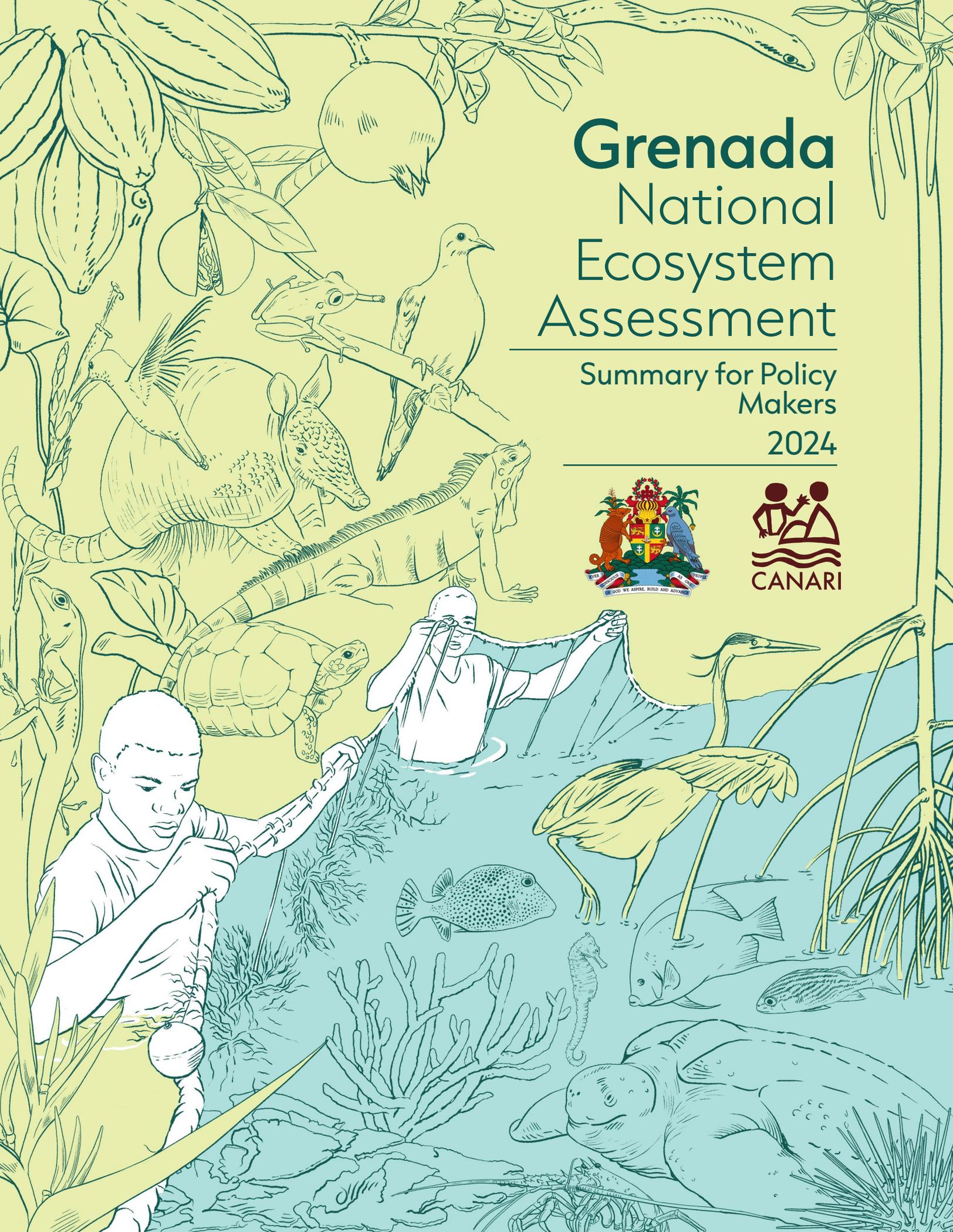


Grenada National Ecosystem Assessment

Summary for Policy
Makers
2024



Citation: St. Louis, A., and Boodram, N. (2023) *Grenada National Ecosystem Assessment— Summary for Policy Makers*. St. Georges, Grenada: Government of Grenada; Barataria, Trinidad and Tobago: Caribbean Natural Resources Institute.

