' products. There should also be a dynamic oil and gas and renewable energy sector and a highly efficient agro-industrial sector cluster dedicated to oils and flavour extraction for health, food, cosmetic and pharmaceutical applications. It is intended that this 'new economy,' will be driven primarily by indigenous knowledge, technology, innovation and entrepreneurship. To pursue this agenda, the GPRS has four overarching objectives.

- **Building resilience.**
- **Developing competitiveness with equity.**
- **Reducing vulnerability.**¹⁵
- **Strengthening governance and security.**¹⁶

In addition, the Government of Grenada has started to develop the National Strategic Development Plan 2030. Projected strategic priorities include;

- **A caring society;**
- **Governance;**
- **A competitive private sector;**
- **Infrastructure, environment and ecology;**
- **Innovation;**
- **Climate change and disaster management.**¹⁷

In addition to the stand-alone pillar, the National Strategic Development Plan 2030 will be "climate-proofed", i.e. climate change considerations will be integrated across the other pillars.¹⁸

The goals of this NAP are in line with the UNFCCC guidelines and follow from Grenada's national strategic development targets. They also support CARICOM's Climate Change Implementation Plan (2011-2021)¹⁹ and are in line with Grenada's Climate Change Policy and with Grenada's National Determined Contributions (NDCs).²⁰

The main objectives of a NAP process according to UNFCCC and LEG Technical Guidelines are:

- to take a medium and long-term approach to reducing vulnerability to the adverse effects of climate change.
- to facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities. In particular development planning processes and strategies within all relevant sectors and at different levels, as appropriate.

¹⁵ Priority area 1: Comprehensive Disaster Risk Reduction and Climate Change Adaptation

¹⁶ Government of Grenada. (2014). Grenada's Growth and Poverty Reduction Strategy, 2014-2018.

¹⁷ Government of Grenada. (2015). Power Point presentation on Grenada, Carriacou, Petit Martinique Strategic Development Plan 2030.

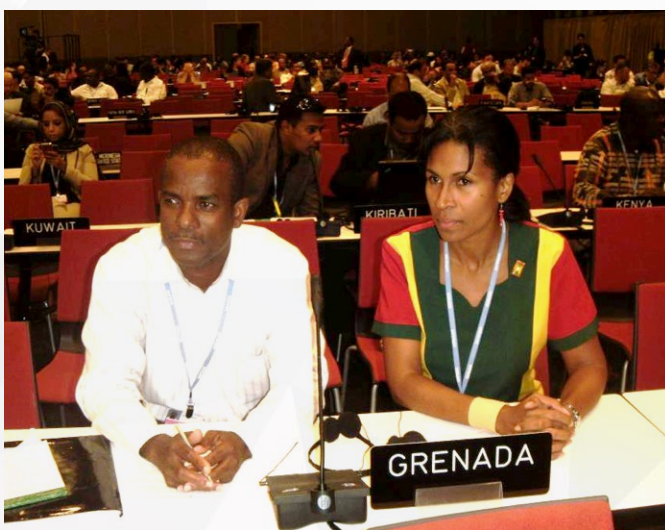
¹⁸ As per Cabinet Conclusion (May 2015)

¹⁹ Caribbean Community Climate Change Centre (2011)

²⁰ Within the adaptation section, the following objectives have been listed: 1) Enhancing institutional framework, 2) Building coastal resilience, 3) Improve water resource management and 4) Building the resilience of communities.

The goals of the NAP for 2017-2021 are:

1. Strengthened institutional structure to support coordination, integration and implementation of climate change adaptation action.
2. Integration of climate change adaptation within the process of the National Sustainable Development Plan 2030 (formulation and implementation).
3. Systematic mainstreaming of climate change considerations within the design and budgets of new government projects.
4. Establishment of a climate-responsive water governance structure.
5. The foundation for food availability, stability, access, and safety amidst increasing climate change risks, is laid.
6. Improved management and conservation of protected areas and other key ecosystems areas.
7. The institutional, professional & technical capacity for integrated coastal zone management is built.
8. Increased resilience of selected infrastructure to climate change, including increasingly extreme weather events through location, planning, design and maintenance to be resilient and managing land sustainably.
9. Mobilisation of funding for the implementation of actions focusing on reducing the risks posed by extreme weather events, as part of NaDMA's 5 year Country Programme (2014-2019).
10. Establishment of climate-sensitive human disease surveillance and control.
11. Strengthened institutional arrangements for the collection, analysis and provision of climate related data to better enable and improve decision making.
12. An informed public that will demand and support public policies aimed at building national resilience to climate change. External climate finance support is ensured through successful project applications and documentation of the implementation of proposed NAP measures.



The function of this NAP document is to provide a strategic, coordinating frame-work for building climate resilience in Grenada, recognising the need to develop the enabling environment for climate change adaptation as well as programmatic priorities.

It is intended to guide GoG ministries, departments and agencies as well as non-state actors (e.g. NGOs, CBOs, citizens, companies, research institutes) in understanding relevant vulnerabilities to risks from climate change and on appropriate responses that they should take. It will signpost stakeholders to existing data and information to guide climate resilient decision-making. The NAP is also intended to help development partners identify resilience building activities to support and to mobilise climate finance from a range of sources.

The principles guiding the development and delivery of the NAP process and document are based on the feedback provided by a wide range of Grenadian stakeholders²¹ who participated in the early 2015 NAP ‘kick off workshop’, feedback from the National Climate Change Committee and principles outlined in the UNFCCC ‘Technical guidelines for the national adaptation plan process.’ The principles are as follows:

- Grenadian Ownership: to be **Grenada-owned and Grenada-driven**, by applying a participatory and consultative process. The GoG, NGOs, CBOs, companies, citizens and research institutes have been and should continue to be engaged in defining priorities and delivering climate resilience in Grenada.
- NAP as an umbrella document; to **build upon existing data, information, capacity and resilience building activities** (started or recommended). Rather than identifying actions ‘from scratch’, this NAP document, is built as much as possible on existing policies, strategies, plans, reports and subsequent recommendations.
- SIDS-specific: to **recognise human and financial capacity constraints, and adopt an approach that works within these circumstances** (e.g. by strategically targeting priority actions) **and builds capacity** (e.g. by attracting additional human and financial resources).
- NAP as a financial resource mobilisation mechanism: to mobilise external resources to support Grenada’s climate adaptation activities. It is Grenada’s position that adaptation is an additional development burden that the country has to undergo as a result of unchecked emissions of greenhouse gases by large emitters. **The responsibility for addressing adaptation therefore has to be borne in large part by those large emitters and not by diverting scarce local resources from ongoing development priorities** like education, health and social development.
- Mainstreaming and integration: to integrate not only sectors in a national adaptation plan, but **climate change adaptation considerations into the sectors, which are budgeted for and implemented.**
- Pre-cautionary principle to prioritise actions that will either; not worsen vulnerabilities to climate change, and/or, which will increase adaptive capacities in the absence of quantity and quality of certain climate change data. **Uncertainty should not be used as a reason to not take action. Ecosystem-based solutions** that will always have a positive impact on livelihoods regardless of how exactly the climate changes, are a priority for Grenada, Carriacou and Petite Martinique.
- Remain flexible; to **monitor, evaluate, report and iterate.** Aligned with the process nature of national adaptation planning, it is important to keep track of new data, information and performance in delivering resilience. As new data and information become available, and circumstances potentially change, it is important to have flexibility to amend the approach and priorities as required.

Current Situation²² — Summary of climate change projections based on previous studies and assessments.

As a small island developing state (SIDS), Grenada has inherent characteristics that make it vulnerable to the adverse impacts of climate change. The country's economy depends on a relatively limited number of economic activities and outputs that are largely climate-dependent and climate-sensitive. A change in any of these activities or output can disproportionately impact Grenada's economy.

As an island, Grenada has an extensive shoreline along which most of the most development and critical infrastructure are located, thus making sea level rise and increasing storm surge intensity, significant threats. Other significant threats to water resources include changes in the rainfall regime and saline intrusion. Grenada's location within the Atlantic Ocean's hurricane track, could further increase its vulnerability to large-scale climatic shifts.²³

Extreme weather and short term climate variability have already had a tremendous impact on the country. Grenada is already experiencing some of the effects of climate variability through damage from severe weather systems and other extreme events, as well as more subtle changes in temperatures and rainfall patterns. The devastating losses to Grenada's economy in 2004 and 2005 from the passage of Hurricanes Ivan and Emily increased the vulnerability of the country's, economy with some of the impacted sectors still in recovery ten years later. The total damage from Hurricane Ivan alone was estimated at XCD 2.4 billion²⁴, twice the value of Grenada's Gross Domestic Product.²⁵

Direct or indirect losses were experienced in virtually every sector and these losses were compounded by the passage of Hurricane Emily just 10 months later. Once considered a rare occurrence, long-term climate change could result in the increased frequency of devastating events such as these becoming the new reality for Grenada.

The National Climate Change Policy for Grenada, Carriacou and Petite Martinique (2017-2021) describes the climate change scenarios for Grenada. Climate change projections for Grenada predict an increase in average annual temperature, reduced average annual rainfall, potential for an increase in the intensity of tropical storms and increased Sea Surface Temperatures (SST). Individually, each of the above changes will present challenges to the integrity of Grenada's natural resources, society and economy. Combined, they pose a substantial risk to the overall continued prosperity of the country, providing the rationale and impetus for the country's National Adaptation Plan.

Climate change is projected to be a progressive process and therefore vulnerability will arise at different times and spatial scales, affecting communities and sectors in distinct ways. Grenada's National Adaptation Plan and the methodology employed for its development, will seek to analyse, select and prioritise measures that address key vulnerabilities in relation to the climate threats described above in order to increase the resilience of the country and its key sectors.

²² As of October 2016; applies also to PoAs

²³ For a more detailed vulnerability assessment, see Grenada's First National Communication.

²⁴ USD1 is equivalent to XCD2.67

²⁵ OECS (2004)

Grenada's current situation in the adaptation process.

As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and, most recently, to the newly established Paris Agreement coming out of the UNFCCC's 21st Conference of the Parties held in December 2015 in Paris, Grenada is committed to reporting on national activities and vulnerabilities in relation to climate change. Since the publication of the UNFCCC First National Communication in 2000 much progress has been made in studying the potential impacts of climate change and required climate change adaptation actions. Grenada has also recently submitted its Intended Nationally Determined Contributions (INDC) report to the UNFCCC, which also includes a short adaptation status. Other recent and critical developments on the international and regional stage include the adoption of the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015-2030 and the CARICOM Declaration for Climate Action (2015). Grenada is currently in the process of developing its Second National Communication (SNC).

Grenada did not start from zero with regard to adaptation planning. Many important steps had already been taken. Some selected actions of the past years include²⁸:

- The development of a climate change policy and action plan (2007-2011); which was updated in 2016.
- Reactivation of the National Climate Change Committee in 2014 and including a dedicated adaptation sub-committee.
- Available climate change projections and vulnerability assessments (though scattered and often for selected areas/sectors)²⁹.
- Establishment of a National Designated Authority (NDA) for the Green Climate Fund and the undertaking of GCF readiness activities.
- The conduct of climate change expenditure reviews for the budget 2015 and 2016.
- The integration of climate change adaptation considerations into various key documents and the sensitisation of staff from various different ministries, the private sector and NGOs on the "Caribbean Climate Online Risk and Adaptation Tool³⁰" (CCORAL), which supports the climate-proofing of plans, strategies and projects by non-climate experts.
- The introduction of a requirement that the project submission form for the GoG's Public Sector Investment Programme should undergo CCORAL screening;
- The development of local adaptation plans for selected areas and a national water adaptation plan.
- Assistance to CBOs and NGOs to become formalized to enable easier access to funding.
- Establishment of a community climate change adaptation fund to help communities build their resilience.
- Development and Cabinet approval of a Coastal Zone Policy.
- The piloting of ecosystem-based adaptation (EbA) projects (focus: coastal and marine ecosystems, reefs and mangroves) and the building of grey infrastructure to support climate and disaster resilience.

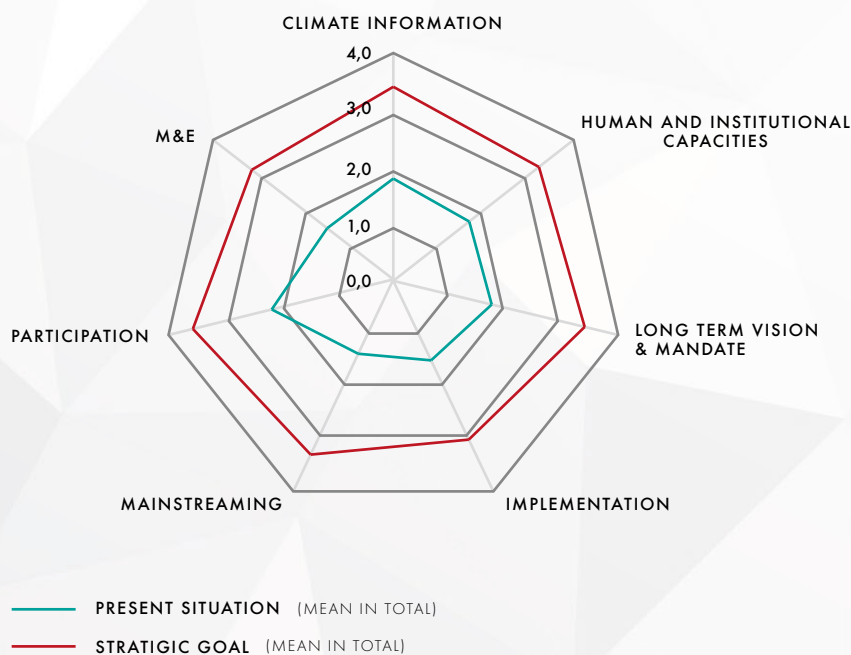
Grenada was able to attract a number of bilateral and multilateral climate change adaptation projects (most projects being regional) which provided funding and technical assistance for many of the adaptation actions listed above. However, in order to ensure efficient and effective use of the finances from these and future projects and to ensure implementation across sectors according to nationally determined climate change adaptation priorities, an overarching strategic framework was needed.

To lay the groundwork for the NAP process (Element A/UNFCCC NAP Technical Guidelines), a participatory snapshot of needs as well as current and intended capacities was undertaken on February 19th and 20th 2015.^{33 34} The assessment helped to identify a common point of departure, from which stakeholders could begin formulating a roadmap for the NAP process. The tool was implemented through participatory process involving stakeholders relevant to the adaptation process. The stocktaking workshop included a joint analysis and debate as well as a questionnaire-based analysis, undertaken individually by each participant. **The findings of the analysis were clustered into 7 success areas:**

- climate information
- human and institutional capacities
- long-term vision and mandate
- implementation
- mainstreaming/ Integration
- participation
- monitoring and evaluation.

The main results of the stocktaking analysis are reflected in the 'spider diagram' shown in Box 2. The blue line identifies the present situation as assessed by the participants of the workshop whereas the red line represents the strategic goal, as seen by the participants. All contributions made by the participants were documented in a separate assessment file including justification for each statement.

Spider diagram from the SNAP analysis for Grenada:



Some of the points coming out of discussions were:

- Access to climate data and vulnerability assessments were not readily available; a need to centralise the data storage was recognised.
- Climate change adaptation efforts were not integrated systematically across ministries and departments, identifying a need to improve information sharing.
- There were issues with continuity given the gaps in knowledge of government staff, and the gaps in knowledge re adaptation efforts between administrations.
- Improvement of coordination across ministries was identified.
- A lack of human capacity re climate adaptation was determined.
- Political will and continuity were discussed as potential barriers to medium and long term adaptation.
- The vast majority of the participants were not aware of the Climate Change Policy and Action Plan 2007-2011.
- Currently, there is no formal development plan in which to place integrated adaptation, but this will be addressed in the development of the new 15-year development plan.
- Almost none of the participants were aware of any monitoring and evaluation (M&E) systems in place for climate change adaptation.

The spider diagram infers the following general conclusions:

- Grenada does not start from zero with regard to climate change adaptation. In all seven areas, first activities had already been conducted or had commenced. However, there was a considerable gap between the current situation and the strategic goal. This justified an ambitious but manageable NAP process which would address more or less all success factors mentioned.
- An assessment of the current situation revealed that the success area 'Participation', was the only area considered to be 'neither weak nor strong'; while the planning capabilities of other success factors were rated as 'rather weak'. The participants proposed that the strategic goal for all of the success factors should be capabilities that were 'rather strong'.
- Significantly below average for the current situation was the success area monitoring and evaluation. This was not surprising since the NAP process was still premature and has not yet embarked on the issue of monitoring future NAP progress.

Key definitions:

Climate change adaptation: the process of adjustment to actual or expected climate change 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.³¹

Climate resilience: the capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function at an acceptable level. Simply put, it is the ability to survive and recover from the effects of climate change. It includes the ability to understand potential impacts and to take appropriate action before, during, and after a particular consequence to minimize negative effects and maintain the ability to respond to changing conditions.³²

National Adaptation Plan process: enables a country to formulate and implement national adaptation plans (NAPs) as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needs. It is a continuous, progressive and iterative process which follows a country-driven, gender-sensitive, participatory and fully transparent approach. (UNFCC NAP Guidelines)

Mainstreaming or integration: the integration of (adaptation) objectives, strategies, policies and measures or operations such that they become part of the national and regional development policies, processes and budgets at all level and stages (Lim and Spanger Siegfried, 2005)

Climate change vulnerability: the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. (IPCC AR5, 2014)

²⁶ Government of Grenada (2015)

²⁷ 1) Enhancing institutional framework, 2) Building Coastal Resilience, 3) Improving water resource management, 4) Building the resilience of communities

²⁸ The list is not exhaustive. For a more detailed list of past/current adaptation actions see Programmes of Actions. For list of relevant reports/plans/assessment see bibliography

²⁹ For example: UNDP Climate Change Profile for Grenada, CARIBSAVE Climate Change Risk Atlas for Grenada, Vulnerability Assessment for Grenada's Water Sector, TNC Coastal Resilience Map, Grenville Vulnerability Assessment, Grenada's Coastal Vulnerability and Risk Assessment, several hazard maps

³⁰ <http://ccoral.caribbeanclimate.bz/>

³¹ WMO, UNEP, IPCC (2014)

³² Rockefeller Foundation. (2009)

Long term vision statement — A resilient nation that continuously adapts to climate change by reducing their vulnerability through comprehensive adaptation strategies.

Overarching goals and indicators (2017-2021):

| Goals | Indicator(s) |
|--|---|
| <p>1. The institutional structure to support coordination, integration and implementation of climate change adaptation action is strengthened.</p> | <p>1.1 At least 12 Ministries/Agencies have active CC Focal Points.</p> <p>1.2 Evidence that National Climate Change Committee meets on a regular basis and is functioning at the national level, involving the private sector, CBOs and NGOs (with specific attention given to youth and gender groups).</p> |
| <p>2. Climate Change Adaptation is reflected in the process of the National Sustainable Development Plan 2030 formulation and implementation.</p> | <p>2.1 Climate Change Adaptation is a cross-cutting topic in the National Sustainable Development Plan 2030.</p> |
| <p>3. Climate change is systematically considered and budgeted for in new government projects.</p> | <p>3.1 All new Public Sector Investment Programme (PSIP) projects undergo the CCORAL screening.</p> <p>3.2 50% of new PSIP projects that have ranked as “high climate change relevance” integrate adaptation considerations into the project design by 2021.</p> |
| <p>4. A climate-responsive water governance structure is established.</p> | <p>4.1 55% of institutional mechanisms taken to improve planning, management and efficient use of water resources.</p> |
| <p>5. The foundation is laid for food availability, stability, access, and safety amidst increasing climate change risks.</p> | <p>5.1 60% of agriculture officers are advising farmers to implement climate-smart agriculture (CSA) practices.</p> |
| <p>6. The management and conservation of protected areas and other key ecosystems areas has improved.</p> | <p>6.1 Protecting and sustainably managing 20% of Grenada’s marine, coastal and terrestrial ecosystems by 2021.</p> |
| <p>7. The institutional, professional and technical capacity for integrated coastal zone management is built.</p> | <p>7.1 A Coastal Zone Management unit is established by 2020.</p> |
| <p>8. Selected infrastructure is located, planned, designed and maintained to be resilient to climate change, including increasingly extreme weather events; land is managed sustainably.</p> | <p>8.1 All ministries and government agencies with the mandate for land management have the capacity to use spatial data to inform decisions on sustainable land management.</p> <p>8.2 Climate variability and change is integrated into policies and guidelines for physical planning and development.</p> |

| Goals | Indicator(s) |
|---|---|
| <p>9. Funding for the implementation of actions focusing on reducing the risk posed by extreme weather events, as part of NaDMA's 5 year Country Programme (2014-2019) is mobilised.</p> | <p>9.1 At least two project proposals are submitted annually, to potential donors and/or investors, commencing in 2017.</p> |
| <p>10. Climate-sensitive human disease surveillance and control is established.</p> | <p>10.1 Climate information has been included in national disease surveillance system to strengthen the analysis and use of climate-sensitive disease data.</p> |
| <p>11. Institutional arrangements for the collection, analysis and provision of climate-related data for use in decision-making are strengthened.</p> | <p>11.1 The Meteorological Office has established a central repository for climate-related data that is operational with information being shared among agencies by 2020.</p> <p>11.2 The National Hydrological and Meteorological service is established and operationalised to collect climate-related data from all available sources by 2021.</p> |
| <p>12. An informed public that will demand and support public policies aimed at building national resilience to climate change.</p> | <p>12.1 Compared to the 2016 OECS survey, results of a repeated KAP (Knowledge, Attitudes and Practices) survey on Climate Change demonstrate improved results for Grenada by 2021.</p> |
| <p>13. Successful project applications ensure external climate finance support to Grenada's adaptation process.</p> | <p>13.1 The GCF has granted Grenada financial support for readiness activities by 06/2017.</p> <p>13.2 At least 2 project proposals to finance implementation of selected NAP activities are submitted to potential donors and/or investors annually, starting in 2017.</p> <p>13.3 At least 1 proposal for funding of PoA 3 has been submitted to the GCF and/or other potential sources of financing by 12/2017.</p> |
| <p>14. The implementation of proposed NAP measures is documented.</p> | <p>14.1 Assessment reports on the implementation of the NAP measures are released every 2 years and make recommendations on possible adjustments to the implementation process and for the update of the NAP document 2022-2027.</p> |

→ Each goal is linked to a programme of action (PoA) with detailed activities and an approximate budget.³⁵

³⁵ The current budget figure for each PoA is a rough estimate. However, it does provide a very good indication for the financial scope of each PoA. Once detailed project proposals are being developed, these figures will be revisited and revised according to the objective of the proposal.

Programme of Action 1:**Institutional arrangements, inter-sectoral coordination and participation**

Goals — The institutional structure to support coordination, integration and implementation of climate change adaptation action is strengthened.

Indicators —

- At least 12 ministries / agencies each have active CC Focal Points.
- Evidence that National Climate Change Committee meets on a regular basis and is functioning at the national level involving the private sector, CBOs and NGOs (with specific attention given to youth and gender groups).

Approximate Budget — USD 335,000

Policy/Strategic function —

A National Climate Change Committee was officially established in 2001 as an inter-agency body. After being dormant for a few years, Grenada re-established the National Climate Change Committee (NCCC) in 2014 to act as the main oversight body for climate change for the Government of Grenada. It does not implement activities, but rather focuses its efforts on providing guidance and coordination. The NCCC is comprised of 13 government members and four subcommittees:

- 1) Mitigation
- 2) Adaptation
- 3) Finance and sustainable development and
- 4) International negotiations and relations.

All sub-committees can nominate additional members, including from the private sector, civil society and other institutions. Climate change enquiries are directed through the Secretariat of the Committee, the UNFCCC climate change focal point. The Secretariat reports to the Senior Management Board (comprised of all Permanent Secretaries in the administration) and receives feedback from the Board.

Advisory Function —

The Sustainable Development Council (SDC) offers the public, unrestricted opportunity to discuss most of Governments key economic, social and environmental initiatives at their planning, implementation and evaluation stages, including climate change actions. The NCCC Secretariat provides regular updates at SDC meetings and receives feedback from SDC meeting participants.