This document has been produced by the Caribbean Natural Resources Institute (CANARI) on behalf of the Government of Grenada as part of the project: “Supporting decision making and building capacity to support IPBES through national ecosystem assessments” with technical support from the National Ecosystem Assessment (NEA) Initiative at UNEP-WCMC. Financial support was provided by the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection of the Federal Republic of Germany.

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List of Acronyms

ABS	Access and Benefit-Sharing	KAP	Knowledge, Attitudes and Practices
BES-Net	Biodiversity and Ecosystem Services Network	MALF	Ministry of Agriculture, Lands and Forestry
CANARI	Caribbean Natural Resources Institute	MEAs	Multilateral Environmental Agreements
CBD	United Nations Convention on Biological Diversity	MMA	Marine Managed Areas
CSA	Climate Smart Agriculture	MPAs	Marine Protected Areas
EbA	Ecosystem-based Adaptation	NCP	Nature's Contributions to People
EEZ	Exclusive Economic Zone	NEA	National Ecosystem Assessment
IAS	Invasive alien species	NTFPs	Non-Timber Forest Products
ICT	Information and Communication Technology	PA	Protected Area
ILK	Indigenous and local knowledge	SLR	Sea Level Rise
IKI	International Climate Initiative	SST	Sea Surface Temperature
		UNDP	United Nations Development Programme
		UNEP	United Nations Environment Programme





1. Introduction

National Ecosystem Assessments (NEAs) collate and synthesise the current knowledge on the status, trends and threats to biodiversity and ecosystem services in target countries. This knowledge and data support national decision making around biodiversity, environmental and sustainable development issues. Grenada's NEA was undertaken by the Government of Grenada over the period 2019-2023. This Summary for Policy Makers extracts and packages the most

relevant information from the NEA to assist policy makers in decision making for general biodiversity protection and the sustainable use of Grenada's natural resources. Overall, the data and information in the NEA aim to empower all Grenadians to take action through local, national and regional efforts [with other Small Island Developing States (SIDS)] to influence international decision making to reduce biodiversity loss.

2. Grenada's ecosystems

The diverse biomes found in Grenada, Carriacou and Petite Martinique are representative of those found throughout the Caribbean region, including high-elevation forests, rivers, lakes, mangroves and coral reefs. The main ecosystem types of the tri-island state of Grenada as described in the Grenada NEA are:

Agriculture and agrosystems

Most of the forested area in Grenada has been repurposed for agriculture including banana, nutmeg, and cocoa cultivation. Although agriculture and agrosystems may not be considered 'natural' as they are modified landscapes for human food production, they do provide habitat for native and domesticated fauna.

Coastal

Beaches, mangroves, seagrass beds and coral reefs make up Grenada's coastal ecosystems. Together they are a complex system, supporting various life stages of marine fauna. Mainland Grenada has numerous beaches as do Carriacou, Petite Martinique and the smaller offshore islands. These beaches are important sites for recreation, tourism and fish landing. Mangroves account for 181ha on mainland Grenada, 101ha in Carriacou and 11ha altogether across the Grenadine islands of Isle de Ronde, Isle de Caille, Saline Island and White Island. Seagrass beds can be found along all the coasts of Grenada, Carriacou and

Petite Martinique. Grenada's total coral reef area is an estimated 150–160 km².