³⁶ Other government institutions include: Fisheries, Agriculture, Land-Use, Forestry, Works, Health, Education, Physical Planning Unit, Foreign Affairs, Carriacou and Petite Martinique, Prime Minister's Office

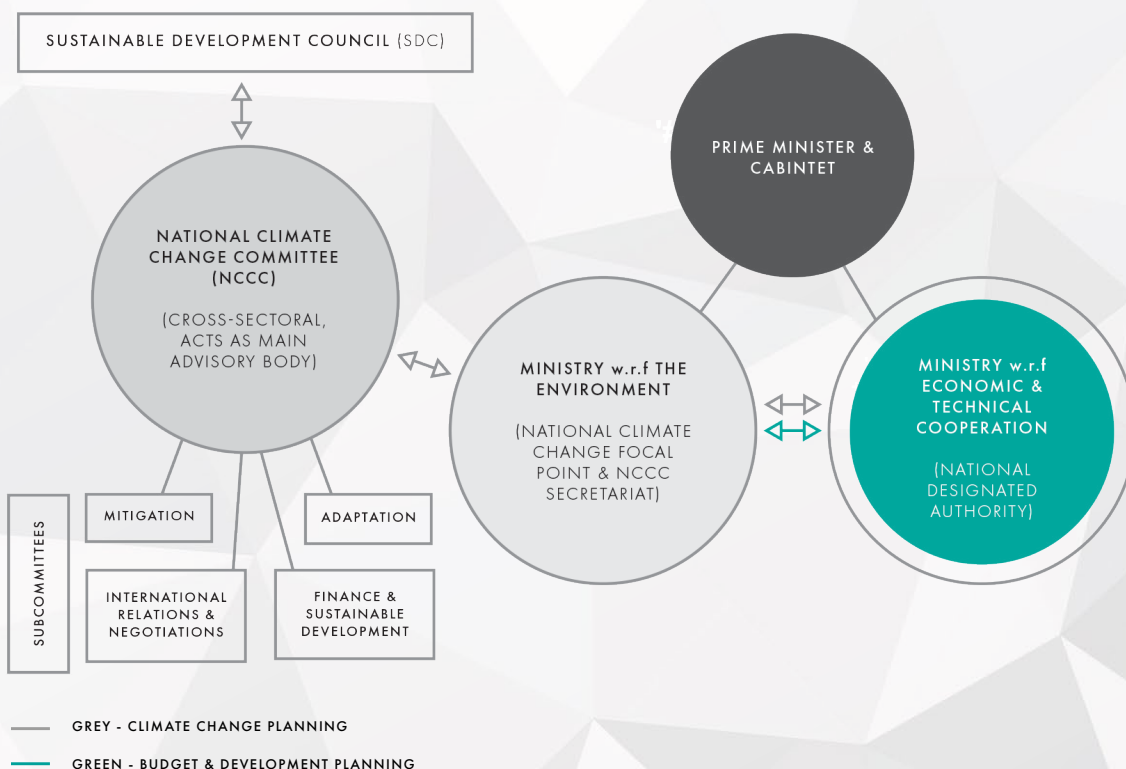
³⁷ Hyogo Framework for Action (2013)

³⁸ Adjusted from: IISD. 2016. sNAPshot: Grenada's Approach to Initiating Sector Integration: <https://www.iisd.org/library/napshot-grenadas-approach-initiating-sector-integration-adaptation-considerations>

Operational Level —

- As of September 2016, the Ministry w.r.f. the Environment coordinates the GoG's climate change adaptation planning and actions. The UNFCCC Climate Change Focal Point of the GoG is based in the Environment Division of the Ministry which is spearheading the NAP process.
- A National Designated Authority (NDA) for the Green Climate Fund (GCF) – the Economic and Technical Cooperation Division in the Ministry of Labour, Economic Development, Trade & Planning – has been established to coordinate activities regarding the Green Climate Fund and to develop guidelines for GCF project development and national consultations. The Environment Division provides technical support to the NDA.
- With respect to project coordination, Grenada does not yet have a mechanism to support coordinating the various global, regional and bi-lateral climate change projects and programmes active in Grenada, Carriacou and Petite Martinique – often funded by international donors. In 2014, the Economic and Technical Cooperation Division in the Ministry of Labour, Economic Development, and Trade & Planning has started to collate climate change (mitigation and adaptation) as well as disaster risk management projects and programmes (domestic, grants and loans).
- Due to its cross-cutting nature, various other Ministries, departments, statutory bodies as well as NGOs, CBOs and the private sector are involved in the implementation of climate change adaptation action in Grenada, Carriacou and Petite Martinique.³⁶
- A well-established institutional framework for disaster risk management (DRM) exists at all administrative levels through the National Disaster Management Agency (NaDMA). The Agency originally established in 1985 as the National Emergency Relief Organization and renamed by a Cabinet Conclusion in 2005 to more adequately reflect its new mandate for comprehensive disaster management, represents a major achievement in risk reduction. The multi-tier organization chaired by the Prime Minister (Minister of National Security) is responsible for coordination of comprehensive disaster management within the State. It comprises an executive group made up of key members of Cabinet and senior policy makers; the National Disaster Office which acts as the Agency's Secretariat; 13 National and 17 District Committees and other key partners.³⁷ Since 2015, the National Disaster Management Agency (NaDMA) is part of the NCCC sub-committee on adaptation. Currently, the UNFCCC focal point has no role within NaDMA's coordination structure.

Current institutional landscape with regard to climate change adaptation³⁸



Priority actions to improve the institutional structure with regard to adaptation planning —

- Increase human resources with regard to climate change adaptation (CCA) within the Environment Division³⁹.
- Appoint a nominee from the Ministry of Carriacou and Petite Martinique Affairs as a Standing Member of the NCCC. The nominee will represent government, civil society (including gender issues) and private sector interests of the people of Carriacou and Petite Martinique.
- Appoint a NaDMA representative as a Standing Member of the NCCC and appointing a NCCC representative as a Member of the National Emergency Advisory Council⁴⁰.
- Establish formal climate change focal points in priority ministries⁴¹ with clear roles and responsibilities. The focal point network will be coordinated by the UNFCCC focal point. The focal points will support the UNFCCC focal point to monitor implementation of sectoral priorities, to support to mobilization funds for implementation and to assist Ministry staff in applying climate risk assessments (CCORAL)⁴² where required in the planning and budgetary process. NaDMA has already identified focal points for various ministries. Where appropriate the same persons should be used.
- Conduct tailored CCA trainings and build capacity of climate change focal points so they are capable of conducting the required tasks.
- Conduct regular focal point meetings coordinated by the Environment Division.
- Establish a Help Desk for CCORAL application in the Environment Division.
- Improve project coordination:
 - Update list of ongoing climate change and disaster projects on a regular basis;
 - Regular/bi-annual meetings of project managers/staff to present ongoing and planned climate change adaptation and disaster risk management activities to avoid duplication, create synergies and learn from another.
- Revamp the Sustainable Development Council to include ongoing climate change and disaster risk reduction.
- Continue SDC meetings on a regular basis.

³⁹ As of November 2016: the UNFCCC focal point is the only officer working full-time on CCA.

⁴⁰ Potential future areas for collaboration could include joint disaster and climate proofing activities and joint awareness raising activities at the community level, for example utilizing NaDMA's district level officers.

⁴¹ Fields to be covered: agriculture, forestry, fisheries, land-use, physical planning, works, health, tourism, met office, Carriacou and Petite Martinique, water, education.

⁴² Caribbean Climate Online Risk and Adaptation Tool: <http://www.caribbeanclimate.bz/general/ccoral-risk-management-tool.html>. CCORAL – developed by the Caribbean Community Climate Change Center - is a system which helps decision makers to see all kinds of activities through a 'climate' or 'climate change' lens, and to identify actions that minimise climate related loss, take advantage of opportunities and build climate resilient development in their countries.



Programme of Action 2:

Systematic integration of adaptation into development policies, plans, programmes, projects, budgets and processes

Goals –

- Climate Change Adaptation is reflected in the process of NSDP formulation and implementation.
- Climate change is systematically considered in new government projects.

Indicators –

- Climate Change Adaptation is a cross-cutting topic in the National Sustainable Development Plan 2030.
- All new Public Sector Investment Programme (PSIP) projects undergo the CCORAL screening.
- 50% of new PSIP projects that have ranked as “high climate change relevance” integrate adaptation considerations into the project design by 2021.

Approximate Budget – USD 650,000

One of two overarching objectives of the national adaptation planning process is:

“To facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate⁴³.”

While it is important to implement ‘stand-alone’ measures to address negative climate impacts and reduce risks, the systematic inclusion of adaptation considerations in planning and decision-making processes, provides a means to anticipate and identify risks across an economy, society or system over time. Integration (also often referred to as ‘mainstreaming’), delivers a sustained approach and is therefore a critical component of the resilience building and adaptation toolbox.

Climate adaptation-oriented policy guidance promotes the ‘entry point concept’, i.e. that systematic integration of adaptation can happen at different levels and steps of planning and decision-making⁴⁴. There are many potential entry points for integrating climate change and there is no blueprint for the most effective points to utilise. For example, integration can take place at national, sub-national, sectoral and/ or project levels and in different areas of decision making such as legislating, policy-making, planning, policy development and budgeting⁴⁵.

This PoA presents the current state of adaptation integration in Grenada and provides a set of priority next steps to strengthen adaptation intergration, moving forward.

⁴³ UNFCCC (2012)

⁴⁴ Eberhardt. (2013)

⁴⁵ GIZ. (2013). A Closer Look at Mainstreaming Adaptation.

The Government of Grenada (GoG) has already made good progress in integrating climate risk and adaptation considerations into development planning and processes.

The Government of Grenada (GoG) has already made good progress in integrating climate risk and adaptation considerations into development planning and processes. For example, adaptation considerations were integrated into the National Agriculture Plan, into the MoALFFE's 2015-2017 Corporate Plan, into the Growth and Poverty Reduction Strategy (2014-2018) and the Coastal Zone Policy. A series of trainings have been conducted for state and non-state actors on how to routinely integrate climate change adaptation into legislation, policy, planning, programmes, projects and budgets. More than 70 technical officers were sensitised in the use of the Caribbean Climate Online Risk and Adaptation Tool (CCORAL). CCORAL is a tool which helps decision-makers to see all kinds of activities through a 'climate' or 'climate change' lens, and to identify actions that minimise climate related loss, take advantage of opportunities and build climate resilient development.

However, integration has tended to be on a one-off or pilot basis. The current focus is on having a requirement for systematic integration via specific entry points over the short, medium and long term. Listed below are the most recent and current entry points identified by the GoG to integrate adaptation into development activities:

1. National development plans
2. Sectoral policies and plans
3. Projects and budgets
4. Environmental Impact Assessments (EIAs).

Priority Actions —

Having demonstrated its technical ability to deliver adaptation integration on an ad hoc basis, the GoG is now focused on targeting strategic integration entry points where there is a possibility for significant adaptation impact and/or systematic integration, a window of opportunity to utilise the entry point and stakeholder support for implementation. Cognisant of possible entry points, strengths, opportunities, weaknesses and threats, the NCCC supports the integration of adaptation into the following four entry points⁴⁶:

- The National Sustainable Development Plan (NSDP) 2030
- Sectoral Corporate Plans (with a focus on priority sectors)
- The Public Sector Investment Programme (PSIP) approval process
- Environmental Impact Assessments (EIAs).

The NCCC has also endorsed an improved integration of disaster risk management and climate change adaptation practice. The following section broadly describes how this integration will be conducted.

The National Sustainable Development Plan (NSDP) 2030 —

The current development of the NSDP offers a window of opportunity for integrating adaptation and an opportunity for significant impact. By including adaptation into key sections of the NSDP (including Good Governance, Economic Sustainability, Social Inclusion and Environmental Sustainability), a driver will be created for climate proofing of flagship development activities and sectoral corporate plans.

Sectoral Corporate Plans —

The annual development of Corporate Plans with associated annual budget estimates offers an entry point for systematic consideration of adaptation by GoG ministries. To ensure that adaptation is integrated into Corporate Plans, a number of mechanisms are being put in place.

The first is the integration of adaptation into the NSDP (as referred to previously). Second is the inclusion of a requirement for Permanent Secretaries to report on climate change adaptation performance in the new annual Permanent Secretary (PS) Performance Agreements between each PS and the Cabinet. The appointment of climate change focal points within priority ministries will drive the inclusive of adaptation measures/climate proofing in annual Corporate Plans (see PoA 1). Fourth is the sensitisation of PSs on the importance of integrating climate risk and adaptation into development planning.

⁴⁶ It is important to note that additional entry points have been explored with key stakeholders which have not been presented in the NAP. Two additional entry points were discussed. First, in addition to systematic climate screenings as part of the Government's Public Sector Investment Programme, private investments could also be targeted. Suitable partners for initiating discussions for the use of CCORAL to screen investments in the private sector are the Grenada Industrial Development Corporation (GIDC), the Grenada Chamber of Commerce and Industries (GCIC) and the Grenada Citizenship by Investment (CBI) Programme. Second, the three year Medium Term Expenditure Framework (MTEF) and annual budgets could be targeted. It was agreed with representatives from the Budget Division of the Ministry of Finance, that it would not necessary to introduce an additional process for integrating adaptation into these, as integration into Corporate Plans would be sufficient to drive integration into budgets. This is a pragmatic approach given limited human resource capacity in Grenada and in the Budget Division. Nonetheless, the NAP's principle of monitoring, evaluating, reporting and iterating will provide opportunities to revisit these decisions over time.

The Public Sector Investment Programme (PSIP) approval process—

Grenada is currently investing in a streamlined approval process for the PSIP to allow the Economic and Technical Cooperation Division (DETC) to review and approve government projects in a systematic manner prior to Cabinet review. The development of this process offers another window of opportunity for systematic integration of climate risk and adaptation consideration. The Caribbean Climate Online Risk and Adaptation Tool (CCORAL) has been selected as the means to consider climate risk and adaptation within the PSIP process, by applying its quick screening exercise to all applications and in some cases, following its more detailed analysis guidance. CCORAL is considered an effective tool given its successful application in Grenada, endorsement by Cabinet and the fact that over 70 Grenadians have already been trained in its application.

Environmental Impact Assessments (EIAs) —

The Physical Planning Unit (PPU) of the GoG is mandated to request and approve EIAs for private developments of a specific size. Members of the PPU have already integrated a need to report on risks from climate change and adaptation responses in past requests for EIAs and are interested in integrating this routinely. This offers another opportunity for systematic integration. In order to facilitate inclusion, the terms of reference for EIAs will be amended; a guidance document on capacity building / how to integrate climate projections into EIAs will also be provided.



Programme of Action 3: Water Availability

Goals — A climate-responsive water governance structure is established.

Indicators — 55% of institutional mechanisms taken to improve planning, management and efficient use of water resources. by 2021.

Approximate Budget — USD 50.2 million

Short Vulnerability Section —

Climate change poses a severe threat to Grenada's water supply, given that it relies on surface water sources and rainwater catchment. Although there are watershed areas in Carriacou and Petite Martinique, catchment and storage capacity are much less. Hence rainwater harvesting and desalination activities are implemented to supply water needs.

Although 54,600 cubic metres of water are available on mainland Grenada during the rainy season, yields drop to 31,800 cubic metres during the dry season. Whereas, demand is 45,500 cubic metres during rainy season and 54,600 cubic metres during dry season. Along with the increase in average temperature due to climate change, this deficit causes a serious current and potential threat as annual rainfall is projected to decrease by up to 21%, which will lead increasingly to droughts.

Saltwater intrusion into coastal groundwater aquifers, due to sea level rise will further limit the availability of water in the future. In addition, the projected increased frequency of heavy rainfall events will aggravate the problem of more frequent water supply outages due to high turbidity in the raw water supply. Additionally, infrastructural damage from extreme weather events (hurricanes, storms and flooding) may interrupt reliable water distribution during and after a weather event.

Apart from climate change, environmental degradation presents a number of challenges. Population growth and tourism expansion, have contributed to reductions in stream and river flow volumes, increased siltation of dams and reduced groundwater recharge rates. Agricultural activities have also contributed to ground water pollution and increased demand for irrigation. These factors therefore affect the quality, quantity and availability of surface and groundwater supplies. Based on this, the water sector has been identified in a number of national policies and strategies as a key sector affected by climate change.

Current Status —

- A vulnerability assessment and an action plan for the water sector in Grenada are available. A more detailed vulnerability assessment is available for the Chemin watershed. The majority of proposed actions in this PoA were taken from the existing action plan and adjusted where required.
- A National Water Policy and a draft drought plan are available.
- A draft Green Climate Fund (GCF) proposal was developed for the water sector entitled "Climate Resilient Water Sector in Grenada (CREWS)". Some actions listed in this PoA have also been included in the proposal.

- Rainwater harvesting in Carriacou and Petite Martinique is the standard traditional practices for water supply. The very first community rainwater harvesting system was commissioned by NaWaSA in Blaize, St. Andrew's on mainland Grenada. Some public buildings (e.g. schools) and private persons (e.g. farmers) have rainwater harvesting systems installed, but this is not standard practice in Grenada.
- Salt-water reverse osmosis plants (SWRO) have been installed in Carriacou and Petite Martinique. Some private hotels in Grenada also have private SWRO plants.
- A UNFCCC Technology Needs Assessment (TNA) with a focus on water was conducted. The following relevant technologies were identified in TNA report: desalination, borehole, micro-sprinkler and drip irrigation, mini-dam, water reclamation and re-use, household drinking water treatment and safe storage, leak detection and management, water efficient fixtures and appliances.
- Compared to other sectors, various documents, reports, studies and data are available for the interface water/adaptation in Grenada, Carriacou and Petite Martinique.
- A National Water Information System (NWIS) was established and is available. It is hosted by the Land-Use Division in the Ministry of Agriculture, Lands, Forestry and Fisheries.
- Leak detection devices were procured and training was conducted.
- An assessment of Grand Etang Lake was completed.

Priority Actions —

Objective 1:

Improve policy, legal, regulatory and institutional framework for the water sector

- Update the National Water policy (2007) to include climate change considerations.
- **Develop a watershed master plan for Grenada, Carriacou and PM:**
 - Complete detailed mapping of the different soil types of the watersheds, spatial variability and depth range of different soil types.
 - Analyse satellite data for change in soil pattern and ground truth with field data.
 - Improve the land use classification system as per the standards used in the Caribbean, and update the land use map for each watershed. Note the change in the land use pattern for the last ten years from satellite images as well as from aerial photographs.
 - Prepare draft Watershed Plan using the "Ridge to Reef" approach.
 - Conduct consultations.
- **Develop a Water Resource Master Plan:**
 - Integrate climate variability, land use change and the impact of increased urbanisation and population on available water resources in the new water resource report or master plan.
 - Conduct consultations.
 - Implement the new water resource master plan.
- Revise and expand GDS 79: 2006 "Specification for effluent from industrial processes discharged into the environment".

- Promulgate regulations for monitoring of existing water quality.
- Promulgate regulations to establish and enforce standards and specifications for effluent discharges into receiving surface, underground or coastal waters.
- Revise fines for current legislation, specifically the Public Health Act and Regulations.
- Improve enforcement of existing legislation (public health, water legislation and other related legislation), through the provision of the necessary support from relevant government agencies
- Provide incentives for the procurement of low-volume and low energy faucets.
- Make rain water harvesting and storage (at least 3 days supply), mandatory for all new buildings in Grenada, CPM (including industries, government). Develop incentives for engaging in this activity/strengthen rain-water harvesting. Encourage rainwater harvesting for agriculture.
- Implement the National Drought Management Plan.
- **Develop an improved methodology for acquiring meteorological and hydrological data:**
 - Update data on all existing water resources (surface and ground) for Grenada, CPM, including the exact location of rain gauges in each watershed.
 - Develop a policy for data collection and training for staff on the importance of data.
 - Audit equipment used for data collection for rainfall and water resources. Identify gaps and update them.
 - Install flood gauges to determine the level of flood waters after each event within the Chemin watershed.
 - Train community members and the staff of NAWASA and the Ministry of Health and Environment, to read flood gauge data to create spatial maps from successive flooding events.
- **Establish a framework and policy for water access:**
 - Undertake an analysis of the amount of water needed for each housing area monthly. Update the present data base and allocate allowances for population increases over at least a ten year period.
 - Analyse the seasonal change in consumption with variation in rainfall pattern.
- **Upgrade the national water information system online data access platform:**
 - Conduct an Information Technology Needs Assessment (infrastructure and institutional) for government departments that manage hydrological and meteorological data.
 - Upgrade the data management platform for each department.
 - Upgrade Information Technology equipment and develop skill sets.
- Create a central coordinating agency, a Water Resource Unit (as proposed in Water Policy). This unit will be responsible for the management of water resources in a holistic manner.
- Assess the implementation of the National Water Sector Policy (2007) so far including its implementation in CPM.

- **Develop water balances for each major watershed:**
 - Calculate monthly water-budgets for each basin along with a final yearly water budget.
 - Conduct continuous analysis of the water budget using the rainfall, evaporation and storage data to enable the effective management of water availability and projection into short, medium and long term time periods.
- **Re-engineer the storm water drainage system across the tri-island state:**
 - Assess the current drainage system; identify where new drains are needed and which existing drains need widening, re-grading etc. Prioritize flood prone communities and thereafter, the major townships.
 - Undertake preliminary engineering design work.
 - Select and clean silt from the mouth of rivers.
- **Increase surface storage and improve the distribution system (including addressing leaks):**
 - Conduct a feasibility study to determine the best locations for additional surface storage and the type of storage.
 - Based on existing plan for improving the distribution system, mobilise additional investments.
 - Quantify losses within the distribution network/ reservoirs.
 - Develop a plan reducing water loss including identification of leakage hot spots.
- **Implement Water Resources Investment Programme.**
 - Develop alternative modalities for water resources (solar-powered desalination plant, community-based rainwater harvesting).
 - Develop and start the implementation of a reforestation programme to improve water catchment.
- **Develop / revise water tariff rates.**
 - Determine water pricing towards sustainable water services. Components will be 1) Water policy objectives and water pricing; 2) Water pricing mechanisms and instruments: levies, taxes and charges.
 - Analyse the revenue potential and administrative complexity of alternative pricing instruments.
- For Carriacou/PM: rehabilitate/repair existing water catchment areas and improve watershed management including the Dumfries dump.
- For Carriacou/PM: extend a reticulated water supply system to the main communities in the northern half of the island, from the Salt-Water Reverse Osmosis plant located at Beausejour.
- Develop public education and media campaigns on the impact of climate change on the water resources.
- Promote water reclamation and re-use technologies, specifically in tourism and industry sector.
- In Carriacou /PM, provide community advisory bulletins on a continuous basis on water consumption patterns using data from the Salt-Water Reverse Osmosis plant.

Programme of Action 4:

Food security

Goals – The foundation is laid for food availability, stability, access, and safety amidst increasing climate change risks.

Indicators – 60% of agriculture officers advising farmers to implement climate-smart agriculture (CSA) practices.

Approximate Budget – USD 46 million

Grenada's mountainous topography means that its steep to moderately steep sloping lands are vulnerable to storms, heavy rainfall and sometimes landslides. This also means that only an estimated 3% of agricultural lands could be lost, which could incur annual costs of US\$4 million in 2050 due to 1 m sea level rise. This means that the direct impacts of sea-level rise on mountainous agricultural lands would be reduced. However, widespread damage to agricultural systems is expected from salt water intrusion into coastal aquifers. Changes in rainfall and temperature raise serious concerns; lack of water available to the agricultural sector and an increasing need for irrigation; heavy rains which erode agricultural soils, damage crops and lead to increased fertilizer runoff all of which are a threat to the integrity of the marine environment including marine protected areas. In November 2009 to June 2011, Grenada experienced the driest drought period (DSD, 2011). Long dry spells can lead to temporary food scarcity and reduced productivity of grazing pastures. Lower animal yields are expected especially in Carriacou due to reduced grass yields.

The priority categories of commodities in the agriculture sector are: traditional tree crops (nutmeg and cocoa), fruits, vegetables, roots and tubers, livestock, and herbs and spices. The climate change impacts on the various commodities are predicted as follows:

Nutmeg - The shallow root system of the nutmeg tree makes it vulnerable to torrential rain and high wind. It contributes to soil and watershed protection in upland areas and is drought resistant. However, water availability would limit its growth. Additionally, the nutmeg belt could be pushed to higher elevations, reducing capacity of water producing watershed.

Cocoa - The cocoa is deep rooted making it more resilient to tropical storms and the organic mulch formed by the fallen leaves retains soil moisture and reduces soil erosion.

Fruit trees - Water availability threatens the growth of trees.

Vegetables - Water availability threatens production. Heavy rains can erode soils, damage crops and lead to fertilizer run-off into marine environment.

Roots and tubers - These are relatively resistant to irregular rainfall and hurricane damage.

Livestock - Drought leads to food scarcity and reduced productivity of grazing pastures resulting in decreased animal yields. High temperatures result in heat related stress, and housing for livestock is vulnerable to extreme events. There is also a high dependence on importation of animal feed which can result in increased vulnerability in respect of a reliable source feed. Carriacou is particularly vulnerable since 30% of the total livestock population is produced there.

Crop pests - It is not clear as yet in which way climate change will impact on the spread of pests affecting crops.