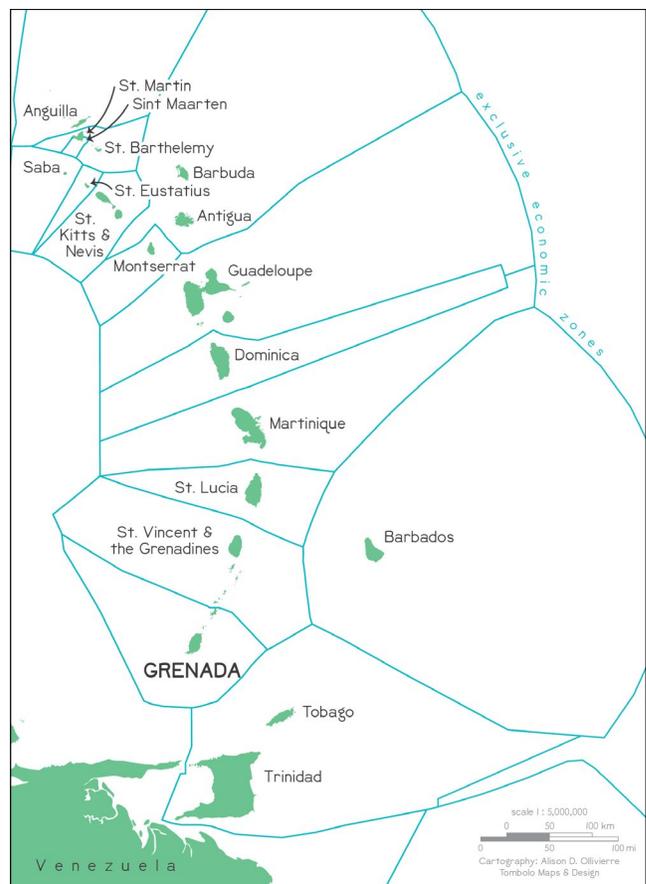


Figure 1. Map of the Eastern Caribbean showing Grenada and its Exclusive Economic Zone (EEZ)
Source Agard et al. (2023)

Deep ocean

Grenada's open and deep ocean occupy a large proportion of its Exclusive Economic Zone (EEZ) and are home to many organisms, including commercially important and highly valuable species. Grenada has a land area of only 340km², but the EEZ covers more than 27,426km²

Freshwater

Grenada is divided into 71 watersheds. There are no permanent streams on Carriacou, Petite Martinique or any of the offshore islands. However, on mainland Grenada there are many small streams at upper elevations merging into larger rivers e.g. the Saint Johns and Baltazar rivers that are closer to the coastline. Grenada also has crater lakes e.g. the Grand Etang Lake, as well as several small ponds and geothermal springs.

Forest ecosystems

Grenada's forest vegetation, not inclusive of Carriacou and Petite Martinique or other offshore islands, covers approximately 58% of its surface. These forests belong to three broad classes—Dry Scrub Woodland, Rainforest and Montane Thicket—and support diverse animal communities.

Offshore islands

Proportionally, island ecosystems support more biodiversity than their respective mainland areas; as such, they are the focus of global biodiversity preservation. Grenada has approximately 60 uninhabited islands, islets, cays and rocks. These range in size from <1ha to 265ha with a cumulative surface area of ~600ha.

3. Services provided by Grenada's ecosystems

Ecosystem services refer to the benefits people obtain from ecosystems usually in one or more of the following four categories: provisioning, regulation, cultural and supporting. These values are explained in Figure 2.

Biodiversity and ecosystem services are critical to the Grenadian economy. They are the basis for many livelihoods and support new businesses, employment opportunities and human well-being in ways that are not as easily quantified. These ecosystem services are also indispensable to food and water security, human health, climate change mitigation and adaptation, and disaster risk reduction. Ecosystem products and services also constitute an essential part of Grenadian identity. For example, Grenada's byname as the 'spice isle' reflects the vibrance and importance of its agriculture and is built upon the health and proper functioning of agricultural as well as forest and aquatic ecosystems. Highlighting the ways in which nature contributes to people is an important pathway to improving the management of Grenada's ecosystems. Nature's Contributions to People (NCP) focuses on recognising these values that are relevant

to local people, beyond just monetary terms which usually fail to capture some of the most important values.

The economically critical industry of tourism relies on the health and unique aesthetic beauty of Grenada's ecosystems, which are largely impossible to substitute with manmade alternatives. Natural capital assets such as beaches, waterfalls and forests are the primary attraction for international tourists to Grenada. Replacing these assets with human-built alternatives will likely not be able to provide a similar economic benefit on the same scale. Charismatic and notable examples of important natural capital assets to tourism include the Grand Etang Lake, which generated a total revenue of US\$585,613.17 in user fees and private tours between 2016 and 2020.