Fisheries - Grenada's fishery is largely artisanal and small-scale in nature but in recent years, the sector has been becoming more commercial in operations in order to increase earnings and employment, contribute to food security, and assist in reducing poverty. Fishing, along with farming, is one of the most reliable sources of employment in many rural and/or coastal communities. However, climate change will have negative impacts on ecosystems that are important to various life stages of commercial fish, coral reefs, sea grass beds and mangroves. Possible consequences are a reduction in the abundance and diversity of reef fish, with implications for livelihoods, food security and the availability of seafood for the tourism sector.

Warmer waters caused by increasing temperatures may drive pelagic species away from the tropics in search of cooler temperatures and could potentially alter breeding and migration patterns. Changes in global temperature, sea levels, sea-ice extent, ocean acidification and salinity, rainfall patterns and extreme weather events will decrease the range of many marine mammals e, g. whales.

Grenada's food security therefore is highly vulnerable to the impacts of climate change which will lead to economic losses, including foreign exchange.

Current Status —

- There are a number of examples of sustainable agriculture and organic farming throughout the country.
- Different documents have identified disaster and climate-smart practices for the agricultural sector in Grenada, amongst them; diversified cropping systems (strip cropping and mixed intercropping), integration of agro-forestry practices in the cropping system, soil erosion control structures and practices (contour farming and grass barriers) and routine tree management (pruning and top-working).
- Subsidies are provided for farm irrigation systems.
- Rainwater-harvesting systems for irrigation at farm level and irrigation advisory support are provided.
- Rudimentary early warning system in place ("Agricultural newsletter") but the system needs to be more robust, systematic and information needs to be better communicated.
- Technical agricultural officers have been trained in sustainable agriculture and permaculture practices.
- The Mirabeau Propagation Station was established as a climate-smart agriculture demonstration site and various permaculture model farms were established.
- Support was provided for farmers to establish composting sites.
- Implementation of sustainable land management practices as pilot projects.
- Climate-smart agriculture approaches were integrated into 2016 work plan of Corporate Plan of the Ministry of Agriculture.
- Small-scale biogas systems to reduce waste/pollution are currently being tested at various farms.
- A License to Burn program to reduce/control burning is operating within the Ministry of Agriculture.

- An index-based insurance product is available for farmers. The Livelihood Protection Policy (LPP) is being offered in Grenada through Trans-Nemwil Insurance Limited in collaboration with Grenada Co-Operative Bank Limited and Grenville Co-Operative Credit Union. The LPP aims to protect low-income earners, including small-holder farmers as well as day labourers in other sectors, with the intention to cover losses to people's livelihoods caused by heavy rainfall and high winds. However, it seems as if the policy is not widely known or bought.
- Limited fish stock data available.
- Fish aggregated devices (FAD's) have been installed at various locations. Other selected livelihood initiatives for fishermen have been implemented.
- A Fishermen Communication Network was established to enable fishermen to extend their fishing range as a result of fish migration. This includes audio communication, BNF Network.

Priority Actions —

Objective 1:

Improve availability of sector-specific climate vulnerability data

- Undertake technical vulnerability analyses to improve understanding of survival and productivity of current crop varieties and consideration of alternatives;
- Conduct a vulnerability assessment of the agri-food sector, including Grenada's dependence on imported food and the associated vulnerability;
- Undertake technical vulnerability analyses to improve understanding of the impacts of climate change on marine fisheries stocks;
- Improve collection and analysis of data on Grenada's fish catch (data to be disaggregated, sheets to be updated).

Objective 2:

Improve policy, legal, regulatory and institutional framework to support climate-smart practices in agriculture and fisheries

- Integrate climate change considerations applying the Climate Change Risk Adaptation Tool (CCORAL) in at least two (2) programmes and/or policies for the agriculture and fisheries sector;
- Create incentives for the implementation of climate-smart agriculture practices;
- Introduce a construction code for hurricane resistant poultry units;
- Develop a food and nutrition security warning system for food supply inadequacies for local and export market needs;
- Approve and implement (draft) National Drought Management Plan.

Objective 3:**Build capacity and provide technology options which ensure food security**

- Train more agricultural technicians in climate-smart agriculture techniques and in monitoring the application of the new techniques. In particular, promote the use of more drought resistant crops by farmers, particularly in the Chemin Watershed by conducting training for farmers on dryland farming techniques which would accommodate less usage of water beyond drip irrigation mulching and introduce farmers to drought resistant crops/diversify crop production;
- Establish four (4) climate-smart agriculture demonstration sites highlighting different technologies and techniques;
- Increase technological options and solutions that offer resilience to climate change in the areas of production, post-harvest handling and agro-processing;
- Implement rainwater harvesting (RWH) and water storage and distribution projects that adopt water management practices and technologies, including the development of RWH ponds in such a way that one pond can be used by a number of farmers, thus minimizing the loss of land area;
- Involve farmers and fisher folk in the development and implementation of diverse projects to adapt to potential changes in the landscape (involving: agro-forestry, apiculture, aquaculture, livestock, etc);
- Promote the use of hydraulic ramp pumps;
- Design and implement a response to the results of the mapping of soil fertility for sustainable agriculture in Grenada (an old map from the 50s is currently being reviewed);
- Establish a farmer field school programme to create a platform of exchange for farmers to learn from other farmers who are currently implementing climate-smart agricultural practices;
- Maintain and recover genetic resources necessary for sustainable agriculture, e.g. by establishing agricultural crop gene banks and implementing local seed distribution programme for vulnerable households.

Objective 4:**Enhance social protection for farming and fishing communities**

- Investigate agriculture/fishing insurance options and new risk transfer instruments and develop respective policies and incentives.

Objective 5:**Improve understanding of and knowledge about climate impacts, vulnerabilities, risks and resilience options**

- Provide hands-on systematic climate change information to farmers and educate farmers about adaptation measures;
- Develop educational campaigns for farmers/extension officers on soil conservation practices, water conservation measures and soil water management systems and practices. Educate fisher folk on use of sustainable fishing practices e.g. appropriate fishing equipment.
- Develop an educational programme to avoid destruction of, whilst encouraging the establishment of windbreaks;
- Adapt traditional pest management techniques and increase farmers' knowledge of these techniques.

Objective 6:

Mobilise funding for further resilience-building measures to ensure food security

- Develop and mobilise resources for implementing a national fire prevention programme for the agricultural sector;
- Develop and mobilize resources to implement a programme of capacity-building for food insecure and vulnerable households to mitigate against livelihood losses from a variable and changing climate;
- Diversify away from low yield/low return agricultural production by developing an Agricultural Export Development Training grant to support the relevant government agencies in marketing and promotions, product development and quality;
- Develop at least one larger project proposal to support food security in times of climate change induced stress on the food production sector;
- Develop a disaster management investment fund to support farmers to mitigate and respond to climate impacts and challenges.



Programme of Action 5:**Ecosystem Resilience**

Goals – Improve management and conservation of protected areas and other key ecosystems areas.

Indicators – Protecting and sustainably managing 20% of Grenada’s marine, coastal and terrestrial ecosystems by 2021.

Approximate Budget – USD 26.6 million

Climate change related variations in temperature, seasonal precipitation and extreme weather events, will exacerbate the effects of existing human stressors on forest ecosystems, the building and construction industry and agriculture. Decreased rainfall and increased average daily temperatures could result in a loss of rainforest zones and their possible migration to higher elevations. The structure and dynamics of tropical dry forests are driven by periods of water stress, making them vulnerable to climate change. There are increased fire risks and soil erosion and decreased water availability and pollination rates. Forest fires result from human interaction with the forest coupled with extreme dryness from droughts, leading to destruction of vegetation. Mangrove habitats are exposed to direct storm impacts and are cut down for coastal development. They are also vulnerable to projected climate change impacts such as; alterations to coastal habitats from storm surges, increased tidal action and flood durations. Sea-level rise could lead to increased salinity within coastal habitats. There are also non-climate stressors such as; charcoal production, construction, cattle grazing and crabbing. Hurricanes can also cause serious damage to forest and forest infrastructure. Sea level rise, beach erosion, and flooding caused by heavy rains threaten the coastal areas.

The damage caused by these events is made worse by destructive practices such as sand mining. Sand mining, sedimentation and careless recreational activities reduce the aesthetics and integrity of these natural resources. These threats reduce the quantity and quality of goods and services that these eco-systems provide and decrease their resilience to climate change impacts. Coral reefs play an important role as a marine ecosystem. They act as a natural barrier to storm surges and are a major tourism draw for the Caribbean. However, they have collapsed in many places, mostly due to overfishing and climate change. Warmer water can result in coral bleaching and disease outbreak. Additionally, increase in carbon dioxide that dissolves into the ocean causes ocean acidification which damages and destroy corals. Storm surges and hurricanes have degraded the coral reef further. Floating trash can also block sunlight, which adversely affects coral reef growth, often damaging marine life, such as fish and turtles. Other human stressors are; coral mining for construction and souvenirs, tourist resorts dumping sewage directly into the water, and boaters, divers, and snorkelers damaging the reefs through carelessness.

In Carriacou, the Sandy Island/Oyster Bed Marine Protected Area is 787 hectares consisting of Sandy Island, Mabouya Island and the surrounding seas. It is within close proximity to the capital of Carriacou (Hillsborough). The priority resources for conservation being the coral reefs, mangroves, sea turtles, beaches, offshore islands, reef fish, and sea grass beds. On mainland Grenada, the Moliniere-Beausejour Marine Protected Area (MPA) stretches from Moliniere point up to Brizan, including Dragon, Flamingo and Beausejour bays. Key hydrological features of this MPA are the rivers (Beausejour and Moliniere), that drain into it. The threats to the MPA are from low abundance of grazers on the coral reef, high nutrient concentrations resulting from run-off from neighbour communities, storm surges and hurricanes.

Current Status —

- A review of environmental legislation has been conducted.
- Marine Protected Areas have been established under the Fisheries Act (Woburn/Clarks Court Bay, Moliniere/Beausejour and Sandy Island/Oyster Bed). Furthermore, stakeholder advisory committees have been formed for the Moliniere/Beausejour & the Woburn/Clark's Court Bay Marine Protected Areas.
- Planned MPAs/Managed Marine Area (MMA) for Grand Anse and Gouyave.
- A communication strategy has been developed for the MPAs.
- An MPA management action plan is available for Moliniere/Beausejour and Sandy Island Oyster Bed.
- New mooring and demarcation fields have been established in the Moliniere/Beausejour MPA and Sandy Island Oyster Bed.
- An MPA water quality testing has been initiated.
- Options have been identified to reduce pollution in Richmond Hill Watershed which leads into Woburn MPA.
- As part of the Caribbean Challenge Initiative, the Government of Grenada pledged to protect 25% of near shore marine and coastal environment by the year 2020.
- Coral nurseries for ecosystem-based adaptation were established at Quarantine Point, and Mabouya, Carriacou. Others are planned.
- A Reef Guardian Programme has been initiated, to reduce the amount of nutrients in MPA watershed. This was performed with the North-East Farmers Organisations, farmers in Moliniere and those at the Happy Hill Secondary School.
- An ongoing lionfish containment programme has been delivered through private initiatives of different dive shops and the Fisheries Division. Selected restaurants are offering lionfish on their menu.
- An artificial reef program has been implemented in Grenville Bay to reduce coastal erosion and re-establish a natural buffer.
- Regular biophysical monitoring of coral reefs is planned, using a report card, reef checks and the Atlantic and Gulf Rapid Reef Assessment (AGRRA). It will involve all MPAs and other selected areas including Levara, Gouyave and Grand Anse.
- Various public awareness programmes are being undertaken to raise awareness about ecosystem services and their relevance for climate change adaptation - (Grenadian Soca star as MPA Ambassador, MPA summer camps, murals, mangrove awareness activities, beach and underwater clean-ups etc).
- A closed season/legislation for catching sea urchins, lobster, conch and turtles is implemented.
- Various mangrove rehabilitation efforts are taking place in the south, along the east coast and in the north of Grenada, including educational information displays (private, schools, project-funded).
- A complete inventory of forest types and compositions has been completed by the forestry division. A new nursery has been established.
- Reforestation activities at the St. David's watershed and at Grand Etang have been implemented by private sector partners and schools.

⁴⁷ <http://maps.coastalresilience.org/gsvg/>

- The RAMSAR list of wetlands of international importance has been annotated to include the Levara wetland.
- A mangrove inventory was completed by Gregg Moore et.al providing estimates as to the extent of Grenada's mangrove distribution. The mangrove mapping is available as part of The Nature Conservancy's (TNC) coastal resilience tool.⁴⁷
- A review of the available literature on the success of conservation and adaptation actions implemented to address the vulnerabilities of dry forest ecosystems to the effects of climate change, was conducted.
- Grenada dry forest biodiversity/conservation programme is being implemented at Mt. Hartman and Perseverance.
- River basin management activities have been implemented by community-based organisations in the St. John's watershed and the Concord watershed.
- A 'Ridge to Reef' approach is being piloted in the Annandale/Beausejour watershed.

Priority Actions —

Objective 1:

Improve policy, legal, regulatory and institutional framework to increase the resilience of important ecosystems

- Develop and update existing legislation to include co-management, control the use of mangroves and to allow for contractual agreements between owners, users and government. This will support mechanisms for management of mangroves and marine protected areas by community led organizations.
- Finalise Draft Sustainable Development Trust Act and enforce once enacted into law.
- Develop options for improved marine life stock (ban, closed seasons etc).

Objective 2:

Improve availability of ecosystem data and strengthen monitoring of critical ecosystems, with a particular focus on Protected Areas

- Collect and analyse information on the Molinière-Beauséjour MPA, Woburn MPA and Sandy Island MPA and produce a MPA-specific database that can be accessed freely and searched by all concerned stakeholders - including water quality testing for all MPAs on a monthly basis and identify data-sharing arrangements within Government (for example: Health, Land Use, NAWASA etc).
- Continue coral reef monitoring programme in correlation with diving pressure to define the limit of acceptable change in relation to diving frequency or maximum number of divers in one location at one time.
- Continue and expand monitoring and reporting on the lionfish population.
- Update mangrove map on a regular basis and include key coastal woodland areas and identify ownership of mapped areas to strategically (re)plant littoral and mangrove forests.
- Conduct vulnerability assessment for dry forests to assist and inform decision making regarding planning sustainable livelihoods.

Objective 3:**Strengthen ecosystem resilience whilst providing livelihood options**

- Expand the MPA network by establishing five new MPAs in order to meet the goal of the Caribbean Challenge Initiative goal. This is to include Grand Anse (other areas for consideration are Gouyave, Levera, south-east coast and White Island).
- Develop an MPA Policy and Action Plan (involving: broad consultation, clear marking of areas).
- In Carriacou - implement actions ranked as “high priority” in Sandy Island Oyster Bed MPA action plan (2015-2025). (E.g. develop zoning plan for the MPA that includes “no take” areas and other areas that permit non-destructive fishing practices. Additionally and in consultation with the public, maintain mooring buoys, remove derelict vessels and other debris).
- Establish new and expand existing coral nursery and artificial reefs in conjunction with local coastal communities for coastal protection and research and use – where environmentally appropriate - for dive marketing.
- Adopt current ‘Ridge to Reef’ approach in Moliniere/Beausejour in other watersheds adjacent to MPAs.
- Provide infrastructure support for the management and enforcement at new and existing MPA sites through implementation of mooring buoys, patrol boats, field offices for rangers etc.
- Expand existing lionfish management programme to include training of fishers in the collection and handling protocol, and training of the first aiders/medical responders.
- Develop and implement a re-forestation plan and programme to replant degraded forests in a climate-sensitive manner and identify and implement livelihood actions that support forest protection and management.
- **Implement a tree planting programme that will:**
 - o contribute to: reducing soil erosion, improving soil fertility, beautifying and enhancing the environment, providing timber and other products and maintaining biodiversity;
 - o encourage stakeholders (e.g. schools and other community groups/organisations) in tree planting in urban and rural areas;
 - o create incentives for tree planting on private lands;
 - o distribute tree seedlings to communities, via the Forestry Department;
 - o strengthen the Forestry Department’s extension services to control the indiscriminate cutting of trees.
- Identify sustainable practices for harvesting mangroves and implement programmes to promote sustainable use and protection of mangroves, including community co-management and alternative livelihoods.
- Develop a programme to manage bamboo (which can be considered for charcoal production), mongoose and other invasive species.
- Use and further develop pilot projects to encourage participation of tourists in ecosystem management related efforts (e.g. charges for lionfish hunting, “adopt a mangrove”, “adopt a coral” initiatives) and improve marketing of relevant eco-tourism sites.
- Research options to deal with influx of sargassum and develop a plan of action to harvest and exploit the usefulness of the sargassum seaweed by networking with other OECS states, French Caribbean islands and UWI to learn and share experiences.

- In Carriacou and Petite Martinique;
 - o replant and replace the lost mangrove population island-wide;
 - o eliminate inappropriate disposal of solid waste;
 - o mobilise resources to implement (fully or in part) the “Coastal Restoration Plan for Carriacou and Petite Martinique” developed by OECS.
- In Carriacou: mobilise funds for the rehabilitation of severely degraded lands in Belle Vue South due to overgrazing, neglect and poor overland water management.

Objective 4:

Increase awareness about ecosystem-based adaptation and its benefits for sustainable development and coastal protection

- Conduct public awareness, educational and interpretation activities and provide information sessions for local communities, concerned authorities and stakeholders to; i) raise public awareness; ii) highlight the values, potential benefits and vulnerability of the MPA resources; iii) increase awareness of the value and vulnerability of coral reefs; iv) bring attention to the negative impact of inappropriate practices such as sand mining or non-selective fishing and v) identify the MPA zoning and rules, applicable regulations and enforcement.
- Conduct ecosystem valuation studies in key coastal areas to promote the benefits of ecosystem conservation and restoration as a means to reduce vulnerability to climatic hazards.
- Conduct participatory mapping activities together with communities, government officials and the private sector, so as to understand and identify coastal assets and ecosystem services, within key areas.
- Expand the ‘Reef Guardians’ outreach and education programme from Moliniere/Beausejour MPA to all other MPAs.
- Raise awareness about the role of herbivores in reef health.
- Organise and participate in information sharing events (conferences, seminars) about marine management.
- Increase awareness of the importance of mangroves.
- Promote more consumption of lionfish.

Programme of Action 6:**Integrated coastal zone management**

Goals – The institutional, professional and technical capacity for integrated coastal zone management is built.

Indicators – A Coastal Zone Management unit is established by 2020.

Approximate Budget – USD 15 million

Coastal resources and infrastructure are threatened by intense weather and tropical storms which cause high winds, storm surge events and coastal flooding. Gradual and slow onset events (increases in sea surface temperatures and changes to other ocean parameters e.g. acidity, currents) will have negative impacts over time on coral reef and seagrass bed ecosystems, and the marine life that depend on the health of these systems. Dramatic changes can occur to beach profiles during a storm or hurricane event and although recovery occurs, it may not be to pre-event conditions. In addition to the natural assets, another area of critical importance is the threat of beach erosion to the majority of existing tourism facilities in areas located near the coastline (e.g. Grand Anse, Carenage, Marquis and Soubise). The greatest total land (206,133.88m²) and beach loss (54,508.88 m²) due to sea-level rise (SLR) is projected to occur in Grand Anse. Resorts impacted in this region include the Allamanda Beach Resort, Coyaba Beach Hotel, Spice Island Resort and Flamboyant Hotel. There are no beaches on the Carenage (harbour in the capital). However the total land loss from SLR, is estimated to be 18,859.95 m². Marquis is projected to have the second greatest loss of beaches (after Grand Anse), at 4,076.53 m²; with a total land loss of 9,282.35m² as a result of SLR. Total land loss at Soubise due to SLR is projected to be 13,752.85 m² (with total beach loss of 3,183.17 m²).

Coastal aquifers are threatened by seawater intrusion from SLR, and this is exacerbated by a decrease in groundwater recharge through over-abstraction and decreasing rainfall. The major open wells in Carriacou and Petite Martinique are within 100m of the shoreline thus making them highly vulnerable to salt water intrusion from SLR. Storm surge events caused by tropical storms and hurricanes can also cause extensive damage to aquifers. This risk of damage increases with higher sea-levels since this makes it easier for contamination to occur during storm surges.

Although not confirmed as a climate change related event, the Sargassum seaweed phenomenon (landing in unusually large quantities) may be a result of above average tropical storm activity in the Sargasso Sea. There is also concern over the risk of disease and invasive species that may accompany the seaweed.

Even with all these vulnerabilities, there is currently no management framework and very little expertise on island to assess and manage these vulnerabilities. A coastal zone task force has been established. The aim is to strengthen their technical capacity through training and collection of data. Some of the existing gaps are in the area of coastal engineering and environmental law.

Current Status —

- A Coastal Vulnerability and Risk Assessment was conducted in 2002 (including research on beach erosion).
- A Coastal Zone Policy has been approved.
- The coastal zone for Grenada, Carriacou and Petite Martinique is defined.

- The development of a Coastal Zone Act has been initiated. (This includes a list of issues to be legislated upon; agreement on the defined coastal zone; identification of the agencies with responsibility to regulate and enforce areas of the legislation; draft legislation and regulations with stakeholder consultations). If the Act is passed, it will include the establishment of an entity responsible for Integrated Coastal Zone Management (ICZM).
- A roadmap for ICZM is available
- Plans have been developed to address coastal issues in selected areas (Lower Sauteurs, Carriacou and Petite Martinique, Greater Grenville).
- A Coastal Zone Task force has been established, comprised of members from various different divisions. Capacity development of integrated coastal zone management for coastal zone task force members is also underway.
- The beach profiling programme was revived (equipment for beach profiling is available); beach monuments for measurements were established at priority beaches; stakeholders for regular profiling were selected and older beach profiling data from 1985 onwards were collected as part of United Nations Educational, Scientific and Cultural Organisation (UNESCO) Sand Watch Program.
 - The Ministry of Health has responsibility for conducting water quality testing at certain beaches however its capacity is very limited. The Department of Fisheries has begun limited water quality monitoring in Marine Protected Areas (MPA). However, not all MPAs are included e.g, the Sandy Island/Oyster Bed MPA (SIOBMPA) is not monitored. Water quality baselines are available for Gouyave and Grand Anse, potential MPA sites. In the past the Produce Chemist laboratory of the Ministry of Agriculture has also been involved in water quality testing. The St. George's University (SGU) has also monitored some beaches.
- Limited tide gauge data is available from two stations in St Georges. These are run by the Meteorological Office of the Maurice Bishop International Airport, in collaboration with a foreign university.
- An Anti-Litter Act was passed in 2015. However, enforcement remains a challenge.
- Cabinet has appointed a Sargassum Task Force, however data in this field is very lacking.
- Sand for construction activity is imported from Guyana. The state-owned Gravel and Concrete Emulsion Production Corporation, grinds stone aggregate into sand.
 - Since 2010, sand-mining is illegal under the Beach Protection Act. However, the state-owned Gravel and Concrete Emulsion Production Corporation is allowed to engage in sand-mining, particularly at Galby Bay. The company has not been mining since April 2016 and is promoting the use of imported and quarry sand.
- A cost/benefit analysis has been completed in respect of the use of imported sand versus beach sand.

Priority Actions —

Objective 1:

Initiate the development a database on relevant ecosystems and coastal structures

- Update existing inventory of all (private and Government) coastal structures. Based on results, develop recommendations to prevent the alteration of coastal dynamics and processes by coastal development. Recommendations should feed into correcting existing coastal structures.
- Undertake regular profiles of prioritised beaches in Grenada, Carriacou and Petite Martinique.
- Initiate the collection of wave and current data.
- Set-up a seagrass monitoring programmes with at least one annual survey to determine areal extent, presence of disease, presence of invasive species, richness, diversity and density.
- Involve communities and schools in data collection for ecosystem monitoring as well as coastal and marine processes.

Objective 2:

Improve technical capacity for integrated coastal zone management

- Establish a Coastal Zone Unit/Board, based on the existing Coastal Zone Task Force; acquiring funds will be necessary to ensure appropriate initial staffing of the Unit/Board, including coastal engineers, GIS experts, marine biologists, environmental lawyers etc.
- Strengthen technical capacity of Coastal Zone Task Force/Coastal Zone Unit members (and others), in a variety of different areas of Integrated Coastal Zone Management, such as; coastal water quality analysis, coastal planning, coastal engineering, coastal project management, hydrographic surveying, draughtsman, data analysis, archiving and modelling for coastal vegetation etc. Where relevant, tailor to reflect the relevant and specific circumstances of Carriacou and Petite Martinique.

Objective 3:

Improve institutional arrangements for coastal zone management

- Continue regular meetings of the Coastal Zone Task Force.
- Develop Coastal Zone Management Act, based on existing Coastal Zone Management Policy.
- **Develop a Coastal Zone Management Plan:**
 - o assess recommendations from CZP and the roadmap;
 - o review previous monitoring documents;
 - o consider international laws such as the UN Convention on the Law of the Sea;
 - o re-visit all coastal cells as defined in the delineated Coastal Zone Management Area, with a view to understanding how ICZM would work in each cell, so as to identify what can be done and what should not be done;
 - o conduct a national consultation on the Coastal Zone Management Plan.