Beyond international tourism, domestic tourism and recreation at beaches, rivers, waterfalls and activities within natural areas such as walking, hiking and swimming have always been a part of Grenadians' relationship with the environment. In particular, morning 'sea baths' are thought to have significant

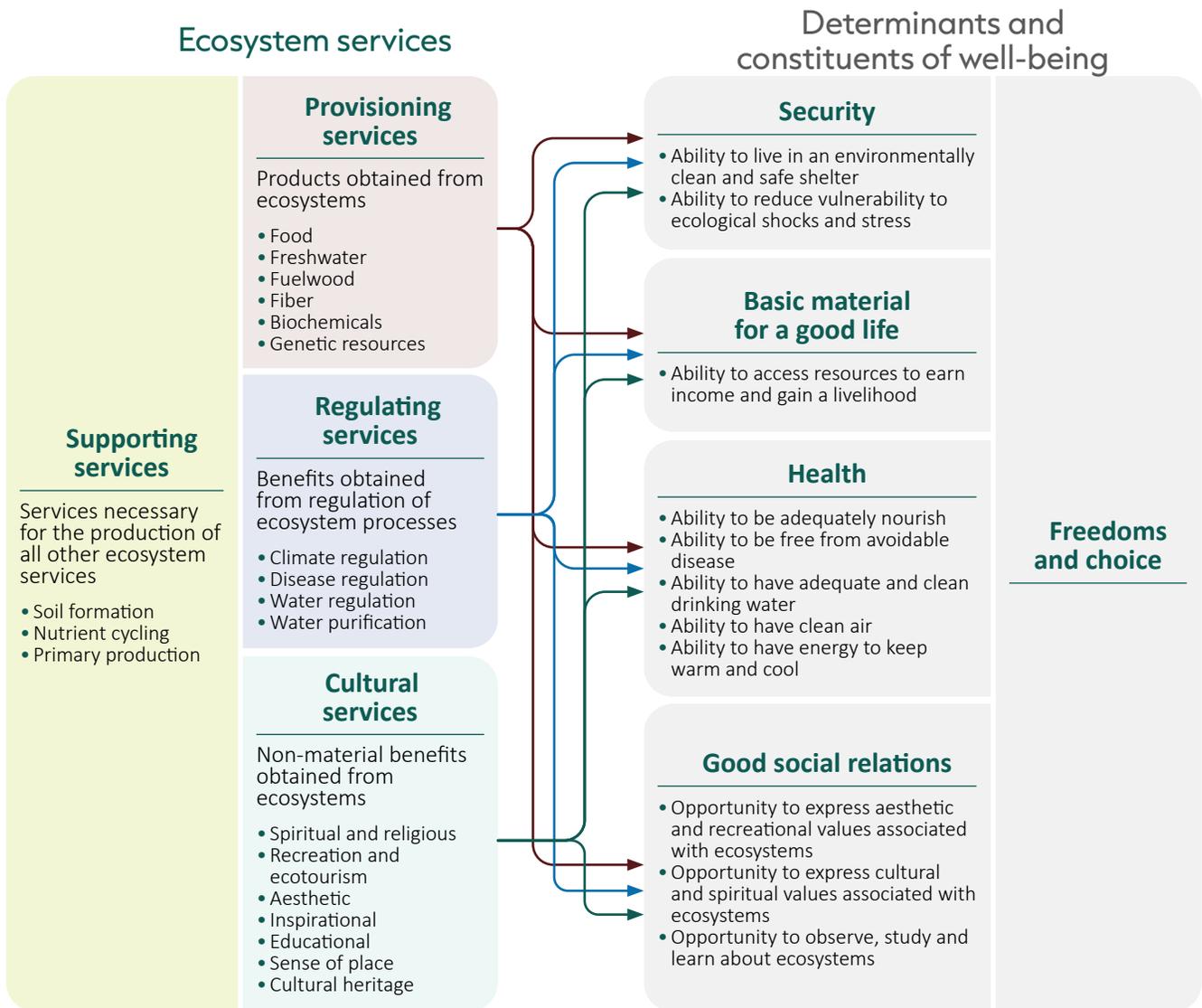


Figure 2. Types of Ecosystem Services

mental and physical health benefits and are routinely practiced by many Grenadians. Following the global COVID-19 pandemic, there has been an increase in recreational activities in natural environments, particularly in hiking and terrestrial recreation. This reflects an increasing value of these ecosystems for Grenadians and a potential increase in demand for the conservation of these natural resources.