- Widen the mandate of the Coastal Zone Task Force to oversee coastal ecosystem-based adaptation efforts in the tri-island state.
- For Carriacou and Petite Martinique; start the preparation of a Coastal Zone Management Plan for Carriacou and Petite Martinique building on recommendations from the “Carriacou and Petite Martinique Coastal Rehabilitation Plan” developed by the OECS and following the steps above.
- **Address sand removal (from beaches as well as off shore):**
 - o launch and sustain large-scale public education and discussions on climate change impacts and the important role of beaches in the protection of coastal communities from climate change impacts;
 - o in partnership with the private sector and civil society, draft a “white paper” on alternatives to beach sand mining for discussion by Cabinet and Parliament;
 - o develop and implement a public service sensitisation campaign on climate change and the importance of sand (consider using a popular Grenadian calypsonian to deliver the message);
 - o set up a sand mining hotline for the public to report cases of sand mining;
 - o prepare phase-out plan with key stakeholders and begin transitioning the construction sector to alternative sand sources.
- Conduct a comprehensive sediment transport and budget study.

Programme of Action 7:**Resilient infrastructure and sustainable land management**

Goals – Selected infrastructure is adequately planned, designed, properly located and maintained to be resilient to climate change, including increasingly extreme weather events; land is to be managed sustainably.

Indicators –

- All ministries and government agencies with the mandate for land management have the capacity to use spatial data to inform decisions on sustainable land management.
- Climate variability and change are integrated into policies and guidelines for physical planning and development.

Approximate Budget – USD 112.9 million

Land is mainly used for agriculture, forest, and built development in Grenada. Residential and agricultural expansion, coupled with industrial and commercial growth, has resulted in intense competition for land. Land use management initiatives have not adequately addressed this and as a consequence, problems of squatting, incompatible use of land, ad-hoc development and inadequate provision for recreational and community facilities have persisted. Carriacou and Petite Martinique have a peculiar situation where, approximately 70 percent of land suitable for development is privately owned and the central ridges and high peaks are designated as forest reserves, and the largest coastal mangroves as marine protected areas. In Petite Martinique, all lands are privately owned with limited parcels acquired by the State for public use.

Infrastructure includes both publicly owned and used assets (roads, telecommunications, utilities, public buildings, schools and spaces), and privately-owned buildings. Coastal infrastructure has greater exposure to sea level rise, storm surge and coastal flooding events. Most of the tourism assets, urban economic and residential infrastructure and activities in Grenada, are located along the coast. All infrastructure located in sloping areas is vulnerable to mass movement (rock fall and landslides) resulting from heavy rainfall, and fallen trees and other impacts from tropical storms and hurricane-force winds. In the past, disasters have adversely impacted infrastructure, disabling water, electricity, and telecommunication facilities for extended periods. Roads and bridges are also negatively impacted, limiting access for post disaster emergency operations. Presently, enough is not being done to upgrade the infrastructure to meet future needs and conditions in response to projected climate change impacts (SLR, storm surges, inland flooding and land slippage) and improve data collection. Communities located along low-lying coastal areas and on high risk sloping terrain, remain vulnerable to climate risks and the associated debilitating socio-economic impacts. Apart from location, structural integrity of residential infrastructure is also a significant determinant of vulnerability, especially for the poor.

Other important infrastructures include the airport and seaports. The Maurice Bishop International Airport (MBIA) is considered to be the most 'at risk' airport within the CARICOM region, as it is predisposed to serious threats from sea-level rise. In this regard, detailed vulnerability assessments are needed not only for MBIA, but also Pearls (abandoned airfield) and Dumfries (new location in Carriacou) and Lauriston (the existing airport in Carriacou).

There is therefore a need for data acquisition to facilitate proper planning and management. There is also a need to implement the building codes, and where applicable, to strengthen the capacity of the stakeholders (including training at tertiary level) to implement climate-resilient building practices.

Current Status —

- Ministry of Works is in discussion with the Caribbean Development Bank on a climate change vulnerability assessment for infrastructure along the Western Main road.
- **Infrastructural improvement work is being has been undertaken:**
 - land slippage mitigation (at Constantine, Gouyave, Sendall Tunnel).
 - installment of adequate infrastructure (e.g. drainage, roads, sewage system, retain structures) in La Sageesse and Beausejour communities.
 - refurbishment and hurricane proofing of schools; St. Patrick's Anglican Primary School and the Holy Cross R.C. School. As such they can also be used as emergency shelters.
 - reconstruction of the Hubble Bridge in The Lance, Gouyave; (also planned are the River Rover road bridges, the hump-back bridge and the Green Bridge).
 - data on bridges island-wide does exist given the national bridge assessment that was conducted in the 1990s. However, Hurricane Ivan changed the priorities in respect of bridge maintenance. A master plan also exists.
- Some construction companies have knowledge on climate-smart and green building practices.
- A new Planning and Development Act 2016 was legislated which will ensure the implementation of the building code. It also binds the Crown. New planning regulations are currently developed. Building set backs are included in the Act.
- The soil database to inform engineering designs is currently designed.
- The Land-Use Division has a database of agro-meteorological data spanning 30 years.
- A final draft land policy is available for Carriacou and Petite Martinique.
- **The following support was provided under the EU funded OECS CCA/SLM project:**
 - A draft land policy for Grenada will be finalised in 2017.
 - This project will provide support for the development of national land use and land cover plans, which will incorporate zoning.
 - Two plotters have already been received and installed; one at Land Use Division and the other at Ministry of Works.
 - The project has provided to the Ministry of Agriculture; three desktop computers, one Laptop, four copies of Trimble Business Software and Arc GIS Software.
 - Officers from the public service have received training in GIS and GPRS:
 - Institutional, policy and legislative gaps analysis on land management was conducted for Grenada, Carriacou and Petite Martinique.
- In 2012, the Port Authority conducted a threat assessment of coastal areas around the island.
- The TOR's for EIA include climate change considerations.
- The population of Soubise, a high disaster risk area, was relocated to a new housing scheme.

Priority Actions —

Objective 1:

Improve policy, legal, regulatory and institutional framework for resilient infrastructure and sustainable land management

- Mobilise resources to:

- o ensure that technical capability exists in the Physical Planning Unit (PPU) to enforce the Building Code and Physical Planning and Development Control Act and Regulations.
- o undertake a comprehensive review of the functions of the PPU with recommendations for organizational structure and updated functions for sustainable land management.
- o ensure the implementation of climate considerations the Physical Planning and Development Control Act and the Building Code and Regulations for Environmental Impact Assessments (EIA) and Archaeological Impact Assessments.

- Update/review the National Physical Development Plan taking into consideration climate risks and define critical areas for conservation and regeneration, taking current plan proposals into consideration.
- Strengthen the inclusion of climate change considerations in EIA TORs and strengthen monitoring of identified risk mitigation measures.
- Integrate climate change considerations into the updated airport master plan.
- Publish a short guide for coastal developers/investors/builders which includes rules, regulations, processes which summarise the main points of the new development manual.
- Approve and implement the Carriacou Land Policy.
- Conduct a strategic and climate-smart plan for inland and coastal tourism development zones with a focus on providing alternatives to coastal tourism and diversifying the tourism product to decrease ecosystem stress from coastal tourism e.g. cultural/culinary tourism, hiking, agro-tourism etc. Include results in the update of relevant tourism plans.

Objective 2:

Identify land and infrastructure at risk of being damaged or lost due to impacts of climate change

- Conduct a detailed Climate Change Vulnerability assessment for all three airports (Dumfries, Maurice Bishop, Pearls), including parking areas (sea-level rise, erosion, increased temperatures and impact on runway, flooding etc.) and implementation of first erosion control measures where required.
- Assess climate change vulnerability of existing tourism sites; identify potentially new sites; assess vulnerability of other relevant tourism infrastructure/develop recommendations for physical adaptation measures for tourism infrastructure such as, the port, resorts, road systems and bridges. Include the results in relevant tourism plans.

Objective 3:

Improve the resilience of selected buildings and infrastructure and implement local area adaptation plans

- Establish a funding programme for improvement of vulnerable households.
- Mobilise resources for the implementation of the “Climate Change Adaptation Plan for Lower Sauteurs” developed by the OECS.

- **Mobilise resources for implementation of Greater Grenville Local Area Plan:**

- o Identify drainage problem areas, pumping station and prospective on-site retention locations and assess need for new drainage systems.
 - o Establish development standards for culverts.
 - o Compose and implement a watershed management plan, with special attention to the Harford Watershed.
 - o Improve maintenance of existing drainage system.
 - o Identify agricultural practices that prevent erosion.
 - o Prohibit development on hazard prone lands through the establishment and implementation of a development order.
 - o Undertake a review and updated engineering study for central sewer services in the Town of Grenville.
 - o Encourage Ministry of Health and Environment to provide education on new septic field treatment and maintenance options.
 - o Relocate piped water services from the bottom of drains to prohibit incidences of cross-contamination.
 - o Enforce laws that prohibit sand mining.
 - o Collect coastal data to develop a coastal zone management plan for the area.
 - o Implement flood mitigation measures for the town of Grenville based on assessment results.
- Implement or mobilise resources to implement recommendations from the WHO/PAHO "Safe Hospital Index" assessment related to disaster and climate risk reduction; set-up a "Safe & Climate-Smart Hospitals/health facilities" Programme.
 - Improve resilience of other selected infrastructure (schools, old age homes, water supply etc.) based on results of detailed vulnerability assessments.
 - Design mitigation and implement construction works to stabilise areas prone to floods, rock falls, and landslides.
 - Improve resilience of most vulnerable bridges as identified in nation-wide bridge assessment.
 - Develop a program for identifying loose boulders and slippage areas. Design mitigation measures.
 - Carriacou - undertake shoreline/cliff stabilisation to protect public infrastructure of socio-economic importance in Windward.

Objective 4:

Improve technical capacity for spatial data management, risk-modelling and climate-smart/green building approaches/standards

- Improve the use of data, GIS and remote sensing for climate change adaptation and prepare a plan of action for long-term sustainability for spatial data management.
- Establish and improve capacity for risk modelling for SLR, storm surges, inland flooding and land slippage.
- Improve data collection.
- Design a tailor made, roll-out training programme on green, climate-resilient building practices, guidelines and standards in collaboration with existing learning centres (e.g. TAMCC, NEWLO).

Programme of Action 8:

Disaster risk reduction and disease prevention

Goals –

- Funding is mobilised for the implementation of actions focusing on reducing the risks posed by extreme weather events as part of NaDMA's 5 year Country Programme (2014-2019).
- Climate-sensitive disease surveillance and control is established.

Indicators –

- At least two (2) project proposals are submitted to potential donors and/or investors annually, starting in 2017.
- Climate information has been included in national disease surveillance system to strengthen the analysis and use of climate-sensitive disease data.

Approximate Budget –

- An overall budget to the NaDMA Country Programme (2015-2019) was not assigned. It consists of various project budget documents.
- Health related budget – approx. USD 180,000.

Climate change is a threat multiplier which will increase and intensify the impacts of weather related hazards. Climate change adaptation and disaster risk reduction always coincide where climatic and meteorological changes have an effect on extreme natural events and thus influence the risk of disaster.

Of particular relevance to Grenada are the projected increases in mean surface temperature, the projected decrease in rainfall and the projected increases in number and intensity of tropical cyclones, viz: 1) The projected reduction in rainfall has the potential to trigger drought conditions, especially during the dry season. 2) The increased moisture in the rainfall has the potential to result in very heavy rainfall over short periods of time. This could trigger increased flash flooding in affected areas. 3) The projected increases in the number and intensity of extreme events is also an area that needs to be monitored and planned for given the relatively high incidence of tropical cyclone impacts in the historical record. Climate change has the potential to increase the wind speed, rainfall volume and severity of storm surges, the latter as a result of the overall strength of the cyclones happening in tandem with the sea level rise resulting from climate change.⁴⁸

Climate change can affect human health by giving rise to conditions that can directly kill or injure human beings, such as extreme weather events, or by creating conditions that alter disease and vector distributions.⁴⁹ Grenada is likely to experience climate change health impacts that are typical for Caribbean SIDS.⁵⁰ These include direct risks to health brought about by hurricanes, tropical storms, flooding and heavy rainfalls, but also by extreme heat. Slow-onset climate related changes such as increasing temperatures, sea-level rise, reduced annual rainfall and drought, combined with more intense rains, give rise to indirect health impacts such as shifting patterns of vector borne diseases.

Grenada's First National Communication identified several human diseases of which incidences are likely to increase under climate change.⁵¹ Vector-borne diseases (particularly dengue, chikungunya and Zika virus) are a primary concern to Grenadian public health officials, given the difficulty of vector management and the outbreak prone nature of these diseases. An increase in intense rainfalls and temperatures is likely to create favorable mosquito breeding conditions, making the control of these diseases a priority in the health sector⁵². Rodent-borne diseases such as leptospirosis are prone to outbreaks during floods, when sewage can mix with drinking water supplies, increasing the risk of human infection. Moreover, heavy rainfall and hurricanes are often accompanied by an increase in water-borne diseases, when communities using pit latrines are flooded and their water supplies contaminated. Grenada's Second National Communication (SNC) is currently being prepared and will include a quantitative analysis of the diseases highlighted in the present study and their potential climate linkages.

Furthermore, Grenada's water supply is strongly affected by the dry season, during which available surface water can decrease as much as 30 to 40%⁵³. This contributes to the decline in water quality during dry seasons and an increase of water-borne diseases (diarrheal diseases in particular). Carriacou and Petite Martinique are particularly affected due to their reliance on rainwater harvesting⁵⁴. Dry spells, drought conditions and prevailing winds during the dry season can also increase particulate matter in the air. This in turn can aggravate persons with respiratory illnesses, such as asthma, and result in an increase of acute respiratory infections. Air-borne respiratory infections may therefore become more common among those who suffer from chronic respiratory diseases, of which there has been an increase in recent years⁵⁵.

Some of the climate change related (human) health risks identified in Grenada, arise from direct extreme weather events and natural disasters, which include;

- physical injury,
- death,
- heat stress and heat-related illness cardio-vascular issues, heat strokes, cardiac arrhythmia),
- psychological trauma,
- loss of livelihoods,
- water, sanitation and hygiene related issues,
- food insecurity, and
- displacement.

Other human health risks arise from indirect events such as; rising temperatures and changing rainfall patterns which can cause;

- infectious diseases,
- vector-borne (dengue, chikungunya and possibly zika),
- water-borne (diarrheal diseases),
- rodent-borne (leptospirosis).

Other indirect causes are; airborne particulates from Saharan dust, which can cause;

- chronic respiratory diseases e.g. asthma,
- acute respiratory infections.

⁴⁸ NaDMA (2014)

⁴⁹ WHO (2012)

⁵⁰ Clarke, et al. (2013)

⁵¹ GoG (2000)

⁵² Patz (2003)

⁵³ Caribsave (2012)

⁵⁴ Ibid.

⁵⁵ Ibid.; Akpınar-Elci (2015)

Current Status —

A well-established disaster risk reduction framework exists. For further information on Grenada's current status, see Grenada's latest Hyogo Framework for Action National Progress report. To build synergies, Grenada's NAP endorses the climate-related actions as identified in NaDMA Country Programme (2015-2019).

A qualitative vulnerability and adaptation assessment for the health sector is available. The Second National Communication – currently conducted - will include a quantitative analysis of the impacts of climatic variables on climate sensitive disease outcomes, expanding on the results of the present study, and building on the outputs of regional projects. In addition to providing an analysis of historical climate and disease trends, the SNC aims to provide an insight into Grenada's changing disease burden under different climate change scenarios.

A National Health Sector Disaster Management Plan is available but is currently under review. It is being led by the Disaster Management Officer in the MoHSS.

The Ministry of Health and Social Security "Corporate Plan" for 2015-2017 was drafted in 2014, providing a road-map for MoHSS programs and activities, and outlining priority areas for health spending in that period⁵⁶. While the Corporate Plan does not explicitly mention specific climate change activities, the SWOT analysis undertaken to develop the plan does identify climate change as a threat to national health. As part of a SMART health care facilities project, health facilities are being assessed in their infrastructure, services, disaster safety, as well as water and energy efficiency. The results feed into a road-map for investment and will be incorporated within national risk exposure databases.

In Grenada, three health facilities will be retrofitted to help reduce downtime and potential damage to the facility in the event of a disaster, as well as reduce operational expenditures by improving water and energy management.

Grenada's draft GCF project proposals includes new or improved drinking water storage and improved plumbing and/or rainwater harvesting infrastructure at 16 community health facilities and related services in four parishes of Grenada and in Carriacou.

Different awareness-raising events were conducted for health professionals on the link between climate change and health and a leaflet is available for the general public.

In recent years, vulnerability assessments and studies of the health sector infrastructure have been conducted. In 2008, the main healthcare facility of the country, Grenada General Hospital located in St. George's, was assessed using PAHO's Hospital Safety Index. PAHO Hospital Safety Index assessment was conducted again in 2013 for the General Hospital and in 2015 for the Princess Alice Hospital (St. Andrew). Small and medium sized health care facilities were assessed in 2015-2016. At least three are earmarked for upgrades.

The Green Checklist developed by PAHO/WHO was applied in 2015/2016 to assess efficiencies of health facilities. The Anti-Litter Act was passed in 2015.

⁵⁶ Government of Grenada (2014), MoHSS

Priority Actions —

Objective 1:

Mobilise funds to implement NaDMA's Country Programme (2015-2019)

- Include climate-related actions from NaDMA's Country Programme (2015-2019) in NAP funding proposals

Objective 2:

Establish climate-sensitive disease surveillance and control

- Include climate information and improve national disease surveillance system to strengthen the analysis and use of disease data and enable forecasting and real-time outbreak monitoring.
- Link historic prevalence/incidence data of priority diseases with climatic data to establish possible correlations.
- Improve vector surveillance, especially data capture, analysis and usage, to better target control measures and save limited resources.
- Limit the spread of vector borne diseases as early as possible to protect residents and tourists.
- **Avoid cancellations and reputational damage by reducing litter, especially plastic;**
 - Develop mechanisms/enforce the Anti-Litter Act with support of litter wardens;
 - Maintain clean waterways;
 - Discuss ban of Styrofoam, taxes on plastic and develop proposals for decision-makers;
 - Promote the GHTA anti-breeding ground program;
 - Ensure that the environmental levy is being charged for all plastics being brought on to the island, including those which are imported as preforms.
 - Develop a refund scheme for plastic bottles (first assessment already undertaken).

Objective 3:

Vector control capacities at community level

- Inclusion of climate-sensitive diseases in Disaster Risk Management training.
- Training of health care personnel on disaster preparedness, response and vector control measures, especially at community-level.

Programme of Action 9:

Climate and sea-level rise data and projections

Goal — Strengthened institutional arrangements for the collection, analysis and provision of climate-related data for use in decision-making

Indicators —

- The establishment by the Meteorological Office of a central repository for climate-related data that is operational with information being shared among agencies.
- Establishment of the National Hydrological and Meteorological service; operationalised to collect climate-related data from all available sources to support sustainable development goals.

Approximate Budget — USD 7 million

Data collection and analysis is very important for climate modelling and projections. Although the Meteorological Office within the Airport Authority of Grenada currently stores 30 years of daily rainfall data, it is used primarily to inform aviation decisions. Additional data collected for this purpose are temperature, wind, humidity, barometric pressure and visibility. However, no climate data is collected in Carriacou and Petite Martinique.

In addition to the Meteorological Office, the National Water and Sewage Authority (NaWaSA), and the Land-use Division of the Ministry of Agriculture, Lands, Forestry and Fisheries both collect rainfall data for their respective uses (monitor water supply and agricultural use) but the data is not used to inform climate change decisions. There is no institution that coordinates the collection, collation, analysis and dissemination of climate-related data for all potential users including the airports, the agriculture sector, the water sector, the National Disaster Management Agency and the Ministry of Health. However, any institution that would be established has to avoid budget risks associated with loss and damage to equipment, storage, maintenance and management of data. It should also consider the risk of 'brain drain' from trained staff who migrate abroad and a lack of equipment. In order to guarantee the usefulness of data collected, this institution would have to convert the data collected into user-friendly formats for technical and meteorological use, academia, modelling and other use.

Grenada cannot access support from the World Meteorological Organisation (WMO) as it is not a member. There are no specific climate change scenarios available for Grenada so, regional data on variation in climate are usually used to conduct climate change scenarios and projections for Grenada, Carriacou and Petite Martinique.

Current Status —

- The staff of the Meteorological Office includes three new forecasters who each completed a two year training programme in this field. As such, the Meteorological Office can now provide 24 hour meteorological service.
- A wind data machine is due to be purchased.
- The Meteorological Office currently has 30 years of daily rainfall data.
- The data currently collected is used to inform aviation decisions. The data includes rainfall, temperature, wind, humidity, barometric pressure and visibility.

- Equipment for Carriacou and Petite Martinique will soon be purchased to facilitate collection of climate data in these two islands.
- The following equipment is available at the Land-Use Division; one soil probe (soil humidity/temperature). At Laura, St. David, two stream flow meters. At St. Johns Little River Water shed, one rain gauge and approximately 30 manual rain gauges.
- Some of the services available at the Land-Use Division are: the collection of agro-meteorological data (rainfall, wind speed and direction, air pressure, humidity, soil temperature and humidity, air temperature, solar radiation); the National Water Information System (includes agro met database and maps); GIS data; map printing (land use, geology, soils, flood hazard) and the Irrigation Management Unit for assessments, monitoring, designs and training.
 - Two automatic weather stations were purchased. They are located in Grand Etang, Forestry nursery and the Laura Estate in St. David's. There are also automatic weather stations at the Mirabeau estate farm, the Caribbean Agriculture Research Development Institute and at the Maurice Bishop International Airport (MBIA).

Priority Actions⁵⁷ —

Objective:

Strengthen the collection, analysis and use of climate-related data

- Establish, equip and maintain a national facility, the National Meteorological Service (own facility) that will be the main coordinator for collecting, collating, analysing and disseminating climate related data to all potential users, including the Maurice Bishop International Airport, the Agricultural Sector, the Water Sector, the National Disaster Management Agency and the Ministry of Health etc.
- Develop a national climate data management policy.
- Monitor and map changes in rainfall patterns, intensity and distribution (atomized weather station in all main water sheds, data easily accessible and distributed to all relevant agencies; information distributed to the public about changes/ extremes).
- Become a member of the World Meteorological Organization so as to benefit from their climate information support.
- Document traditional knowledge and anecdotal information on climate-related impacts to supplement gaps in the data record.
- Enhance climate data products in support of decision-making in key sectors, with collaboration from CIMH.
- Meteorological Office collaboration with regional climate modeling groups.
- Build and maintain capacity among decision makers to access and use climate-related data.
- Carriacou/Petite Martinique; include Carriacou and Petite Martinique in expanded hydro-meteorological network with equipment to measure rainfall, temperature, sea-surface temperature and sea-level rise.

⁵⁷ This is a cross-cutting theme and related actions appear in other PoAs as well.

Programme of Action 10:

Sustained public education and participation

Goal — An informed public that will demand and support public policies aimed at building national resilience to climate change.**Indicators** — Compared to the 2016 OECS survey, results of a repeated KAP (Knowledge, Attitudes and Practices) survey on Climate Change demonstrate improved results for Grenada by 2021.**Approximate Budget** — USD 1.7 million

Unemployment, crime and violence, and poverty are perceived as the three most serious problems facing the Caribbean today. Less than two percent of the respondents of a KAP survey from across six OECS countries listed climate change as the most serious issue facing the Caribbean. More than 50 percent of OECS residents indicated that they are informed about different aspects of climate change. 70 percent asserted that they are either “very well informed” or “somewhat informed” about the causes of climate change. While 72.9 percent said they feel “very well informed” or “somewhat informed” about the consequences of climate change 64.1 percent reported that they feel “very well informed” or “somewhat informed” about ways of fighting climate change. However, for all three aspects of climate change, more than 1 in 4 respondents (25.0%) stated that they are “not at all informed.” Women feel less informed than men about the causes and consequences of climate change and ways it could be reduced. According to the KAP survey, while the whole population should be targeted for climate change education, special efforts should be used to pitch the messages of climate change to women, persons with low educational levels and the elderly.

Current Status —

- An OECS KAP survey on climate change was conducted in 2013 and on by the Japan-Caribbean Climate Change Partnership implemented by UNDP in 2016.
- Climate change communication strategy was developed.
- Climate change is part of the secondary school curriculum.
- Grenada-specific primary school material on climate change available and distributed to schools (“Greenz Climate Champion”, teacher manual, worksheet collection, student passport, stickers and posters).
- Community level presentations, adhoc presentations to schools and public lectures have been conducted.
- There is the ongoing broadcast of various public service announcements on the subject of climate change.
- Several other climate change sensitisation activities have been implemented: billboards, theatre plays, video competition, production of Youtube videos, including a Grenadian climate change song and music video.
- A monthly public forum Sustainable Development Council during which various aspects of climate change are presented and discussed.
- Various climate change adaptation demonstration projects have been implemented at the community-level.