Grenada's terrestrial ecosystems are essential for providing freshwater. In the face of increasing water

demand due to economic growth and increasing rainfall unpredictability due to climate change, these water provisioning services will become even more important. Approximately US\$23,986,622.54 of value in water supplies is generated every year from natural water. Given the importance of the water supply and the increasing threats to it e.g. climate change, the preservation of these watersheds will be critical for long term well-being, especially considering the very high economic costs associated with water production alternatives such as desalination.

Although there is a pressing need for further research, current evidence indicates that Grenada's genetic resources are extremely valuable and require protection. Bioprospecting or the exploration of biodiversity for new biological resources of social and economic value already occurs in Grenada. The country's numerous herbal/bush medicines and remedies include substances that can have significant commercial value. The implications of having a strong genetic asset base should be considered in the context of the *Nagoya Protocol* especially the implementation of rules related to Access and Benefit-Sharing (ABS).

The genetic diversity of agricultural products is a major Grenadian asset that generates significant income, but has the potential to generate much more. High-quality cocoa (Figure 3) and spice products are dependent on local agricultural and varietal diversity unique to Grenada. The example of soursop should be noted, as between 2012 and 2017, the export value of soursop grew over 20 times to US\$2.67 million. This may prove true for many other under-utilised agricultural products from Grenada.

The genetic pool of the species that produce agricultural products and the species that produce Non-Timber Forest Products (NTFPs) should be considered as having a high potential value, given the growing global interest in unique natural products.

Much of the value of genetic resources is tied to both their current and potential use. This potential use, (or possible bioprospecting), holds significant promise, for example: (1) future direct revenue, (2) development of new drugs and other products to address key developmental challenges including combating disease, and (3) food security through sustainable agriculture practices. Given the largely untapped potential and paucity of knowledge of Grenada's genetic resources, it is important to

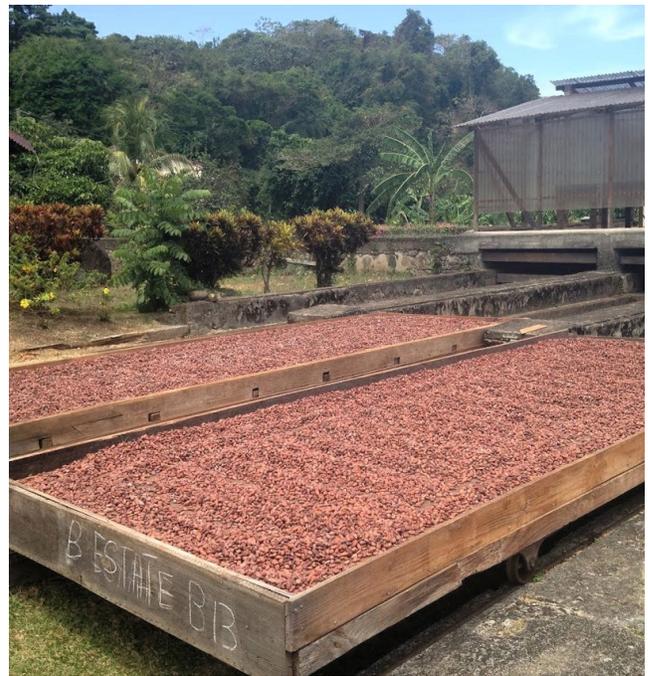


Figure 3. Cocoa processing at the Belmont Estate
(Photo credit: Nicole Leotaud)

conserve and protect them now to ensure continued access to future use and potential.