Priority Actions⁵⁸ —

Objective 1:

Strengthen the knowledge base of decision makers with regard to climate change and adaptation

- Bi-annual/year-end cabinet updates on “Recent Developments in Climate Change” aimed at keeping government officials abreast of; new developments in the understanding of the science, the impacts of climate change; the implications for Grenada, as well as the progress made towards NAP implementation and NDC achievements.
- Targeted presentations and seminars to senior decision-makers in the public and private sector.

Objective 2:

To support the teaching of Climate Change at all levels of the education system

- Further promote the use of the Grenada-specific “Greenz Climate Champion” interactive toolkit within primary schools and after school programmes in the tri-island state. The toolkit includes: a teacher manual, worksheet collection, stickers, passport and posters. Integrate the toolkit into the regular school curriculum.
- Mobilise funds for printing further copies of the “Greenz Climate Champion” interactive toolkit.
- Integrate “Greenz Climate Champion” material into course material for teacher education.
- Include climate change projects into the activities done by students at the secondary schools, T.A. Marryshow Community College and St. George’s University.

Objective 3:

Further generate national awareness of climate change and its impacts and the role of the individual in responding to such impacts

- Continue to raise awareness in communities regarding the importance of coastal ecosystems for climate change adaptation.
 - Continue community level presentations, discussions and public forums on climate change and its implications for Grenada.
 - Continue implementation of practical demonstration projects at the community level that can be used to highlight the impacts of climate change and the potential of community led response activities as well as the livelihood opportunities (if applicable).
 - At the end of the ICCAS programme, transform ICCAS Facebook page/website into a Facebook page/webpage of the Environment Division and upload content regularly.
 - Conduct trainings for the media on climate change.
 - Involve the Conference of Churches and other social partners as key agents in the dissemination of climate change information.
- Increasingly raise awareness about climate change and adaptation amongst private sector stakeholders and identify further areas of collaboration between public and private sector.
-

⁵⁸ Also a cross-cutting theme and related actions appear in other PoAs as well

Programme of Action 11:

Adaptation Financing

Goal — Successful project applications ensure external climate finance support to Grenada's adaptation process.

Indicators —

- The GCF has granted Grenada financial support for readiness activities by 06/2017.
- At least 2 project proposals to finance implementation of NAP activities are submitted to potential donors and/or investors annually, starting in 2017.
- At least one proposal of relevance for the implementation of NAP actions under Programme of Action 3 has been submitted to the GCF 12/2017.

Approximate Budget — USD 1.4 million

State of adaptation finance in Grenada —

Grenada faces a range of barriers for climate-resilient development. This includes insufficient awareness about potential sources of funding, how to access them and the difficulty in understanding funds' procedures. The limited capacity to develop and implement projects, hampers the integration of adaptation actions into political and community structures.

The importance of this challenge is also described in the AOSIS APA Statement at the UNFCCC Climate Change Conference in May 2016 and to support SIDS in this regard:

“ Furthermore, the Paris Agreement recognises the unique vulnerabilities and special circumstances of small island developing states and our capacity constraints when it comes to accessing available financing. To that end, we call for expedited action to ensure that the institutions serving the Agreement urgently simplify procedures for SIDS and LDCs to access the critical resources we need to address climate change. ”

Therefore, this Programme of Action of Grenada's NAP, focuses on; the state of adaptation finance in Grenada; the use of existing domestic and external finance; engaging with domestic and international companies on how to leverage finance; scaling up access to other external finance (identifying existing and new sources); improving the investment environment for adaptation and enhancing Grenada's absorptive capacity. This includes identifying and addressing climate finance readiness gaps, particularly in terms of institutional capacity.

The CARICOM Declaration for Climate Action stresses the need for SIDS to receive improved and prioritised access to public, grant-based financial support to address climate change and its impacts. This is in line with the AOSIS Leaders' Declaration on Climate Change of 2009, the reaffirmation of the AOSIS Leaders' Declaration of 2012 and the 2014 Barbados Declaration on Achieving Sustainable Energy for All in Small Island Developing States in which the AOSIS states call upon;

“ [..] the international community, with the developed countries taking the lead, to undertake urgent, ambitious and decisive action to significantly reduce emissions of all greenhouse gases, including fast action strategies, and to support SIDS, and other particularly vulnerable countries, in their efforts to adapt to the adverse impacts of climate change, including through the provision of increased levels of financial and technological resources.⁵⁹ ”

In its NDC, Grenada emphasises that its contribution to the mitigation of climate change is ambitious as it exceeds the requirements for SIDS, (decided upon at COP20 in Lima). In line with the COP decision FCCC/CP/2015/10/Add.1 article 9, the country is in need of international financial and technical support to manage the additional development burden that resulted from emissions of global greenhouse gases, without diverting scarce domestic resources from ongoing development priorities like education, health and social development. In spite of this, Grenada is committed to mobilise its own resources, as far as possible, to facilitate the process to mitigate and adapt to climate change.

In this context, Grenada is positioning itself to access international funding sources, such as the Green Climate Fund (GCF). Grenada has requested support from the GCF's readiness and preparatory programme, in particular for building the capacity of the Nationally Designated Authority (NDA) and the development of a country programme.

Grenada has also received support from the Caribbean Climate Finance Readiness Programme⁶⁰ for the assessment of its state of climate finance readiness, capacity building measures as well as in-depth gap analysis for potential National Implementing Entities to be accredited with the Green Climate Fund.

In 2015 and 2016, the Government of Grenada conducted a Climate Expenditure Labelling analysis for all capital projects.⁶¹ The analysis showed further that almost half (49%) of the capital budget 2016 (48% of the capital budget 2015), is at risk of being compromised by the negative impacts of climate change.⁶² The 2016 capital budget remains as much at risk as the 2015 capital budget, which highlights the need for systematic risk-screenings and “climate-proofing” as part of any project's design phase. At the same time, the result showed that in 2015, 9% of the total capital budget allocated to climate change related projects (16% of the overall capital budget 2015) was financed with domestic resources.⁶³ In 2016, 24% of the project budgets which are dedicated to climate change mitigation and adaptation (26% of the overall capital budget 2016) were funded with domestic resources.⁶⁴

⁵⁹ See e.g. AOSIS Declaration on climate change from 2009: <http://sustainabledevelopment.un.org/content/documents/1566AOSISummitDeclarationSept21FINAL.pdf> (retrieved 30 March 2014).

Grenada is however highly dependent on external sources of finance, and has been successful in accessing a wide range of bilateral and multilateral sources of adaptation finance. In 2015, 91% of the capital budget for climate change was externally funded. 42% was in the form of grants and 49% as loans.⁶⁵ In 2016, 76% of the capital budget for climate change was externally funded. 41% was in the form of grants and 35% as loans. The sectors that have accessed the most sources of financing are environment and governance of adaptation, agriculture and land use, disaster risk management, coastal zone management and Marine Managed Areas (MMAs). In addition, the Overseas Development Institute (ODI) estimated that Grenada had received US\$ 16.47 million from the main multilateral climate funds in the last decade for climate resilience building activities.⁶⁶

While Grenada has been successful in accessing loans, it is noted that Grenada is a highly indebted country with a debt-Gross Domestic Product (GDP) ratio of 107%, projected fiscal deficits over the period 2014 to 2017 and modest growth in the economy. The government has limited fiscal space to incur additional debt, whether concessional or not. Grenada's current Memorandum of Understanding with the International Monetary Fund (IMF) imposes restrictions on accessing debt finance from third parties, which may in turn limit access to adaptation finance as concessional loans⁶⁷.

⁶⁰ Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), implemented by GIZ, partially in cooperation with the Caribbean Development Bank (CDB).

⁶¹ It needs to be noted that the labelling exercise for the budget 2015 was a first preliminary assessment with methodological constraints due to limited project information available. For the budget 2016, more information was available. However, only 82% of the budget was labelled since not all project officers submitted a (sufficiently) filled-out project information sheet.

⁶² ICCAS project (2016), 2nd Climate Change Public Expenditure Review (CPEIR).

⁶³ ICCAS project (2015), Climate Public Expenditure and Institutional Review (CPEIR).

⁶⁴ At the time of development of the NAP, the Climate Expenditure Labelling on the 2017 and 2018 budget was still in process.

⁶⁵ ICCAS project (2015), Climate Public Expenditure and Institutional Review (CPEIR).

⁶⁶ ODI (2014) reviewed nine international climate funds, namely the Adaptation Fund (AF), the Clean Technology Fund (CTF), the Forest Investment Programme (FIP), the Forest Carbon Partnership Facility (FCPF), the Global Environment Facility (GEF) (with a focus on activities under its fifth replenishment), the Least Developed Countries Fund (LDCF), the Pilot Programme on Climate Resilience (PPCR), the Scaling Up Renewable Energy Programme (SREP) and the Special Climate Change Fund (SCCF).

⁶⁷ International Monetary Fund (2015), Letter of Intent, Memorandum of Economic and Financial Policies, and Technical Memorandum of Understanding, November 3, 2015.



Grenada is rated as high-risk by the rating agencies and therefore continues to experience difficulties in attracting private sector investors and securing competitive debt finance. The CARICOM Implementation Plan for Achieving Development Resilient to Climate Change (March 2012)⁶⁸ identifies the assessment and review of the investment risk profile for each CARICOM member state as a priority action required to then improve the risk reward balance and attract private foreign direct investment into adaptation in the region. According to the 2016 report from the World Bank Group⁶⁹ comparing business regulation for domestic firms in 189 economies, Grenada is ranked 135th in terms of ease of doing business.⁷⁰ To finance and implement large-scale infrastructure projects, Public-Private Partnerships (PPPs) are an increasingly popular tool for procuring or managing public infrastructure projects. Adopted in July 2014, Grenada's PPP⁷¹ policy recognises PPPs as an important instrument in achieving the country's key economic policy objectives: boosting growth and job creation, while improving fiscal and debt sustainability.⁷² However a recent report published by the World Bank's Public Private Investment Advisory Facility (PPIAF)⁷³ highlights the challenges faced by failing to integrate the risks of a changing climate into the legal and financial frameworks for PPPs. Therefore, Grenada intends to climate-proof its PPP policy in the coming years.

Both the domestic and international private sector have invested in adaptation in Grenada, however it is not branded as adaptation and has not been documented as such. The first GCF project proposal includes a component that is targeted at large scale water users, including those in the private sector. While this is a positive step, the engagement of the private sector in adaptation consists mostly of individual pilots and is not documented nor explored for scaling up purposes by the government. Agriculture, beverages (rum distillery), water-energy and tourism are sectors where there is significant private sector presence and thus opportunities for private investment in adaptation goods and services. However, it must be noted that Grenada's private sector is composed of relatively small to medium scale businesses with stricter financial limitations than those of international largescale companies. Nevertheless, hotels, dive shops and marinas have introduced small-scale programmes with adaptation co-benefits such as the replanting of trees and mangroves and the introduction of small artificial reefs as coral and fish nurseries.⁷⁴

As a small island developing state, Grenada has limited human resources and capacity. This is the main climate finance readiness gap faced by Grenada, contributing to the country's limited absorptive capacity.⁷⁵ Under the IMF structural adjustment programme, Grenada has had to impose strict hiring conditions in the public service, under which only three persons can be hired for every 10 persons leaving the public service. This obviously further exacerbates the readiness gap, which Grenada is hoping it will rapidly overcome, with international support offered over the coming years.

⁶⁸ CCCCC (2011)

⁶⁹ World Bank (2016)

⁷⁰ The report focuses on regulations and regulatory processes involved in setting up and operating a business. It analyses those that address asymmetries in information (such as credit market regulations), those that balance asymmetries in bargaining power (such as labour market regulations) and those that enable the provision of public goods or services (such as business or property registration).

⁷¹ PPP is as a legally binding contract between a public sector entity and a private company—typically referred to as a concessionaire—where the partners agree to share some portion of the risks and rewards inherent in an infrastructure project.

⁷² Government of Grenada (2014), PPP Policy

⁷³ World Bank (2016), Emerging trends

⁷⁴ GIZ (2016), Status report (based on mission) of adaptation finance accessed to date and recommended climate finance actions to include in Grenada's NAP.

⁷⁵ By 'absorptive capacity', we mean the capacity of a country to absorb great amounts of aid in the medium term. A limited absorptive capacity may lead to delays in disbursement of aid (both grants and concessional loans) already committed for specific projects/uses (Reyes, Absorptive Capacity for Foreign Aid, 1990).

Priority Actions —

While Grenada faces a ‘fiscal and economic crisis’, the government is still committed to using the national budget as far as possible to adapt to climate change. Obvious opportunities to use the budget in this way are presented in Programme of Action 2 on the integration of adaptation into development. Several integration measures require human resources, such as civil servants to undertake climate proofing activities within their existing day to day commitments. PoA 2 also describes the measures Grenada will be taking to integrate adaptation into the budgeting process; first through integration of climate risk and adaptation consideration into sectoral Corporate Plans, and second, through climate proofing the Public Sector Investment Programme (PSIP) approval process.

In addition to this, the Government of Grenada (GoG) plans to explore the design of new economic and other fiscal instruments to raise funds and reform incentive systems to change behaviours. It is important to note that user fees are already being used to protect mangroves and reefs in Marine Protected Areas (MPAs).

Due to its high-level of indebtedness, Grenada is welcoming the use of adaptation debt swap mechanisms, as an innovative finance instrument for adaptation. The Commonwealth Secretary General has identified debt swaps as one of the three key action areas for the Secretariat to focus on and support member countries. The Government of Grenada is currently exploring the options for debt for nature swaps to reduce climate change impacts and to promote ocean-based energy.

Grenada plans to scale up access to external finance. External finance to be accessed in the near term should, where appropriate, preferably be in the form of grants given the lack of fiscal space to incur additional debt (whether concessional or not) and the restrictions imposed by the IMF’s debt restructuring plan. **This is in line with Article 9, paragraph 4 of the Paris Agreement, which stipulates that:**

“The provision of scaled-up financial resources should consider the need for public and grant-based resources for adaptation, in particular for countries that are the most vulnerable to the adverse effects of climate change and are facing significant capacity constraints, including the least developed countries and SIDS⁷⁶”

In order to access sufficient finance to fund the implementation of the NAP, Grenada continues to develop and leverage existing financing options, including existing national budgets and private sector investments, where available, whilst fully exploiting emerging international financing opportunities from the various climate finance funds.

Grenada is interested in pursuing direct access to the GCF, and has initiated the preparation for the accreditation of the Grenadian Development Bank (GDB) as the Direct Access Entity (DAE)⁷⁶ to the GCF.

⁷⁶ UNFCCC (2015).

Accreditation of the GDB would allow for lending, on-lending and blending using GCF funds. However, additional capacity development and other support is required to fulfil the requirements of the GCF. In terms of how best to channel multilateral sources of finance, Grenada plans to develop a short-term path to access the GCF via existing multilateral and regional accredited implementing entities, while at the same time pursuing direct access, through accreditation of a DAE. The accreditation process is currently being supported by the Government of Germany; additional funding through the GCF's Readiness Programme will be sought, if and when necessary. In the longer run, direct access through its own NDA will enable Grenada to finance primarily smaller-scale projects, whilst building capacity and retaining more funding at the national level. In particular for smaller-scale projects (up to USD 10 million), multilateral and regional accredited implementing entities will continue to play an important role by supporting larger scale projects.

Grenada has applied to the GCF, for readiness support to allow the development of a country programme and build the capacity of the NDA. In addition, Grenada intends to apply for readiness support to develop a pipeline of projects and support the accreditation of a DAE. Grenada intends to access the Project Preparation Facility (PPF) of the GCF and to support accredited direct access entities in project preparation activities.

It is expected that actions taken in this area whilst focused on the GCF, will create transferrable skills and expertise increasing the ease of access to other funds (and international financial markets). The development of a robust pipeline of bankable projects (including projects based on the NAP, supported by a comprehensive financial analysis in addition to a clear articulation of problem, options, solution, and delivery and monitoring) shall attract potential funders.

Grenada intends to develop a concept for the institutionalisation of the Community Climate Change Adaptation Fund (CCCAF), initiated as part of the BMUB/IKI-funded ICCAS programme. Currently operated as a programme activity within ICCAS, Grenada will ensure a sound institutionalisation of the CCCAF, including outlining funding and operational procedures and requirements (including gender considerations), institutional embedment, links to national budgetary and planning processes and community-based call for proposals. The current funding structure has been so far financed through bilateral climate funds from the Government of Germany. The intention is that, with the institutionalisation of CCCAF, Grenada provides a local funding instrument to bundle small-scale community adaptation projects, attract international grant money, including from the GCF, and facilitate the channeling of the grants to the communities. This should help to reduce risk and transaction costs, two major barriers facing the implementation of community projects.

There is increasing interest from the international development banks and from the financial markets to use PPPs as a vehicle for infrastructure funding. In order to potentially take advantage of this, Grenada has reviewed the World Bank report on PPPs and considers appropriate actions to ensure its PPP Policy is considering the impacts of climate change on the PPP's structure, risk ration and allocation, as well as potential performance impacts.

Given the current hiring restrictions in the public service, Grenada is exploring innovative approaches to strengthen human resource capacity. One approach already tested in Grenada is embedding an international expert within a national institution, with his or her salary being paid/supplemented by an international development partner (e.g. GIZ's integrated expert programme). Another approach is for the GoG to include funded staff positions as a term and strict condition for all new bilateral funding agreements, bearing in mind the significant benefits related to institutional capacity development. It is expected these staff would need to be project staff given typical bilateral funding requirements.

Programme of Action 12:

Monitoring and evaluation

Goal – The implementation of proposed NAP measures, to be documented.

Indicators – Assessment reports on the NAP process are released every 2 years, which give recommendations on possible adjustments in the process to be reflected in the NAP document 2022-2027.

Approximate Budget – USD 170,000

'Reporting, monitoring, and review' is one of four key elements of the NAP process as defined by the NAP Technical Guidelines. It is intended to:

- Address inefficiencies, incorporate the results of new assessments and emerging science and reflect lessons learned from adaptation efforts.
- Monitor and review the efforts undertaken, and provide information in national communications on the progress made and the effectiveness of the NAP process.⁷⁷

Defining monitoring, evaluation, indicators and reporting —

Monitoring: the systematic and continuous collection of data and information that enables stakeholders to check whether an intervention is on track or achieving set objectives.⁷⁸

Evaluation: a systematic assessment of the worth or utility of an intervention at a specific point in time, for example whether a policy has been effective in achieving set objectives.⁷⁹

Indicator: a measurable characteristic or variable which helps to describe an existing situation and to track changes or trends – i.e. progress over time.⁸⁰

Reporting: the process by which monitoring and/or evaluation information is formally communicated, often across governance scales. It can enable the assessment of adaptation performance and facilitate learning on different scales.⁸¹

Monitoring and evaluation (M&E), are essential in order to effectively guide the implementation of adaptation planning. Regularly checking and assessing the implementation of the NAP would indicate whether or not the various concrete adaptation interventions are on track or whether the processes/actions, need to be adjusted. The monitoring and evaluation process stimulates learning and ensures accountability and transparency by setting clearly defined indicators. In addition, Grenada's NAP M&E framework will be guided by the following principles, mirroring the overall principles of the NAP.

Keep it simple: cognisant of human capacity constraints, progress on NAP implementation will be measured by a set of "core indicators" rather than attempting to identify progress on each individual proposed measure and intervention.

Use what already exists: where possible, the NAP M&E framework builds on Grenada's M&E framework for Implementation Plan of the Regional Climate Change Framework (2009-2021) to avoid duplication of reporting efforts.⁸²

Apply a participatory process: institutions responsible for NAP implementation and/or which can provide data of relevance for M&E will be asked to report.

NAP Reporting —

Every 2 years, (together with the NDC reporting), a short progress report on the NAP process will be produced. The Environment Division together with the climate change focal point network coordinates the compilation of the report whereas all relevant responsible entities contribute. The NCCC oversees the reporting and findings/recommendations will be discussed. **The report comprises information on the following issues:**

1. new findings on climate change and vulnerabilities in Grenada, Carriacou and Petite Martinique;
2. progress and obstacles in achieving goals and indicators;
3. recommendations for future steps and measures.

The report will be submitted to Cabinet and communicated widely. The report will be uploaded to the Government website and results discussed at suitable forums such as the Sustainable Development Council or the PS Senior Management Board Meeting. A new NAP is due in 2022.

Priority Actions —

- Appoint an M&E coordinator within the climate change focal point network.
- Collect aggregated data from climate change focal points within ministries/agencies involved in implementation.
- Conduct tailored M&E trainings and build capacity of climate change focal points so they are capable of conducting the required tasks.
- Analyse and report on adaptive capacity and reduction of vulnerability at the country level, and/or how government policies/plans/ interventions are contributing.
- Analyse and report on adaptive capacity and reduction of vulnerability at the local/individual/household level and how interventions are contributing.
- Analyse and report on progress addressing gender through M&E of adaptation.
- Report progress and updates within National Communication.

⁷⁷ UNFCCC (2012).

⁷⁸ GIZ and IISD (2015)

⁷⁹ Ibid.

⁸⁰ Ibid.

⁸¹ European Environment Agency. (2015)

⁸² All indicators from Grenada's M&E framework for mplementation Plan of the Regional Climate Change Framework (2009-2021) have been market with *

Summary of PoA 1-

Institutional arrangements inter-sectoral coordination and participation

Approx. budget: USD 335,000

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|--|-----------------------------------|----------|---|
| 1.1 | Increase human resources with regard to climate change adaptation (CCA) of the Environment Division. | Ministry w.r.f. the Environment (MoEHE) | 200,000 | 5 years | |
| 1.2 | Appoint a nominee from the MCPMALG as a Standing Member of the NCCC. The nominee will represent government, civil society (including gender issues) and private sector interests of the people of CPM. | Chair of the NCCC and NCCC members. | 0 | 1 year | |
| 1.3 | Appoint a NaDMA representative as a Standing Member of the NCCC and appoint a NCCC representative as a Member of the National Emergency Advisory Council. | Chair of the NCCC and NCCC members, Chair of the National Emergency Advisory Council and Members of the National Emergency Advisory Council. | 0 | 1 year | |
| 1.4 | Establish formal climate change focal points in priority ministries ⁹³ with clear roles and responsibilities. | Environment Division together with priority ministries. | 0 | 1 year | Appointments could draw on pool of CCORAL trained persons, and/or NaDMA focal points. |
| 1.5 | Conduct tailored CCA trainings and build capacity of climate change focal points so they are capable of conducting the required tasks. | Environment Division | 100,000 | 5 years | |
| 1.6 | Conduct regular focal point meetings coordinated by the Environment Division. | Environment | 0 | 5 years | |
| 1.7 | Establish a Help Desk for CCORAL application in the Environment Division and provide assistance for CCORAL application. | Environment Division, CC Focal Point Network, CCORAL trainers. | 0 | 5 years | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|----------------|-----------------------------------|----------|----------|
| 1.8 | Update list of ongoing climate change and disaster projects on a regular basis. | DETC | 0 | 5 years | |
| 1.9 | Regular/bi-annual meetings of project managers/staff to present ongoing and planned climate change adaptation and disaster risk management activities to avoid duplication, create synergies and learn from another. | DETC | 0 | 5 years | |
| 1.10 | Revamp the Sustainable Development Council to include more climate change and disaster risk reduction. | SDC Council | 0 | 1 year | |
| 1.11 | Continue SDC meetings on a regular basis. | SDC Chair | 35,000 | 5 years | |

⁸³ Fields to be covered: agriculture, forestry, fisheries, land-use, physical planning, works, health, tourism, meteorological office, Carriacou and Petite Martinique, water, education.