Grenada's genetic resources may have many potential uses and can provide opportunities to derive economic and social benefits from harvesting, thus forming a niche economic sector. Measures must be considered to safeguard the country from bio piracy and illegal bioprospecting. Being a party to the *Nagoya Protocol* can offer Grenada a framework to better manage genetic stock and forge partnerships for transparent use and harvesting. The draft *Environmental Management Bill, 2018* can create a basic framework for the holistic management of Grenada's genetic resources. Regulations need to be drafted under an overarching approved *Environment Management Act* to provide further specificity to fair and equitable benefit sharing from sustainable utilisation of living natural resources.



4. Drivers, pressures and threats impacting Grenada's ecosystems

Grenada's ecosystems are affected by several drivers, pressures and threats. Drivers are the economic and social factors that exert pressure on the environment and affect its state. These changes in the environmental state have impacts on the ecosystems as well as human health and well-being. To address these impacts, society can take preventive, adaptive or curative measures in response to the driving forces, pressures, and threats.

Economic drivers

Government debt, vulnerability to external shocks like financial and extreme weather, and external funding prioritising areas other than ecosystems are some examples of economic drivers. Other drivers originate from industries, demand for resources such as hydrocarbons, tourism-driven events and unsustainable agriculture.

Social drivers

Social drivers of environmental and ecosystem change include population growth and the expansion of housing and settlements. Poverty, poor governance, inadequate local resource management, weak institutional capacity in addition to absent or incomplete land and sectoral policies are also significant social drivers of environmental change. Additionally, cultural drivers like public perception and patterns of natural resources use, and competition for limited land space contribute to environmental change.

Terrestrial ecosystem pressures

Terrestrial ecosystems are under pressure due to various factors such as land degradation and land use change caused by drivers such as agriculture, tourism and residential development, and commercial activities. These activities lead to deforestation, habitat loss and fragmentation, erosion (Figure 4), and sedimentation. Unsustainable land management

practices, along with increasing competition for resources, invasive alien species (IAS), and pollution (chemicals, nutrients, sediments) also significantly impact Grenada's ecosystems. Moreover, land tenure can also be a source of pressure as urbanisation of agricultural land often forces farmers to move to marginal lands, which are typically located near or within forested watershed areas.

Coastal and marine ecosystem pressures

Coastal and marine ecosystems are facing a number of threats due to development activities such as tourism, leading to overfishing, pollution, eutrophication, and sedimentation. Regional pressures include climate change related hurricanes that damage reefs and threaten coastal residents, coral bleaching caused by increasing sea surface temperatures (SSTs) and ocean acidification. Invasive species such as Sargassum and lionfish also have notable impacts on coastal ecosystems. Further, many epizootic events and disease outbreaks have been reported in coral reefs



Figure 4. Aggressive debushing on roadsides can lead to soil erosion (Photo credit: Kriss Davies)

and sea turtles within the Caribbean Region, including Grenada. Regardless of the source of pollution, both marine and terrestrial ecosystems are impacted by agriculture, domestic and industrial waste, including sewage and solid waste.

Climate change pressures

Climate change is given special consideration within this document given its current and severe potential impact on Grenada and the Caribbean as a whole. Climate projections for Grenada and the other islands of the Eastern Caribbean show increasing air and SSTs, and changing rainfall patterns. These are expected to result in a range of threats, including sea level rise (SLR), as well as more intense hurricanes, droughts and floods. These threats combined with fragile ecosystems on many of these islands, are expected to yield multiple negative repercussions and have the potential to negatively impact the way of life on these islands, including the ability of ecosystems to support human life and livelihoods. As climate change progresses, economic shocks are expected to increase in both frequency and intensity, with women being particularly vulnerable.

Human activities that lead to changes in land use, hydrology, nutrient cycles or increase in pollution can reduce the resilience of ecosystems (the ability of the system to continue its functioning amid, and recover from, a disturbance) especially when coupled with changing climate conditions. Such synergies have the potential to trigger cascading or domino effects that may negatively impact our access to ecosystem services, social and economic well-being, and livelihoods.

Tourism has been greatly impacted by previous hurricanes, with future species and habitat loss potentially impacting the ecotourism sector. The high cost of insurance and abatement of damage from hurricanes and other extreme weather events, and significant productivity loss due to heat exposure of workers in deforested areas are also potential impacts. Increases in vector-borne diseases are predicted across the Caribbean, due to climatic changes, causing more favourable conditions for species such as the yellow fever mosquito (*Aedes aegypti*). Resource conflicts and internal or external migration, due to scarce resources, are increasingly likely due to climate change. Overall climate change is expected to impact all ecosystem types in Grenada (Table 1).

Table 1. Impacts of climate change on different ecosystem types in Grenada

Ecosystem type	Impact of climate change on the ecosystem
Forest	Climate change is likely to lead to the expansion of drought-tolerant, non-native and native edge species into forests, especially into intact Dry Forest communities. There is likely to be overall loss of species diversity, including abundance and composition of NTFP species, which could lead to disproportionately negative impacts for vulnerable people whose livelihoods depend upon these species.
Agricultural	Changes in rainfall patterns, along with more frequent droughts, wildfires and floods have the potential to decrease crop productivity and limit the potential of agricultural ecosystems to store carbon in the future. As sea levels rise, saltwater intrusion could cause agricultural land in coastal areas to become unusable and abandoned.

Ecosystem type	Impact of climate change on the ecosystem
<p>Coastal and marine</p>	<p>SLR, coupled with storm surges and increased coastal erosion, threaten people and property. Communities may be unable to respond to SLR due to limited opportunities for landward retreat.</p> <p>SLR is expected to transform fringing mangroves to basin mangroves, diminishing Grenada's defence against storms and winds. Saltwater intrusion from SLR will increase the salinity in salt ponds, backwaters and estuaries, reducing available oxygen and limiting their ability to support brackish water species while also leading to high algal growth and fish kills in marine ecosystems. Impacts of climate change on fishery production or yields could have wide-ranging implications for Grenada's economy.</p> <p>As mean ocean temperatures increase, coral bleaching will occur more frequently and last longer. Increased ocean warming also favours coral disease outbreaks.</p> <p>Increased storm intensity and strong storm surges may dislodge and damage corals while increased acidification negatively affects corals and reduces the amount of sand available for beach formation. Extreme storms and wave surges are expected to erode seagrass beds. SLR will also reduce the amount of light that is available for seagrass photosynthesis.</p>
<p>Freshwater</p>	<p>Climate change can reduce the availability of water due to changes in precipitation patterns. This will impact domestic water supply and the water available for agriculture and industry. Increased flooding and erosion after hurricanes and droughts can negatively impact freshwater-supply intakes and coastal water quality. Cultural activities such as river tubing and baptisms will be subsequently affected. Reduction in water availability and quality will adversely impact tourism and potentially intensify existing gender inequalities. Moreover, the health of freshwater ecosystems including species diversity and abundance, will decrease, potentially leading to resource conflicts within communities.</p>

5. Response options to protect and maximise the services provided by Grenada's ecosystems

It is important to identify response options targeting the drivers, pressures and threats to ecosystem services. These measures can help conserve biodiversity, ecosystems and maximise returns from ecosystem services to the people of Grenada. Response options described in this section include foundational activities, enabling environment and instrumental tools.

Foundational issues refer to the current knowledge about ecosystem services, the gaps identified in the NEA and potential responses to fill these gaps. Instrumental tools include the technological, educational, social, and economic approaches and practices that can be used to protect and mainstream ecosystem services. The enabling environment refers

to the political and policy context and the cultural environment, including societal values, attitudes and behaviours central to the acceptance (or rejection) of ecosystem service opportunities identified in the NEA. Response options are further elaborated in Table 2 and sections below.