Summary of PoA 2-

Systematic integration of adaptation into development policies, plans, programmes, projects, budgets and processes

Approx. budget: USD 650,000

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---|-----------------------------------|----------|---|
| 2.1 | Design and execute a process for integrating climate change adaptation considerations into NSDP 2030, and into its monitoring and evaluation process. | Environment Division and NSDP Technical Working Group. | 50,000 | 1 year | Integration of climate risk and adaptation into the NSDP 2030 should provide a driver for their inclusion in sectoral Corporate Plans. |
| 2.2 | Integrate a requirement for climate action to be addressed as a 'cross-cutting' issue in annual Permanent Secretary (PS) Performance Agreement between PS and Cabinet/ Cabinet Secretary. Focus should be on PSs with responsibility for fisheries, agriculture, land-use, forestry, works, health, education, physical planning, foreign affairs, CPM, Prime Minister's Office. In addition, sensitise PSs to the importance of integrating climate change adaptation in development planning. | Cabinet Office, Environment Division, Climate Change Focal Points, Permanent Secretaries, NCCC. | 50,000 | 5 years | The adaptation content of PS Performance Agreements should drive adaptation content in ministerial Corporate Plans and associated budgets. See 2.3. It is recommended that sensitisation is linked to PS Performance Agreement inclusion of climate adaptation (see measure 2.2). A speaking slot should be targeted at the annual PS retreat as an efficient means to communicate with PSs. |
| 2.3 | Utilise NAP measures annexes (#3-12) to select and integrate activities into annual Corporate Plans and annual budgets. | Ministries with responsibility for fisheries, agriculture, land-use, forestry, works, health, education, physical planning, foreign affairs, CPM, Prime Minister's Office. Environment Division to oversee reporting and provide assistance. | 0 | 5 years | Each ministry should take responsibility for those measures for which it is allocated as lead implementer/coordinator. Climate change focal points should facilitate this process where possible. Any NAP measures not integrated in the first available Corporate Plan can roll over to the next Corporate Plan. It will be necessary for each ministry to define which actions can be undertaken within its existing budget and which require external support. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|---|-----------------------------------|----------|---|
| 2.4 | Continue to apply CCORAL screening to all projects submitted to the PSIP approval process. | DETC, all Ministries submitting to PSIP, CCORAL Help Desk in the Environment Division, CC focal points. | 0 | 5 years | Limitation the PSIP will not facilitate climate screening of private sector investment projects. This option will be discussed after the first revision period. |
| 2.5 | Make in-depth CCORAL assessment a requirement for all projects that are recorded as highly climate influenced under CCORAL screening within PSIP process; integrate proposed interventions at appropriate stage of PSIP project preparation. | DETC, climate change focal points, CCORAL trained persons, CCORAL Help Desk in Environment Division. | 0 | 5 years | In 2017/18, first pilots for in-depth CCORAL assessment will be conducted. Lessons learned will be captured and additional sector-specific resource material will be developed. |
| 2.6 | In addition to CCORAL resource material, develop sector and Grenada-specific resource material to technical officers with in-depth CCORAL assessment within PSIP process. | Environmental Division | 500,000 | 2 years | The same resource material should also be used for other mainstreaming processes (for example private sector investments). |
| 2.7 | Raise climate risk and adaptation considerations relevant to PSIP projects in discussions with potential funders to mobilise resources for adaptation considerations to be integrated in project designs. | Respective ministries, DETC, Environment Division. | 0 | 5 years | |
| 2.8 | Amend basic template terms of reference for statutorily required Environmental Impact Assessments (EIAs) such that they integrate assessment of climate risks and resilience building. | Environment Division; PPU; Planning and Development Authority. | 0 | 1 year | |
| 2.9 | Develop clear guidance on how to utilise climate change projections in Grenadian EIAs (linking to existing use of GeoNode and the Caribbean Handbook on Risk Management ⁸⁴). Build capacity of relevant staff on how to apply guidance to utilise these projections in Grenadian EIAs. | Environment Division; PPU; Planning and Development Authority, Ministry of Works, PCU. | 50,000 | 2 years | |

Summary of PoA 3-
Water Availability

Approx. budget: USD 50.2 million

Objective 1: Improve policy, legal, regulatory and institutional framework for the water sector

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|------------------------|-----------------------------------|---------------------------------|---|
| 3.1 | Update the National Water policy (2007) to include climate change considerations. | Land-use | 20,000 | 6 months | Integration of climate risk and adaptation into the NSDP 2030 should provide a driver for their inclusion in sectoral Corporate Plans. |
| 3.2 | <p>Develop a watershed master plan for Grenada, Carriacou and PM:</p> <ul style="list-style-type: none"> - Complete detailed mapping of the different soil types of the watersheds, spatial variability and depth range of different soil types. - Analyse satellite data for change in soil pattern and ground truth with field data. - Improve the land use classification system as per the standards used in the Caribbean, and update the land use map for each watershed. Note the change in the land use pattern for the last ten years from satellite images as well as from aerial photographs. - Prepare draft Watershed Plan using the "Ridge to Reef" approach. - Conduct consultations. | Forestry, Land-use | 195,000 | 8 months (March to December) | This will be completed in 2017 under the Pilot Programme for Climate Resilience's (PPCR) Regional Disaster Vulnerability Reduction Project (RDVRP). |
| 3.3 | <p>Develop a Water Resource Master Plan:</p> <ul style="list-style-type: none"> - Integrate climate variability, land use change and the impact of increased urbanisation and population on available water resources in the new water resource report or master plan. - Conduct consultations. - Implement the new water resource master plan. | NaWaSa, Agriculture | 50,000 | 5 years | This will be completed in 2017 under the Pilot Programme for Climate Resilience's (PPCR) Regional Disaster Vulnerability Reduction Project (RDVRP). |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---|-----------------------------------|----------|--|
| 3.4 | Revise and expand GDS 79: 2006 "Specification for effluent from industrial processes discharged into the environment". | Grenada Bureau of Standard (GDBS), Ministry of Finance. | 5,000 | 9 months | Quarter 3 and Quarter 4 in 2017. |
| 3.5 | Promulgate regulations for monitoring of existing water quality. | Agriculture, Environmental Health. | 50,000 | 9 months | |
| 3.6 | Promulgate regulations to establish and enforce standards and specifications for effluent discharges into receiving surface, underground or coastal waters. | Environment, GDBS. | 75,000 | 2 years | <ul style="list-style-type: none"> - Specification for effluent from industrial processes discharged into the environment (GDS 79: 2006) exists only for industrial processes. However it should be reviewed. - Identify aspects of GDS 79: 2006 for a technical regulation that would be applied for this action. - Environment Division would have to make the request to the GDBS. |
| 3.7 | Revise fines for current legislation, specifically the Public Health Act and Regulations. | Health | 20,000 | 6 months | |
| 3.8 | Improve enforcement of existing legislation (public health, water legislation and other related legislation), through the provision of the necessary support from relevant government agencies. | Agriculture, NaWaSA, Health, Works. | 30,000 | 3 years | |
| 3.9 | Provide incentives for the procurement of low-volume and low energy faucets. | Works, Finance. | 50,000 | 1 year | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|---|-----------------------------------|----------|--|
| 3.10 | Make rain water harvesting and storage (at least 3 days supply), mandatory for all new buildings in Grenada, CPM (including industries, government). Develop incentives for engaging in this activity/strengthen rain-water harvesting. Encourage rainwater harvesting for agriculture. | PPU, Works, Agriculture. | 30,000 | 9 months | Quarter 1 to Quarter 3 in 2018. |
| 3.11 | Implement the National Drought Management Plan. | Agriculture. | 75,000 | 5 years | The National Drought Management Plan should be finalised and approved by Cabinet by the end of 2016. |
| 3.12 | <p>Develop an improved methodology for acquiring meteorological and hydrological data:</p> <ul style="list-style-type: none"> - Update data on all existing water resources (surface and ground) for Grenada, CPM, including the exact location of rain gauges in each watershed. - Develop a policy for data collection and training for staff on the importance of data. - Audit equipment used for data collection for rainfall and water resources. Identify gaps and update them. - Install flood gauges to determine the level of flood waters after each event within the Chemin watershed. - Train community members and the staff of NAWASA and the Ministry of Health and Environment, to read flood gauge data to create spatial maps from successive flooding events. | Land-use Division, Meteorological office. | 200,000 | 1 year | This will be completed in 2017 under the Pilot Programme for Climate Resilience (PPCR). |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|---------------------|-----------------------------------|----------|---|
| 3.13 | <p>Establish a framework and policy for water access:</p> <ul style="list-style-type: none"> - Undertake an analysis of the amount of water needed for each housing area monthly. Update the present data base and allocate allowances for population increases over at least a ten year period. - Analyse the seasonal change in consumption with variation in rainfall pattern. | Agriculture, NaWaSA | 100,000 | 5 years | |
| 3.14 | <p>Upgrade the national water information system online data access platform:</p> <ul style="list-style-type: none"> - Conduct an Information Technology Needs Assessment (infrastructure and institutional) for government departments that manage hydrological and meteorological data. - Upgrade the data management platform for each department. - Upgrade Information Technology equipment and develop skill sets. | Agriculture, | 120,000 - 150,000 | 5 years | Urgently needed is a system that can be linked to all agencies and schools. |
| 3.15 | <p>Create a central coordinating agency, a Water Resource Unit (as proposed in Water Policy). This unit will be responsible for the management of water resources in a holistic manner.</p> | Works, Land-use | 470,000 | 3 years | Includes equipment, training and staffing for the first 2 years. Implement in the period 2018-2020. |
| 3.16 | <p>Assess the implementation of the National Water Sector Policy (2007) so far including its implementation in CPM.</p> | Works, Land-use | 20,000 | 6 months | Quarter 1 to Quarter 2 in 2021. |
| 3.17 | <p>Develop water balances for each major watershed:</p> <ul style="list-style-type: none"> - Calculate monthly water-budgets for each basin along with a final yearly water budget. - Conduct continuous analysis of the water budget using the rainfall, evaporation and storage data to enable the effective management of water availability and projection into short, medium and long term time periods. | Agriculture NaWaSa. | Skills in house | 5 years | This should also be the responsibility of the Water Resources Unit (once established). |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|----------------|-----------------------------------|----------|-------------------------|
| 3.18 | <p>Re-engineer the storm water drainage system across the tri-island state:</p> <ul style="list-style-type: none"> - Assess the current drainage system; identify where new drains are needed and which existing drains need widening, re-grading etc. Prioritize flood prone communities and thereafter, the major townships. - Undertake preliminary engineering design work. - Select and clean silt from the mouth of rivers. | Works. | 1.2 million | 2 years | Implement in 2019-2021. |
| 3.19 | <p>Increase surface storage and improve the distribution system (including addressing leaks):</p> <ul style="list-style-type: none"> - Conduct a feasibility study to determine the best locations for additional surface storage and the type of storage. - Based on existing plan for improving the distribution system, mobilise additional investments. - Quantify losses within the distribution network/ reservoirs. - Develop a plan reducing water loss including identification of leakage hot spots. | Works. | 32.4 million | 5 years | |
| 3.20 | <p>Implement Water Resources Investment Programme.</p> <ul style="list-style-type: none"> - Develop alternative modalities for water resources (solar-powered desalination plant, community-based rainwater harvesting). - Develop and start the implementation of a reforestation programme to improve water catchment. | Works. | 10 million | 4 years | Implement in 2018-2021. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|------------------------------|-----------------------------------|----------|--|
| 3.21 | <p>Develop/revise water tariff rates.</p> <ul style="list-style-type: none"> - Determine water pricing towards sustainable water services. Components will be 1) Water policy objectives and water pricing; 2) Water pricing mechanisms and instruments: levies, taxes and charges. - Analyse the revenue potential and administrative complexity of alternative pricing instruments. | Works. | 150,000 | 1 year | Implement in Quarter 3 2018 to Quarter 2 2019. |
| 3.22 | For Carriacou/PM: rehabilitate/repair existing water catchment areas and improve watershed management including the Dumfries dump. | Works, MCPMLG. | 2 million | 2 years | Implement in 2018 to 2019 |
| 3.23 | For Carriacou/PM: extend a reticulated water supply system to the main communities in the northern half of the island, from the Salt-Water Reverse Osmosis plant located at Beausejour. | Works, MCPMLG. | 2.8 million | 1 year | Implement mid- 2018 to mid- 2019. |
| 3.24 | Develop public education and media campaigns on the impact of climate change on the water resources. | Works, Environment. | 70,000 | 4 years | Implement 2018 to 2021. |
| 3.25 | Promote water reclamation and re-use technologies, specifically in tourism and industry sector. | Tourism, Works, Environment. | 50,000 | 4 years | Implement 2018 to 2021. |
| 3.26 | In Carriacou /PM, provide community advisory bulletins on a continuous basis on water consumption patterns using data from the Salt-Water Reverse Osmosis plant. | Environment, MCPMLG | 30,000 | 4 years | Implement 2018 to 2021. |

Summary of PoA 4-
Food Security

Approx. budget: USD 46 million

Objective 1: Improve availability of sector-specific climate vulnerability data

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|--|-----------------------------------|----------|--|
| 4.1 | Undertake technical vulnerability analysis to improve understanding of survival and productivity of current crop varieties and consideration of alternatives. | Agronomy, Extension Division and Planning. | 200,000 | 4 years | Should be renewed every 5 years. |
| 4.2 | Conduct a vulnerability assessment of the agri-food sector, especially including Grenada's dependence on imported food and its vulnerability. | Agriculture, MCPMLG, Trade, MNIB. | 250,000 | 5 years | |
| 4.3 | Undertake technical vulnerability analysis to improve understanding of impacts of climate change on marine fisheries stocks | Fisheries, MCPMLG | 0.15-1.5 million | 5 years | The cost and timeline depends on the number of species. |
| 4.4 | Improve collection and analysis of data on fish catch (disaggregate data, update sheets) and conduct analysis. | Fisheries, MCPMLG | 200,000 | 4 years | The data is already available. Need more funding to build and expand to a more comprehensive system. |

Objective 2: Improve policy, legal, regulatory and institutional framework to support climate-smart practices in agriculture and fisheries

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---|-----------------------------------|-----------|----------------------------------|
| 4.5 | Integrate climate change considerations by applying Climate Change Online Risk Adaptation Tool (CCORAL) in at least two Programmes and Policies for the agriculture and fisheries sector. | Environment, Agriculture, MCPMLG. | 20,000 | 1-2 years | Should be renewed every 5 years. |
| 4.6 | Create incentives for implementation of climate-smart agriculture practices. | Extension Division - Agriculture | 5 million | 5 years | |
| 4.7 | Introduce construction codes for hurricane resistant poultry units. | Livestock Division – Agriculture, MCPMLG. | 50,000 | 3 years | |
| 4.8 | Develop food and nutrition security warning system for food supply inadequacies for local and export market needs. | Agriculture, MCPMLG. | 60,000 | 3 years | |
| 4.9 | Approve and implement draft National Drought Management Plan. | NaDMA | 250,000 | 1 year | |

Objective 3: Build capacity and provide technology options which ensure food security

| | | | Indicative cost where known (USD) | Timeline | Comments |
|-----------------|--|--|--|--------------------|--|
| Measures | Responsibility | | | | |
| 4.10 | Train more agriculture technicians in climate-smart agriculture techniques and monitor application of new techniques. In particular, promote the use of more drought resistant crops by farmers, particularly in the Chemin Watershed by conducting trainings for farmers on dryland farming techniques which would accommodate less usage of water beyond drip irrigation-mulching and introduce farmers to drought resistant crops/ diversify crop production. | Agriculture, MCPMLG, CARDI, IICA. | 50,000 | 5 years | This activity should be continued after the NAP (2017-2021) |
| 4.11 | Establish four climate-smart agriculture demo sites highlighting different technologies and techniques. | Extension, Agronomy | 1.75 million | 4 years | |
| 4.12 | Increase technological options & solutions for production, post-harvest handling & agro-processing that offer resilience to climate change. | MNIB, Agriculture, MCPMLG, IICA | 5 million | 5 years | |
| 4.13 | Implement rainwater harvesting (RWH) and water storage and distribution projects that adopt water management practices and technologies, including developing RWH ponds in such a way that one pond can be used by a number of farmers, and hence minimum land area is lost. | NaWaSA, Agriculture, MCPMLG. | 50,000 per project | 6 months / project | The cost depends on the project scale and number of beneficiaries and systems installed. |
| 4.14 | Involve farmers and fisher folk in the implementation of agro-forestry (apiculture, aquaculture, livestock, etc.) projects to adapt to potential changes in the landscape. | Fisheries, Livestock, Extension, Forestry. | 2.5 million | 5 years | This should be done in collaboration with fishers and farmers. Continue until 2023. |

| | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|----------------------------------|-----------------------------------|----------|---|
| 4.15 | Promote the use of hydraulic ramp pumps. | Agriculture, MCPMLG. | 300,000 | 3 years | |
| 4.16 | Design and implement a response to the results of the mapping of soil fertility for sustainable agriculture in Grenada (old map from the 50s currently being reviewed). | Agriculture. | 1 million | 3 years | The review will be completed in 2018 by a project funded by the Government of Morocco and this activity should commence after 2018. |
| 4.17 | Establish a farmer field school programme to create a platform of exchange for farmers to learn from other farmers who are currently implementing climate-smart agricultural practices. | Extension Division - Agriculture | 100,000 | 5 years | |
| 4.18 | Maintain and recover genetic resources necessary for sustainable agriculture, e.g. by establishing "agricultural crop gene bank and implementing local seed distribution programme for vulnerable households. | Agriculture, MCPMLG, CARDI, UWI | 1.5 million | 2 years | This should also include livestock. |

Objective 4: Enhance social protection for farming and fishing communities

| | | | | | |
|------|--|---------------------------------|-----------|---------|------------------------------------|
| 4.19 | Investigate agriculture/fishing insurance options and new risk transfer instruments, develop respective policies and incentives. | Fisheries, Agriculture, MCPMLG. | 2 million | 5 years | Continue beyond the 5 year period. |
|------|--|---------------------------------|-----------|---------|------------------------------------|

Objective 5: Improve understanding of and knowledge about climate impacts, vulnerabilities, risks and resilience options

| | | | Indicative cost where known (USD) | Timeline | Comments |
|-----------------|--|---|--|-----------------|--|
| Measures | Responsibility | | | | |
| 4.20 | Provide hands-on systematic climate change information to farmers and educate farmers about adaptation measures | Agriculture, MCPMLG, Environment | 0.5 million | 5 years | Continue beyond the 5 year period. |
| 4.21 | Develop educational campaigns for farmers/extension officers on soil conservation practices, water conservation measures and soil water management systems practices. Educate fisher folks in use of sustainable fishing practices e.g. appropriate fishing equipment. | Agriculture, MCPMLG | 300,000 | 5 years | Continue beyond the 5 year period. |
| 4.22 | Develop an education programme to avoid destruction of windbreaks and encourage their establishment. | Agriculture, MCPMLG | 200,000 | 1 year | This should be linked to Agro-forestry and should be continuous. |
| 4.23 | Adapt traditional pest management techniques and increase farmers knowledge of these techniques. | Extension Division, Pest Management Unit. | 0.25 million | 2 years | |

Objective 6: Mobilise funding for further resilience-building measures to ensure food security

| | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|--|-----------------------------------|----------|--|
| 4.24 | Develop and mobilise resources for implementing national fire prevention programme for agriculture sector. | Agriculture, MCPMLG, Police | 2 million | 5 years | This should be continuous and involve multiple stakeholders. |
| 4.25 | Develop and mobilise resources for implementing a programme for capacity-building of food insecure and vulnerable households to mitigate against livelihood losses from a variable and changing climate. ⁸⁵ | National Authority for Zero Hunger Initiative Research and Extension Division. | 3 million | 3 years | Continue beyond the 3 year period. |
| 4.26 | Diversify from low yield/low return agricultural production by developing an Agricultural Export Development Training grant to support the government agencies in developing countries in marketing and promotions, product development and quality. | National Authority for Zero Hunger Initiative Research and Grenada Food and Nutrition Council (GFNC) Extension Division. | 3 million | 3 years | Continue beyond the 3 year period. |
| 4.27 | Develop at least one larger project proposal to support food security in times of climate change. | National Authority for Zero Hunger Initiative Research, GFNC and Extension Division. | 10 million | 3 years | Continue beyond the 3 year period. |
| 4.28 | Develop a disaster management investment fund to support farmers to mitigate and respond to climate impacts and challenges. | Agriculture, Grenada Development Bank (GDB). | 5 million | 5 years | |

⁸⁵ The existing community assessment needs to be updated

Summary of PoA 5-

Ecosystem resilience

Approx. budget: USD 26.6 million

Objective 1: Improve policy, legal, regulatory and institutional framework to increase the resilience of important ecosystems

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|--|-----------------------------------|----------|--|
| 5.1 | Develop and update existing legislation to include co-management, control the use of mangroves and to allow for contractual agreements between owners, users and government. This will support mechanisms for management of mangroves and marine protected areas by community led organizations. | Fisheries, Legal Affairs, Forestry, Physical Planning Unit, Environment, MCPMLA. | 100,000 | 5 years | |
| 5.2 | Finalise Draft Sustainable Development Trust Act and enforce once enacted (on Grenada Sustainable Development Trust Fund). | Fisheries, Environment, MCPMLA. | 450,000 | 3 years | Estimate is based on \$150,000 per year. |
| 5.3 | Develop options for improved stock of ruminant's herbivores (ban, closed seasons etc). | Fisheries, MCPMLA. | 100,000 | 4 years | Complete in collaboration with Carriacou |

Objective 2: Improve availability of ecosystem data and strengthen monitoring of critical ecosystems, with a particular focus on Protected Areas

| | | | | | |
|-----|---|--------------------|-----------|---------|---|
| 5.4 | Collect and analyse information on the Molinière-Beauséjour MPA, Woburn Clarke's Court Bay MPA and Sandy Island Oyster Bed MPA. Produce a MPA-specific database that can be accessed freely and searched by all concerned stakeholders. This should include water quality testing for all MPAs on a monthly basis and identify data-sharing arrangements within Government (for example: Health, Land Use, NAWASA etc). | Fisheries, MCPMLA. | 1 million | 2 years | Complete in collaboration with Carriacou. Explore possible partnerships with regional academic institutions and develop a central data repository. |
|-----|---|--------------------|-----------|---------|---|

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|---|-----------------------------------|----------|---|
| 5.5 | Continue coral reef monitoring programme in correlation with diving pressure to define the limit of acceptable change in relation to diving frequency or maximum number of divers in one location at one time. | Fisheries, Coastal Zone Taskforce, Environment, MCPMLA. | 200.000 | 2 years | This should be done at least once a year in all MPAs and establish baselines for future MPAs/ MMAs). The estimated cost is based on \$100,000 per year. |
| 5.6 | Continue and expand lionfish monitoring and reporting. | Fisheries, CPMLA | 500.000 | 4 years | |
| 5.7 | Update mangrove map on a regular basis and include key coastal woodland areas. Identify ownership of mapped areas to strategically (re)plant littoral and mangrove forests. | Forestry, Forestry, Environment, Coastal Zone Task force, MCPMLA. | 2.5 million | 5 years | Conduct in partnership with the Land Use Division, Grenada Fund for Conservation, Lands and Survey and Physical Planning Unit. |
| 5.8 | Conduct vulnerability assessment for dry forests to make informed decisions regarding planning for sustainable livelihoods. | Forestry, Environment, MCPMLA. | 200,000 | 4 years | |

Objective 3: Strengthen ecosystem resilience while providing livelihood options (where possible)

| | | | | | |
|------|---|--------------------|-------------|---------|---|
| 5.9 | Expand the MPA network by establishing five new MPA's, including Grand Anse (involving Gouyave, Levera, south-east coast and White Island) so as to meet the Caribbean Challenge Initiative goal. | Fisheries, MCPMLA. | 7.5 million | 5 years | Perform in collaboration with CPM. Note that the below areas were identified as key areas; nursery in Grand Anse Bay, another in Carriacou in progress). The estimate was based on \$1.5 Million per MPA. |
| 5.10 | Develop a MPA Policy and Action Plan (suggestions: broad consultation, clear demarcation of areas). | Fisheries, MCPMLA. | 50,000 | 2 years | Conduct in collaboration with CPM. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|---|-----------------------------------|----------|--|
| 5.11 | Carriacou; implement actions ranked as "high priority" in Sandy Island Oyster Bed MPA Action Plan (2015-2025) (e.g. with public consultation, develop a zoning plan for the MPA that includes "no take" areas and other areas that permit non-destructive fishing practices; maintain mooring buoys, removal of derelict vessels and other debris etc). | Fisheries, MCPMLA. | 500,000 | 4 years | |
| 5.12 | Establish new and expand existing coral nursery and artificial reefs, in conjunction with local coastal communities, for coastal protection and research and use – where environmentally appropriate - for dive marketing. | Fisheries, Environment, Coastal Zone Taskforce, Dive Association, SGU, MCPMLA | 2.5 million | 5 years | |
| 5.13 | Adopt current 'Ridge to Reef' approach in Moliniere/Beausejour and in other watersheds adjacent to MPAs. | Fisheries, MCPMLA | 2 million | 5 years | Conduct in collaboration with Carriacou. |
| 5.14 | Provide infrastructure support for the management and enforcement at new and existing MPA sites by implementation of mooring buoys, patrol boats, field offices for rangers etc. | Fisheries | 2 million | 4 years | Conduct in collaboration with Carriacou. |
| 5.15 | Expand existing lionfish management programme to include training of fishers in the collection and handling protocol, and training of the first aiders/medical responders. | Fisheries | 500,000 | 3 years | Conduct in collaboration with Carriacou. |
| 5.16 | Develop and implement a re-afforestation plan and programme to replant degraded forests in a climate-sensitive manner and identify and implement livelihood actions that support forest protection and management. | Forestry | 300,000 | 5 years | Perform in collaboration with Carriacou. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|---|-----------------------------------|----------|---|
| 5.17 | <p>Implement a tree planting programme that will:</p> <ul style="list-style-type: none"> - Contribute to reducing soil erosion, improving soil fertility, beautifying and enhancing the environment, providing timber and other products and maintain biodiversity, encourage stakeholders (e.g. schools and other community groups/organisations) in tree planting in urban and rural areas. - Create incentives for tree planting on private lands. - Establish a tree seedling distribution programme for communities by the Forestry Department to support the tree planting programme . - Strengthen the Forestry Department's extension services to control indiscriminate cutting of trees. | Forestry, Environment | 300.000 | 5 years | Perform in collaboration with Carriacou. |
| 5.18 | Identify sustainable practices for harvesting mangroves and implement programmes to promote sustainable use and protection of mangroves, including community co-management and alternative livelihoods. | Forestry, Fisheries, Environment, Coastal Zone Taskforce. | 500,000 | 3 years | Perform in collaboration with Carriacou. |
| 5.19 | Develop a programme to manage bamboo (promote for charcoal), mongoose and other invasive species. | Forestry, Environment, MCPMLA. | 500,000 | 3 years | Complete in collaboration with Carriacou. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|--|-----------------------------------|----------|--|
| 5.20 | Use and further develop pilot projects to encourage participation of tourists in ecosystem management related efforts (e.g. charges for lionfish hunting, "adopt a mangrove", "adopt a coral" initiatives) and improve marketing of relevant eco-tourism sites. | Fisheries, Tourism, Environment, MCPMLA. | 800.000 | 4 years | Complete in collaboration with Carriacou. |
| 5.21 | Research options to deal with influx of sargassum and develop a plan of action to harvest and exploit the usefulness of the sargassum seaweed by networking with other OECS states and French islands and UWI to learn and share experiences. | Fisheries, Environment, Sargassum Taskforce, Coastal Zone Taskforce, MCPMLA. | 500.000 | 3 years | Collaboration with MCPMALG, Environment, SGU, UWI and Sargassum Committee. |
| 5.22 | Carriacou and PM; replant and replace the lost mangrove population island-wide (note MPAs have specific objectives to be achieved within their boundaries). | MCPMALG, Forestry, Environment. | 300.000 | 4 years | |
| 5.23 | Carriacou/PM: eliminate inappropriate disposal of solid waste (note MPAs have specific objectives to be achieved within their boundaries). | Carriacou, Forestry, Environment, Grenada Solid Waste Management Authority (GSWMA) | 200.000 | 4 years | Complete in collaboration with Fisheries. |
| 5.24 | Carriacou: implement a programme for the rehabilitation of severely degraded lands in Belle Vue South due to overgrazing, neglect and poor overland water management (this will include the mobilization of funding to support programme). | Carriacou, Forestry, Environment | 300.000 | 4 years | |
| 5.25 | Carriacou/PM: implement the "Coastal Restoration Plan for CPM" developed by OECS. | Carriacou, Coastal Zone Taskforce | 500.000 | 4 years | Complete in collaboration with Forestry. |

Objective 4: Increase awareness about ecosystem-based adaptation and its benefits for sustainable development and coastal protection

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|--|-----------------------------------|----------|---|
| 5.26 | Conduct public awareness, education and interpretation activities and information sessions for local communities, concerned authorities and stakeholders to highlight the values, potential benefits and vulnerability of the MPA resources, to increase awareness of the value and vulnerability of coral reefs, and on the negative impact of inappropriate practices such as sand mining or non-selective fishing, on MPA zoning and rules, applicable regulations and enforcement. | Fisheries, Environment, Education | 500.000 | 4 years | Complete in collaboration with Carriacou. |
| 5.27 | Conduct ecosystem valuation studies in key coastal areas to advocate for the benefits of ecosystem conservation and restoration to reduce vulnerability to climatic hazards. | Environment, Fisheries | 100,000 | 3 years | In collaboration with Carriacou. |
| 5.28 | Conduct participatory mapping activities together with communities, government officials and the private sector to understand and identify coastal assets and ecosystem services within key areas. | Environment, Fisheries, Coastal Zone Taskforce, NGO's and CBO's. | 100,000 | 3 years | |
| 5.29 | Expand the 'Reef Guardians' outreach and education programme from Moliniere/Beausejour MPA to all the other MPAs. | Fisheries, MCPMLA | 500,000 | 3 years | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|------------------------|-----------------------------------|----------|----------------------------------|
| 5.30 | Conduct programmes to raise awareness about the role of herbivore fish in reef health. | Fisheries, MCPMLA. | 500.000 | 4 years | |
| 5.31 | Organize and participate in information sharing events (conferences, seminars) about marine management. | Fisheries. | 100.000 | 3 years | In collaboration with Carriacou. |
| 5.32 | Conduct programmes to increase awareness of importance of mangroves. | Forestry, Environment. | 200.000 | 5 years | In collaboration with Carriacou. |
| 5.33 | Promote more lionfish consumption. | Fisheries. | 300.000 | 5 years | In collaboration with Carriacou. |

Summary of PoA 6-

Integrated coastal zone management

Approx. budget: USD 15 million

Objective 1: Initiate the development a database on relevant ecosystems and coastal structures

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---|-----------------------------------|----------|--|
| 6.1 | Update existing inventory of all (private and Government) coastal structures. Based on results, develop recommendations to prevent the alteration of coastal dynamics and processes by coastal development. Recommendations should feed into correcting existing coastal structures. This activity will set the benchmark for establishing and constantly monitoring the High Water Mark and therefore informing coastal setbacks as well as regulations under the CZ Management Act. | Lands and Survey, Agriculture, PPU, Environment, Coastal Zone Task Force, MCPMALG. | 5 million | 4 years | For a more accurate costing, an estimate is needed regarding the cost of surveying each land parcel. |
| 6.2 | Undertake regular profiles of prioritised beaches in Grenada, CPM. This will inform which areas are vulnerable to sea level rise, storm surge and are experiencing coastal erosion. This will provide important data on the coastal processes which can then inform stabilisation efforts either through hard or soft engineering, EbA practices and coastal planning. | Coastal Zone Task Force, Environment, NGOs active in the coastal area, Lands and Survey, MCPMALG. | 165,000 | 5 years | Some activities & training have already started. Indicative costs cover transportation, equipment maintenance etc. May need to link with Geodetic work already being done under the DVRP Project. Surveyors and Imani persons could also assist. |
| 6.3 | Initiate the collection of wave and current data. This will provide important data on coastal processes which can inform the coastal zone management unit in reviewing coastal developments and in the creation of a coastal zone management plan. | Coastal Task Force; Environment, CMPALG. | 1 million | 5 years | Training will be needed for local persons. (At least Masters level). Also coastal engineering expertise needed, as well as software for analysis. Indicative costs would have to cover periodic installation, monitoring and diving to maintain the equipment. Approx. USD 220,000 will cover the equipment cost. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|---|-----------------------------------|----------|--|
| 6.4 | Set-up seagrass monitoring programme involving at minimum, an annual survey in order to determine areal extent, presence of disease, presence of invasive species richness and diversity, density etc. | Fisheries Environment Coastal Zone Task Force, CMPALG. | 100.000 | 5 years | Recommendation to add Coral Reef Monitoring and expand the monitoring programmes beyond the MPA areas. To start with, permanent transects can be installed for regular monitoring both within and out of MPAs. Costing based on current monitoring and the need to scale up. |
| 6.5 | Involve communities and schools in data and information collection for ecosystem monitoring as well as coastal and marine processes. | Ministry of Education, (in order to mobilise Primary, Secondary and Tertiary institutions), Fisheries, Forestry, Environment, NGO's, MCPMALG. | 1 million | 5 years | |

Objective 2: Improve technical capacity for integrated coastal zone management

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|--|-----------------------------------|----------|--|
| 6.6 | Establish Coastal Zone Unit and Board,- Board can be based on the existing CZ Task Force; funding is required to ensure appropriate initial staffing of the Unit, incl. coastal engineers, GIS experts, marine biologists, environmental lawyers etc. | Environment Division | 1 million | 5 years | Phased approach needed. Gaps already identified for coastal engineering and environmental law. Build on these gaps first. (Indicative costs based on USD 185,000 or hiring coastal engineer and another technical person multiplied by 5 years). Link to establishment of a Coastal Zone Management Unit Utilize existing Task Force Members right now. |
| 6.7 | Strengthen technical capacity of CZ Task Force/ CZ Unit members and others in a variety of different areas of Integrated Coastal Zone Management, - e.g. such as coastal water quality analysis, coastal planning, coastal engineering, coastal project management, hydrographic surveying, draughtsman, data analysis, archiving and modelling for coastal vegetation etc. and tailor to reflect the relevant and specific circumstances of Carriacou and PM. | Environment Division, Coastal Zone Task Force. | 250,000 | 5 years | Link to establishment of a Coastal Zone Management Unit and Board as per the above. Costing based on short term capacity building for Task Force (50,000 per year for 5 years). |

Objective 3: Improve institutional set-up for coastal zone management

| | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|---|--|----------|---|
| 6.8 | Continue regular meetings of the Coastal Zone Task Force. | Environment Division | 18,500 | 5 years | Capacity Building is needed for Coastal Zone Task Force. (Right now meetings have no cost associated. A small amount such as USD 3700 may assist with future costs for catering, workshops, etc. Remuneration for Task Force members for attending meetings would also be beneficial. USD 14,700. |
| 6.9 | Develop Coastal Zone Management Act, based on existing Coastal Zone Management Policy. | Environment Division, Coastal Zone Task Force, Legal Affairs. | Already in progress funded under ICCAS Project | 1 year | Need to look at enforcement and training for Coastal Zone Task Force and Police Officers. (CZM Policy would also need an M&E framework). |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|--|--|----------|---|
| 6.10 | <p>Develop a Coastal Zone Management Plan:</p> <ul style="list-style-type: none"> - Assess recommendations from CZP and the roadmap. - Review previous monitoring documents. - Consider international laws such as the UN Convention on the Law of the Sea. - Re-visit all coastal cells as defined in the delineated Coastal Zone Management Area, with a view to understanding how ICZM would work in each cell, what can be done and what should not be done. - Conduct a national consultation on the Coastal Zone Management Plan. | Environment Division Coastal Zone Task Force MCPMALG. | 2-3 million | 3 years | <p>A consultant would need to be hired.</p> <p>Have to be based on ongoing Data Collection under objective 1.</p> <p>USD 135,000 for island wide consultations over 1 year.</p> |
| 6.11 | Widen the mandate of Coastal Zone Task Force to oversee coastal ecosystem-based adaptation efforts in the tri-island state. | Environment Division, Coastal Zone Task Force, Forestry, Fisheries, MCPMALG. | Should be linked to the process and funds allocated for the development of the Coastal Zone Act happening under the ICCAS Project. | 1 year | This should be incorporated into the current draft of the Coastal Zone Act Actions under the United Nations Environment Programme's Ecosystem-based Adaptation (UNEP EbA) project (legislative review) may assist with this. |
| 6.12 | For Carriacou and PM; start the preparation of a Coastal Zone Management Plan for CPM building on recommendations from the "Carriacou and Petite Martinique Coastal Rehabilitation Plan" developed by the OECS and following the steps above. | Coastal Zone Task Force, Environment, MCPMALG | 50,000 - 70,000 | 1 year | Consultant should be hired. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|--|-----------------------------------|-----------|--|
| 6.13 | <p>Address sand mining on beaches and removal of sand from off shore sources.</p> <ul style="list-style-type: none"> - Launch and sustain an ongoing extensive public education and discussion programme on climate change impacts on coastal communities (Emphasize the value of beaches to coastal communities). - In partnership with the private sector and civil society, draft a "white paper" on alternatives to GCEMPC beach sand mining for discussion at Cabinet and Parliament. - Develop and run ongoing public service announcements on climate change and the importance of sand (consider using a popular Grenadian calypsonian to deliver the message). - Set up a sand mining hotline, for the public to report incidences of removal of sand. - Prepare phase-out plan with key stakeholders to begin transitioning of construction sector to alternative sand sources. | Coastal Zone Task Force, Environment, MCPMALG | 50,000 - 70,000 | 1 year | Consultant should be hired. |
| 6.14 | Address sand removal from beaches and off shore sources. Begin a comprehensive sediment transport and budget study Phase 1. | Coastal Zone Task Force, Environment, MCPMALG. | 163,000 | 1.5 years | The extension of the ICCAS Project will pilot this action focusing on particular sections of the coastal zone. |
| 6.15 | Address sand removal from beaches and sourcesBegin a comprehensive sediment transport and budget study Phase 2. | Coastal Zone Task Force, Environment, MCPMALG. | 2.5 million | 4 years | This phase will cover the remaining areas of the tri-island state. |

Summary of PoA 7-

Resilient infrastructure and sustainable land management

Approx. budget: USD 112.9 million

Objective 1: Improve policy, legal, regulatory and institutional framework for resilient infrastructure and sustainable land management

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---------------------------------|-----------------------------------|-------------------|---|
| 7.1 | <p>Mobilise resources to:</p> <ul style="list-style-type: none"> - Ensure that technical capability exists in the Physical Planning Unit (PPU) to enforce the Building Code and Physical Planning and Development Control Act and Regulations. - Conduct a comprehensive review of the functions of the PPU with recommendations for organizational structure and updated functions for sustainable land management. - Ensure that climate considerations are implemented through the enforcement of the Physical Planning and Development Control Act and the Building Code and Regulations for Environmental Impact Assessments (EIA) and Archaeological Impact Assessments. | PPU, Human Resource Development | 1.5 million | 3 years | <p>Capacity for CPM is needed</p> <p>Collaboration with Police Officers is necessary.</p> |
| 7.2 | Update of National Physical Development Plan taking into consideration climate risks and identifying critical areas for conservation & regeneration, taking current plan proposals into consideration. | PPU | 1.4 million | 4-5 years | Include drainage network. |
| 7.3 | Strengthen the inclusion of climate change considerations in EIA TORs and strengthen monitoring of identified risk mitigation measures. | PPU | No cost | Short-term (2017) | This should be linked to action 1 and build capacity for monitoring mitigation measures. The Coastal Zone Task Force can also have a role here. Draft regulations for the 2016 Act are in place and are being reviewed by PPU together with Legal Affairs. To be implemented in 2017. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---|-----------------------------------|-----------|--|
| 7.4 | Climate change considerations integrated into updated airport master plan. | Ministry of Tourism and Civil Aviation, Airports Authority, Ports Authority, PPU, Min. of Works | 100,000 | 1-2 years | Recommendation to duplicate this for the Tourism Master Plan. |
| 7.5 | Complete and publish a short guide for coastal developers/ investors/builders which includes rules, regulations, processes which summarises main points of the new development manual. | PPU, Government Printery. | 8-10,000 | 1 year | This assumes that a draft is nearly completed. Clarification needed as to where additional costs are necessary besides printing. |
| 7.6 | Approve and implement the Carriacou Land Policy. | MCPMALG, PPU. | 0.5 million | 3-4 years | Draft completed. The aim is to integrate this draft plan into the National Land Policy above. |
| 7.7 | Conduct a strategic and climate-smart plan for inland and coastal tourism development zones with a focus on providing alternatives to coastal tourism and diversify the tourism product to decrease ecosystem stress from coastal tourism (e.g. cultural/culinary tourism, hiking, agro-tourism etc.). Include results in the update of relevant tourism plans. | Tourism, GTA, PPU, Grenada Industrial Development Corporation (GIDC), Coastal Zone Task Force, Lands and Surveys. | 1 million | 3-5 years | |

Objective 2: Identify land and infrastructure at risk of being damaged or lost due to impacts of climate change

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|--|-----------------------------------|-----------|--|
| 7.8 | Conduct detailed Climate Change Vulnerability Assessment for all three airports (Dumfries, Maurice Bishop, Pearls), including parking areas (sea-level rise, erosion, increased temperatures and impact on runway, flooding etc.) and implementation of first erosion control measures, where required. | Ministry of Tourism and Civil Aviation, Grenada Airports Authority, PPU Environment, NaDMA.. | 5-10 million | 2 years | It is planned to use Pearls airstrip for an aviation school and for emergency landings. The update of National Development Plan should inform these actions. |
| 7.9 | Assess climate change vulnerability of existing tourism sites and potential new sites; assess vulnerability of other relevant tourism infrastructure; develop recommendations for physical adaptation measures for tourism infrastructure like port, resorts, road system and bridges. Include results in relevant tourism plans. | Tourism, GTA, Environment, Works, Lands and Survey, PPU, NaDMA. | 20 million | 3-5 years | Should be linked with activity under objective 1: "Conduct a strategic and climate smart plan for inland and coastal tourism". A starting point could be the fiWI assessment for the town of St. George's. |

Objective 3: Improve the resilience of selected buildings and infrastructure and implement local area adaptation plans

| | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-------------|---|--|-----------------------------------|-----------|--|
| 7.10 | Establish a funding programme for improvement of vulnerable households. | Social Development and Housing, Credit Union, Local Banks. | 5 million | 3-5 years | Other vulnerable sectors should be included i.e. where relevant and necessary should include commercial buildings and infrastructure Mechanisms for operations must ensure that the neediest benefits from this programme. |
| 7.11 | Mobilise resources for the implementation of the "CLIMATE CHANGE ADAPTATION PLAN FOR LOWER SAUTEURS" developed by the OECS. | Coastal zone task force, PPU, Lands and Survey, Works, Environment, NaDMA. | 5 million | 3-5 years | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|--|---|----------------|---|
| 7.12 | <p>Mobilise resources for implementation of Greater Grenville Local Area Plan:</p> <ul style="list-style-type: none"> - Identify drainage problem areas, pumping station and prospective on-site retention locations and assess need for new drainage systems. - Establish development standards for culverts. - Compose and implement a watershed management plan, with special attention to the Harford Watershed. - Improve maintenance of existing drainage system. - Identify agricultural practices that prevent erosion. - Prohibit development on hazard prone lands through the establishment and implementation of a development order. - Undertake a review and updated engineering study for central sewer services in the Town of Grenville. - Encourage the Environmental Health Department to provide education on new septic field treatment and maintenance options. - Relocate piped water services from the bottom of drains to prohibit incidences of cross-contamination. - Enforce laws that prohibit sand mining. Collect coastal data to develop a coastal zone management plan for the area. Implement flood mitigation measures for the town of Grenville based on assessment results (study conducted by a Canadian university?). | <p>PPU, Works, Grenada Bureau of Standards, Land-use, Agriculture, CZM Task Force, Environmental Health, NaWaSA.</p> | <p>15 million</p> | <p>5 years</p> | <p>This should be continued beyond the 5 year period.</p> |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|--|-----------------------------------|-----------|---|
| 7.13 | Implement/mobilise resources to implement recommendations from the WHO/PAHO "Safe Hospital Index" assessment related to disaster and climate risk reduction. Set-up a "Safe & Climate-Smart Hospitals/Health Facilities" Programme. | PPU, Health, NaDMA. | 2 million | 2-3 years | |
| 7.14 | Improve resilience of other selected infrastructure (schools, old age homes, water supply etc.) based on results of detailed vulnerability assessments. | Education, Works, NaWaSa, Social services. | 4 million | 3-5 years | |
| 7.15 | Design and implement mitigation works construction works to stabilize areas prone to floods, rock falls, and landslides. Improve resilience of most vulnerable bridges as identified in nation-wide bridge assessment. | Works, PPU. | 40 million | 3-5 years | PPU for mapping. |
| 7.16 | Develop a program for identifying loose boulders and slippage areas. Design and implement mitigation measures. | Works, PPU. | 1 million | 3-5 years | This should be linked to 7.15 above – stabilisation of areas prone to floods, rock falls etc. Link to National Physical Development Plan. Should be continued beyond the 5 year period. |
| 7.17 | Carriacou; undertake shoreline/cliff stabilisation to protect public infrastructure of socio-economic importance in Windward. | MCPMLG, Works. | 5 million | 3-5 years | |

Objective 4: Improve technical capacity for spatial data management, risk modelling and climate-smart/ green building approaches/standards

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|---|-----------------------------------|-----------|----------|
| 7.18 | Improve the use of data, GIS and remote sensing for climate change adaptation and prepare a plan of action for long-term sustainability for spatial data management. | Land-Use, PPU, Environment, NaDMA, Meteorological office. | 0.5 million | 2-5 years | |
| 7.19 | Establish and improve capacity for risk modelling for SLR, storm surges, inland flooding and land slippage and improve data collection. | Meteorological Office, Land-Use, PPU, Environment. | 350,000 | 2-5 years | |
| 7.20 | Design a training programme on green, climate-resilient building practices, guidelines and standards in collaboration with existing learning centres (e.g. TAMCC, NEWLO) and target-group specific training content. | Education, PPU. | 0.5 million | 2-5 years | |

Summary of PoA 8-

Disaster risk reduction and disease prevention

Approx. budget: USD180,000

Objective 1: Mobilise funds to implement NaDMA's Country Programme (2015-2019)

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|---|-----------------------------------|----------|----------|
| 8.1 | Include climate-related actions from NaDMA's Country Programme (2015-2019) in NAP funding proposals. | Environment Division, DETC, NCCC, NaDMA | 20,000 | Ongoing | |

Objective 2: Establish climate-sensitive disease surveillance and control

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|--------------------------------|-----------------------------------|----------|--|
| 8.2 | Include climate information and improve national disease surveillance system to strengthen the analysis and use of disease data and enable forecasting and real-time outbreak monitoring. | Epidemiology Department. | 60,000 | 2 years | There is a need for software/database that can incorporate health and climate information. CIMH tools are available/ accessible; but there's a need for someone who is sufficiently trained to analyse climate and health information to contribute more effectively to this action. |
| 8.3 | Link historic prevalence/incidence data of priority diseases with climatic data to establish possible correlations. | Universities (SGU / Regional). | 10,000 | 1 year | Can be done by a university student as their research project. Data for specific variables are available. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|---|-----------------------------------|----------|--|
| 8.4 | Improve vector surveillance, especially data capture, analysis and usage, to better target control measures and save limited resources. | Vector Control, Environmental Health Department. | 30,000 | 2 years | Including purchase of GPS hand-held units, training of field officers in GIS usage and skills. |
| 8.5 | Limit the spread of vector borne diseases as early as possible to protect residents and tourists. Avoid cancellations and reputational damage by reducing litter, especially plastic. | Ministry of Health, Police, Ministry of Tourism, Grenada Solid Waste Authority. | n/a | 5 years | <ul style="list-style-type: none"> - Develop mechanism/enforce the Anti-Litter Act with support of litter wardens. - Maintain clean waterways. - Discuss ban of styrofoam and taxes on plastic. - Promote the GHTA anti-breeding ground program. - Ensure that the environmental levy is being charged for all plastics being brought on to the island, including those which are imported as preforms. - Develop a refund scheme for plastic bottles. |

Objective 3: Build disaster preparedness and vector control capacities at community level

| | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|--|-----------------------------------|------------|----------|
| 8.6 | Inclusion of climate-sensitive diseases in Disaster Risk Management training. | NaDMA, Preventative Health Care Department, (MOH). | 10,000 | 1 year | |
| 8.7 | Training of health care personnel on disaster preparedness, response and vector control measures, especially at community-level. | Ministry of Health (Community Services) | 50,000 | Continuous | |

Summary of PoA 9-

Climate and sea-level rise data and projections

Approx. budget: USD 7 million

Objective: Strengthen the collection, analysis and use of climate-related data

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|---|--|-----------------------------------|-----------|----------|
| 9.1 | Establish, equip and maintain the National Meteorological Service (own facility) that will be the main coordinator for collecting, collating, analysing and disseminating climate related data to all potential users, including the Maurice Bishop International Airport, the Agricultural Sector, the Water Sector, the National Disaster Management Agency and the Ministry of Health etc. | Meteorological Office and Ministry of Finance. | 1 million | 3-4 years | |
| 9.2 | Develop a national climate data management policy. | Meteorological Office and Environment Division. | 100,000 | 1-2 years | |
| 9.3 | Monitor and map changes in rainfall patterns, intensity and distribution (atomized weather station in all main water sheds, data easily accessible and distributed to all relevant agencies and information to the public about changes/ extremes). | Meteorological Office and Finance | 2 million | 5 years | |
| 9.4 | Become a member of the World Meteorological Organization so as to benefit from their climate information support | Meteorological Office and Foreign Affairs with support from CIMH | 1,000 | 1 year | |
| 9.5 | Documentation of traditional knowledge and anecdotal information on climate-related impacts to supplement gaps in the data record. | Meteorological Office, Tourism, NaWaSA, NaDMA, Land-Use. | 0.5 million | 2-3 years | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-----|--|---|-----------------------------------|-----------|---|
| 9.6 | Carriacou/PM: include CPM in an expanded hydro-met network - with equipment to measure rainfall, temperature, sea-surface temperature, and sea-level rise. | Meteorological Office and Finance. | 3 million | 5 years | |
| 9.7 | Enhance climate data products - with the collaboration of CIMH - to support decision-making in key sectors. | Meteorological Office and Land-Use Division, NaWaSA, NaDMA, Extension | 200,000 | 1-2 years | |
| 9.8 | Enhance the collaboration of the Meteorological Office with regional climate modelling groups. | Meteorological Office. | 100,000 | 5 years | Should be continued beyond the 5 year period. |
| 9.9 | Build and maintain capacity among decision makers to access and use climate-related data. | Meteorological Office and Land-Use Division, NaWaSA, NaDMA, Extension Division, Health. | 100,000 | 1-2 years | |

Summary of PoA 10-

Sustained public education and participation

Approx. budget: USD 1.7 million

Objective 1: Strengthen the knowledge base of decision makers with regard to climate change and adaptation

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|---|----------------|-----------------------------------|---------------------|---|
| 10.1 | Develop bi-annual/year-end Cabinet Updates on "Recent Developments in Climate Change" aimed at keeping government officials abreast of new developments in the understanding of the science and impacts of climate change and the implications for Grenada, as well as progress made towards NAP implementation and NDC achievements. | NCCC | 10,000 | 5 years and ongoing | Include Parliament and the Senior Management Board. Conduct a cost-benefit analysis on action on climate change mitigation and adaptation versus no action. |
| 10.2 | Conduct targeted presentations and seminars to senior decision-makers in the public and private sector. | NCCC | 5,000 | 5 years and ongoing | |

Objective 2: Support the teaching of climate change at all levels of the education system

| Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments | |
|----------|---|-----------------------------------|----------|----------|--|
| 10.3 | Promote the use of the Grenada-specific "Greenz Climate Champion" interactive toolkit within the tri-island's primary schools and after school programmes. (Toolkit includes teacher manual, worksheet collection, stickers, passport and posters) Toolkit to be integrated into the regular school curriculum. | Environment and Education. | 16,000 | Ongoing | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | |
|------|--|--------------------------------|-----------------------------------|----------|--|
| 10.4 | Mobilise funds for printing additional copies of the "Greenz Climate Champion" interactive toolkit. | Education | 16,000 | 3 years | |
| 10.5 | Integrate "Greenz Climate Champion" material into course material for teacher education. | Education, TAMCC, Environment. | 60,000 | 5 years | Produce teaching course, seminars and other materials. |
| 10.6 | Include climate change projects into the activities done by secondary school students at T.A. Marryshow Community College and St. George's University. | NCCC, Education, TAMCC, SGU. | 80,000 | 5 years | |

Objective 3: Further generate a national awareness of climate change and its impacts and the role of the individual in responding to the impacts

| | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|----------------------------|-----------------------------------|-------------------|---|
| 10.7 | Continue to raise awareness in communities regarding the importance of coastal ecosystems for climate change adaptation. | Environment and Education. | 36,000 | 5 years - ongoing | Use days of environmental significance. Use platforms such as Exhibition, Grenlec debates, NaWaSA's Water Warz quiz, walks and commercials. |
| 10.8 | At the end of the ICCAS programme (2018), transform ICCAS Facebook page/website into a Facebook page/webpage of the Environment Division and upload content regularly. | Environment. | 0 | 3 years | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | |
|-------|--|--|-----------------------------------|-------------------|--|
| 10.9 | Continue community level presentations, discussions and public fora on climate change and its implications for Grenada, CPM. | Environment and key stakeholders. | 40,000 | 5 years - ongoing | Include the Sustainable Development Council. |
| 10.10 | Continue implementation of practical demonstration projects at the community level that can be used to highlight the impacts of climate change and the potential of community led response activities as well as the livelihood opportunities (if applicable). | Environment and Community, Climate Change Adaptation Fund. | 1.25 million | 5 years | |

Summary of PoA 11-

Adaptation financing

Approx. budget: USD 1.4 million

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|---|-----------------------------------|----------|---|
| 11.1 | Explore the design of new economic and other fiscal instruments to raise funds for adaptation. Reform incentive systems to change behaviours such that people adapt. | MoFPEDTEC; Environment Division. | 40,000 | 2 years | |
| 11.2 | Complete process of assessment of debt swap model to finance marine conservation and ecosystem based adaptation to climate change; proceed according to assessment results. | MoFPEDTEC; Environment Division; TNC Debt Unit. | 30,000 | 1 year | |
| 11.3 | Assess private sector challenges to/market for building resilience and the role of government. Identify actions to be undertaken to increase private sector involvement, focusing on the agriculture, beverage (rum distillery), energy and tourism sectors. | NCCC; MoFPEDTEC | 20,000 | 2 years | Source of private sector finance not yet clear. This needs to be identified during the process. |
| 11.4 | Position Grenada to benefit from bilateral funds and multilateral funds, preferably in the form of grants where appropriate. Apply for funding where there is alignment between Grenada's needs and funder priorities. | DETC; NCCC. | 200,000 | 5 years | |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|-----------------------------------|-----------------------------------|----------|--|
| 11.5 | Apply for and implement Climate Finance Readiness support provided by the GCF. | DETC, Environment Division, NCCC. | 250,00 | 5 years | Application for Areas 1 and 2 already complete (development of Country Programme and Capacity Building for NDA processes). GCF approval expected in 2017. Implementation planned jointly with Delivery Partner. Application of Areas 3 and 4 to be submitted in 2017 (development of a pipeline of projects and accreditation of a NIE). |
| 11.6 | Seek accreditation for GCF National Implementing Entity (NIE) in Grenada. | DETC | 100,000 | 2 years | This builds on recommendations arising from the Climate Finance Readiness assessment of Grenada, as well as the gap analysis for two potential NIEs in Grenada. Based on this analysis, the Grenada Development Bank has been chosen as the intended NIE. |

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|-------|--|---|-----------------------------------|----------|---|
| 11.7 | Improve the investment risk profile and the attractiveness of the country to private foreign direct investment, through enhanced ease of doing business. | MoFPEDTEC; DETC; NCCC, GIDC. | 400,000 | 5 years | Staff USD 12,000 year per person Expert USD 92,000 year per year |
| 11.8 | Review and revise Grenada's PPP policy in light of the recommendations provided in the 2016 World Bank report on emerging trends in integrating climate resilience in large scale, multi-sector infrastructure projects. | Environment Division; NCCC; MoFPEDTEC, MoF (Policy Unit). | 50,000 | 1 year | |
| 11.9 | Develop and implement climate change themed training programme on bankable proposal development to state and non-state actors. ⁸⁶ Programme to include mentoring and refresher courses as required. | NCCC; DETC; Environment Division. | 50,000 | | Development of this course should build on lessons learned from ICCAS guidance/ training on how to write proposals for the national Community Adaptation Fund and on the proposal writing course offered by the Caribbean Development Bank. |
| 11.10 | Support staff exchange programmes: government staff spending time working at the CCCCC offices to build capacity, or exchanging places with persons from another Caribbean country. | NCCC; DETC; Environment Division, DPA. | 100,000 | 5 years | |
| 11.11 | Institutionalisation of CCCAF. | NCCC; DETC; Environment Division. | 150,000 | 2 years | |

⁸⁶ GIZ (2016), Status report (based on mission) of adaptation finance accessed to date and recommended climate finance actions to include in Grenada's NAP.

Summary of PoA 12-

Monitoring and evaluation

Approx. budget: USD 170,000

| # | Measures | Responsibility | Indicative cost where known (USD) | Timeline | Comments |
|------|--|---|-----------------------------------|----------|----------|
| 12.1 | Appoint an M&E coordinator within the climate change focal point network. | NCCC; Environment Division. | 20,000 | 3 months | |
| 12.2 | Collect aggregated data from climate change focal points within ministries/agencies involved in implementation. | NCCC; Environment Division, CC focal points. | 30,000 | Ongoing | |
| 12.3 | Conduct tailored M&E training and build capacity of climate change focal points so they are capable of conducting the required tasks. | NCCC; Environment Division, CC focal points. | 50,000 | 1 year | |
| 12.4 | Analyse and report on adaptive capacity and reduction of vulnerability at the country level, and/or how government policies/plans/ interventions are contributing. | Environment Division and key stakeholders. | 20,000 | Ongoing | |
| 12.5 | Analyse and report adaptive capacity and reduction of vulnerability at the local/ individual/household level and how interventions are contributing. | Environment Division and key stakeholders. | 20,000 | Ongoing | |
| 12.6 | Analyse and report on progress addressing gender dimensions through M&E of adaptation. | NCCC; Environment Division | 10,000 | Ongoing | |
| 12.7 | Report progress on NAP implementation and update within National Communication. | NCCC; Environment Division | 20,000 | Ongoing | |

Process of development of the NAP document

Since 2015, the development of the NAP has been through a very broad consultation process. The plan was developed with detailed input from more than 160 Grenadian stakeholders from various ministries, private sector, NGOs, CBOs, TAMCC and SGU (60% male/40% female participation). **The process included the following steps.**

A national kick-off workshop, in early 2015, on Stocktaking for National Adaptation Planning (SNAP) consultation⁸⁷; assessing climate resilience and adaptation planning capacities currently available and intended for Grenada, Carriacou and Petite Martinique.

Assessment of the current state of adaptation integration in Grenada was completed via one-to-one interviews with representatives of the NCCC, Environment Division, Cabinet Office, NaDMA, the Physical Planning Unit and Budget Division. Recommendations for integrating adaptation were also generated through these one-to-one interviews and were endorsed during a NCCC meeting. Interview questions and discussion points were informed by the 'guiding questions for analysing planning and budgeting processes' presented in GIZ's 2014 'NAP Align' methodology.⁸⁸

A Cabinet Conclusion endorsing the development of a NAP document and the implementation of a NAP process.

Provision of strategic direction and detailed comments at various stages by the National Climate Change Committee (NCCC), specifically the adaptation sub-committee.

Initiation and launch of the NAP process, including briefing state and non-state stakeholders, about the risks from a variable and changing climate and how the NAP could help address these risks.

Extensive review of existing documentation (policies, plans, studies, reports etc.) on climate scenarios, vulnerabilities, risks and adaptation options for Grenada, Carriacou and Petite Martinique. All of this information was collated into sector-specific action plans, which were discussed and revised in sectoral workshops (see next bullet point).

Nine sectoral workshops were conducted (involving agriculture, water, tourism, infrastructure, health, fisheries, forestry, coastal zone management and Carriacou/PM), to develop final sector plans with prioritised actions and various meetings from November 2015 – September 2016.

The table below presents the prioritisation and ranking guidance agreed by the Environment Division.⁸⁹ The top 60% measures from across the sector workshops were then organised into cross-cutting programmes of action (PoA). In order to address the cross-sectoral nature of most of Grenada's adaptation goals, priority sectoral measures have been organised and presented as cross-cutting PoAs.

One final national consultation with 67 stakeholders was held to add costing, responsibilities and to finalise PoA goals and indicators. The different working groups also discussed various 'NAP vision' options.

'NAP vision' options were discussed at the final national consultation. The final decision was taken by the NCCC.

Attendance of various international and regional fora to learn from other countries' NAP experience and to present Grenada's approach. Jamaica's approach and experience of the NAP process was presented both at the kick-off workshop and again at the final national consultation.

Various newspaper articles and social media posts were also prepared to inform the general public about the development of the NAP.

These steps were guided by the UNFCCC 'Technical guidelines for the national adaptation plan process'.⁹⁰

⁸⁷ Using GIZ's SNAP Tool

⁸⁸ GIZ. (2014). NAP Align.

⁸⁹ The prioritisation criteria were not applied for PoA 9, 10 and 11.

⁹⁰ UNFCCC (2012)

SCORING SYSTEM – DEFINITIONS (3 MAX - 0 MIN)

| | SCORE 3 | SCORE 2 | SCORE 1 | SCORE 0 |
|---|--|--|--|---|
| CRITERION 1 To what extent does this measure focus on implementation at the community level? | It is a community – based measure | To a moderate extent. | To a limited extent | No relevance for community-based implementation |
| CRITERION 2 What is the possibility of this measure being funded by capital budget over the next 5 years. | Highly likely | Potentially | Highly likely | Not likely |
| CRITERION 3 To what extent can this measure be feasibly implemented within five years, according to available human, technical, institutional, legal, administrative, and other, resources? | Highly feasible. Resources available. | Moderately feasible. Moderate resource gaps could be sourced externally | Limited feasibility. Major resource gaps would be costly to resource externally | Unfeasible |
| CRITERION 4 How urgent is the proposed measure given the current climatic-impacts, vulnerabilities and risks where delaying action would lead to increased costs at a later stage? | Very urgent and highly demanded by agriculture stakeholders, since it addresses serious current climatic impacts, and/or a challenge where delaying action would lead to increased costs | Moderately urgent since it addresses moderate current climatic impacts, and/or a challenge where delaying action would lead to increased costs | To a limited extent, since it addresses minor climatic impacts but delaying action would not lead to increased costs | Not at all |
| CRITERION 5 To what extent is this measure transformative? | Potential for replicating/upscaling, for knowledge & learning, and contributes to enabling the environment. | Potential for replicating/upscaling, for knowledge & learning, and/or contribution to enabling the environment. | Limited potential for types of transformation described above. | No potential for replicating or upscaling, for knowledge & learning, & / or contribution to enabling the environment. |

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| MINISTRY / ORGANISATION | NAME | SECTOR WORKSHOPS |
|---|---------------------|---|
| Agriculture | Daniel Lewis | Agriculture, Nat. Consult. NAP Kick-off |
| Agriculture | Merina Jessamy | Mainstreaming meeting |
| Agriculture - agronomy | Shira Baldeo | Agriculture |
| Agriculture - agronomy | Indra Baldeo | Agriculture |
| Agriculture - drm | Benedict Peters | Tourism, Nat. Consult., NAP Kick-off |
| Agriculture - extension | George Phillip | Water, Agri., Nat. Consult., NAP Kick-off |
| Agriculture - extension | Randolph Shears | Agriculture |
| Agriculture - land-use | Celia Edwards | Infrastructure |
| Agriculture - land-use | Raymond Baptiste | Agriculture |
| Agriculture - livestock | Bowen Louison | National Consultation |
| Agriculture - livestock | Dexton St. Bernard | National Consultation |
| Agriculture - planning | Gregory Delsol | Agriculture, National Consultation |
| Agriculture - produce chemist laboratory | Erwin Henry | Agriculture |
| Agriculture - spice research project | Ronald O'Neale | Agriculture |
| Cabinet office | Feona Sandy | NAP Kick-off |
| Cabinet office | Francis Robertson | Mainstreaming meeting |
| Cardi | Reuben Raymond | National Consultation |
| Carriacou farmer | David Andrew | Carriacou and Petite Martinique, Nat. Consult. |
| Ccccc | Joseph McGann | National Consultation |
| Ccccc | Ottis Joslyn | National Consultation |
| Clabone spring water | Richard Sylvester | Water |
| Royal grenada police force, coast guard - rgpf | Bobby Medford | CZM |
| Consultant | Nicholas Fields | National Consultation |
| Consultant | Judi Clarke | National Consultation |
| Consultant - tna | Joyce Thomas | Water |
| Cpm water taxi ass. | Bryan Prince | Carriacou and Petite Martinique |
| Detc | Titus Antoine | National Consultation, Mainstreaming |
| Detc | Yolande Newton | National Consultation |
| Detc | Rickie Morain | National Consultation |
| Detc | Valerie Joseph | NAP Kick-off |
| Devotion 2 ocean | Frank Collymore | Fisheries/MPA |
| Dvrp | Ronnie Theodore | Infrastructure |
| Education | Augustine Vesprey | National Consultation |
| Environment | Aria St. Louis | Forestry, Water, CZM, Agri., CPM, Nat' Con., NAP Kick-off, Infrastructure., Facilitation |
| Environment | Andre Joseph-Witzig | Fish., Tourism, CZM, Infrastructure., Nat. Consult |
| Environment | Kevin Andall | National Consultation |
| Environment | Martina Duncan | Agri., Nat'l Consult., Kick-off, Mainstream |
| Environment | Roopram Rajwant | NAP Kick-off |
| Environment - Intern | Shedonna Richards | Forestry, Fisheries/MPA |
| Environment - Intern | Nichole Gellineau | National Consultation |
| Finance - Budget | Kerry Pierre | Mainstreaming meeting |
| Forestry | Anthony Jeremiah | Forestry, CZM, Nat. Consult., NAP Kick-off |
| Forestry | Dillon Palmer | Forestry |
| Forestry | Aleanna Williams | Forestry |
| Friends of the Earth | Kriss Davies | CZM |
| Friends of the Earth | Joseph Antoine | CZM |
| GCA | Matthias Joseph | Agriculture |
| GEF-SGP | Simone Lewis | Forestry, National Consultation |
| GFC | Sabrina Compton | Forestry, National Consultation |
| GFC | Zoya Buckmire | Forestry |
| GFNC | Lydia Browne | Agriculture |
| GFNC | Norma Purcell | Agriculture |
| GFNC | Lishelle Murray | National Consultation |
| GHTA - Aquanauts | Gerlinde Seupel | Tourism |
| GHTA - Sea Breeze | Hannah Charles | Tourism |
| GHTA - Sea Breeze | Sharon Thomas | National Consultation |
| GHTA | Ian Blaikie | Tourism |
| GIDC | Janelle Collins | Tourism |
| GIPE | Carlyle Glean Jr | Infrastructure |
| GIZ-Headquarter | Susann Mende | Mainstreaming meeting |
| GIZ-Headquarter | Till Below | NAP Kick-off |
| GIZ-ICCAS | Dieter Rothenberger | Water, Agriculture, Mainstreaming |
| GIZ-ICCAS | Maxine Welsh | CZM |
| GIZ-ICCAS | Petra Fraser | National Consultation |
| GIZ-ICCAS | Eva Wuttge | Facilitation |
| GIZ-ICCAS | Ntaba Francis | Facilitation |
| GIZ-ICCAS - Intern | Kirsten Sander | NAP Kick-off |
| Glenelg Spring Water | James Benoit | Water |
| Global Affairs, Canada | Jan Sheltinga | National Consultation |
| GNOW | Peggy Nesfield | Agriculture, National Consultation |
| GOAM | Dunstan Campbell | Agriculture |
| GCEPC | Stephanie Joseph | Infrastructure |
| Grenada Marine | Jason Fletcher | Fisheries/MPA |
| GRENCODA | Kelsey Paul | Tourism |
| GTA | Kirl Hoschtialek | Water, Tourism, National Consultation |
| Health | Kenneth Hazard | CZM, National Consultation |
| Health | Dhanraj Ramkhalawan | National Consultation |
| Health | Francis Martin | National Consultation |
| Health | Clement Gabriel | National Consultation |

| MINISTRY / ORGANISATION | NAME | SECTOR WORKSHOPS |
|---|--------------------------|---|
| Health - Volunteer | Jennifer Smith | National Consultation |
| IICA | Derek Charles | Agriculture, National Consultation |
| IISD | Cristian Ledwell | National Consultation |
| IISD | Alec Crawford | National Consultation |
| Jamaica - Ministry. of Economic Growth & Job Creation | Sandra Buchanan | National Consultation |
| Jamaica-Ministry. of Economic Growth & Job Creation | Clifford Mahlung | National Consultation |
| J-CCCC | Annlyn McPhie | National Consultation |
| J-CCCC | Yoko Ebisawa | National Consultation |
| J-CCCC | Donna Gittens | National Consultation |
| J-CCCC | Eltha Brown | National Consultation |
| JECO Caribbean | Liandra Lewis | Agriculture |
| MAYAG | Patrick Braithwaite | Fisheries/MPA |
| MBIA | Glenn Forsyth | Tourism, National Consultation |
| MBIA | Wendy Francette-Williams | Climate Data meeting |
| MBIA | Christina Joseph | Climate Data meeting |
| MBIA – Metereological . Office | Hubert Whyte | National Consultation, NAP Kick-off |
| MCPMLG | Dainelle Coy | Carriacou and Petite Martinique |
| MCPMLG | Javon Stafford | Carriacou and Petite Martinique |
| MCPMLG | Jamaal Adams | Carriacou and Petite Martinique |
| MCPMLG | Trevlyn Andrew | Carriacou and Petite Martinique |
| MCPMLG - Agriculture | Benson Patrice | Carriacou and Petite Martinique |
| MCPMLG , – Agriculture./Fisheries. | Acarlijuan Fleary | Carriacou and Petite Martinique |
| MCPMLG - Culture | Felix Mendes | Carriacou and Petite Martinique |
| MCPMLG - CZM | Davon Baker | CPM, NAP Kick-off, National Consultation |
| MCPMLG - Environmental. Health | William Guadeloupe | Carriacou and Petite Martinique |
| MCPMLG - Local Gov't | Winsley McLawbeing | Carriacou and Petite Martinique |
| MCPMLG - PMA | Dexter Miller | National Consultation |
| MCPMLG – Public Relations | Deanna Isaac | Carriacou and Petite Martinique |
| MCPMLG - Sports | Timothy Leggard | Carriacou and Petite Martinique |
| MCPMLG - Youth | Sherwin Plenty | Carriacou and Petite Martinique |
| MNIB | Terry-Ann Hypolite | National Consultation |
| MPA - Fisheries | Roland Baldeo | Fisheries/MPA |
| MPA - Fisheries | Denzel Adams | Fisheries/MPA, National Consultation |
| MPA - Fisheries | Orlando Harvey | Fisheries/MPA, CZM |
| MPA - Fisheries | Christabelle Andrews | Fisheries/MPA |
| MPA - Fisheries | Roxanne Graham | Fisheries/MPA |
| Mt. Royal Women's Group | May McKenzie | Carriacou and Petite Martinique |
| NaDMA | Kemron Dufont | Nat. Consul., NAP Kick-off, Mainstreaming |
| NaDMA | Terrence Walters | Mainstreaming meeting |
| NaDMA | Simeon Grainger | NAP Kick-off |
| Native Sprit Scuba | Adrian Blackman | Fisheries/MPA |
| NaWaSA | Allan Neptune | Water, CZM, National Consultation |
| NaWaSA | Christopher Greenidge | NAP Kick-off |
| NCCC | Paul Phillip | NAP Kick-off |
| NCCC – Agriculture, .Land-use | Trevor Thompson | Water, National Consultation., Kick-off, Mainstream |
| NCCC - DETC | Fitzroy James | Mainstreaming meeting |
| NCCC - Foreign Affairs | Roxie Hutchinson | National Consultation |
| People In Action | Denyse Ogilvie | Agriculture |
| People In Action | Clifton Maxwell | Agriculture |
| PPU | Lennox Taylor | CZM |
| PPU | Fabian Purcell | Infrastructure, National Consultation |
| PPU | Daniel Lalgie | NAP Kick-off, Mainstreaming meeting |
| Prime Minister's Ministry | Petal Rush | NAP Kick-off |
| Quinn Company | Graeme Fletcher | Infrastructure, National Consultation |
| SGU | Nigel Edwards | Agriculture |
| Southern Fisherman Assn. | James Nicholas | Fisheries/MPA |
| SPECTO | Claudette Pitt | Tourism |
| SPECTO | Valentino Sawney | National Consultation |
| Sustainable Grenadines | Luther Rennie | Carriacou and Petite Martinique |
| TAMCC | Merlisia John | Tourism |
| TAMCC | Imron Lowhar | Agriculture |
| TAMCC | John Telesford | National Consultation |
| TAMCC/Civil Society | Victor Phillip | National Consultation |
| TNC | Aden Forteau | Forestry |
| TNC | Myles Phillip | Fisheries/MPA |
| Tourism | Gertrude Duncan | Tourism, National Consultation |
| Tourism | Augustine Pascall | CZM |
| Tourism | Michael Jessamy | NAP Kick-off |
| Tourism - Civil Aviation | Earl Charles | Tourism, NAP Kick-off |
| TP Smith Engineering | Terrence Smith | Water, National Consultation |
| UNDP | Gabor Vereczi | Mainstreaming meeting |
| UNDP-ICCAS | Andris Douglas | Carriacou and Petite Martinique |
| UNDP-ICCAS | Sheena Bristol | Carriacou and Petite Martinique |
| UNDP-ICCAS | Kadijah Edwards | National Consultation |
| UNDP - Ridge to Reef Project | Nicole Welsh | Fisheries/MPA |
| UNEP-Eba Project | Leyana Romain | Fisheries/MPA, National. Consultation, NAP Kick-off |
| USAID | John Furlow | National Consultation, NAP Kick-off |
| USAID - Barbados | Christina Cains | NAP Kick-off |
| Wilson Centre | Roger Mark De Souza | National Consultation |
| Communication & Works | Kelvon Burke | CZM, Infrastructure, National Consultation |



NOVEMBER 2017

NATIONAL CLIMATE
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PLAN (NAP) **FOR GRENADA,
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