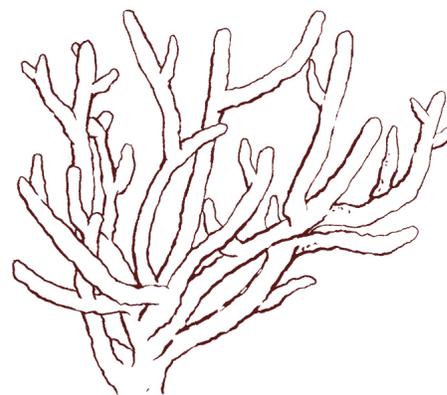


Table 2. Response options to protect and maximise ecosystem services

Response option	Description
Enabling	Policy, laws, institutions, governance and social attitudes
Foundational	Responses related to the generation and distribution of knowledge- including indigenous and local knowledge (ILK)
Instrumental	Markets, incentives, technology, practices and voluntary actions

Enabling response options

Governance

Addressing the drivers that lead to loss of nature’s goods and services can be a complex task and may require multisectoral, stakeholder-led solutions and high-level political engagement. It is suggested that different forms of high-level leadership in governance be explored to promote transformational cross-sectoral thinking and mainstreaming of ecosystem services. Such leadership is key to resolving challenging issues, including the designation and the management of protected areas (PAs) and the elimination of perverse incentives that undermine the optimisation of ecosystem services for local people. Leadership is essential, not only to ensure stakeholder buy-in, effectiveness of communication, and the management of limited financial and human resources, but also to facilitate innovation and systems-level change. During the NEA stakeholder consultations, a key concern was the dichotomy between high-level decision making and grassroots stakeholder engagement. It is important to note that these are parallel and complementary modalities for effective ecosystem services management.

Multisectoral, holistic response

In the past, high degrees of specialisation have traditionally meant silo-based thinking. However, it is important that planning and management of ecosystem services and response options adopt holistic thinking and practices. This includes building relationships across communities, sectors and actors which in turn can improve buy-in, decision making and implementation effectiveness, resulting

in improved quantity and quality of ecosystem services obtained by Grenadians. Moreover, shifting from a solely economic sectoral lens to an approach that emphasises relationships and networks of stakeholders can provide new ways to improve management of ecosystem services that are particularly relevant for small island developing states like Grenada.

Grenada’s ecosystem services are monitored through complex linkages and feedback loops that support sector-focused decision making, planning and resource allocation. Where ecosystem services are to be restored and maximised, the current compartmentalisation of governance and management of these services must be transformed. An example of an issue with complex implications is the management of the tri- island nation’s limited land area, which underpins a high demand for space across all economic sectors. Maintaining healthy ecosystems and their services, while reducing conflict over space, requires cross-sectoral planning, budgeting and management that reflects the interconnectedness of Grenada’s ecosystems.

International, regional and national frameworks and obligations

Grenada has a comprehensive national policy framework and is signatory to a number of multilateral environmental agreements (MEAs) that have direct implications for the management of natural and human impacted ecosystems and their services. International obligations commit the country to work programmes arising from multilateral instruments, which have important policy and

economic impacts on Grenada, relevant to ecosystem services management and delivery. Grenada is also part of several regional agreements, some of which have important implications for managing the island's ecosystem goods and services.

Despite a comprehensive web of international obligations, there are gaps in the country's treaty framework, as the Government has yet to sign some agreements. In some cases, Grenada has not fully implemented its treaty obligations. Inability to fully implement treaty obligations and/or participate in the multilateral processes represents a missed opportunity to leverage potential sources of administrative and technical capacity, secure funding for national or regionally focused projects and programmes, and participate in information generation and sharing processes that are central to the management of ecosystem services. Multiple benefits from Grenada's engagement with MEAs can only be fully realised with adequate human resources assigned to international processes, transparent communication and engagement with local stakeholders, and timely integration of obligations into laws, policies, programmes and plans.

A coordinated multi-sectoral approach to policies, laws and regulations would address some institutional capacity challenges. The approach should also focus on integrating ecosystem services into governance and sectoral planning, policies and frameworks. Doing so will promote interagency coordination, sharing of personnel, knowledge, technical capacity and equipment. Consequently, it will enable evidence based and informed decision making.

Mainstreaming ecosystem services across national policies and plans offers amplification of delivery by providing an enabling environment for developing new ecosystem-based services, markets and education systems. A cost-effective approach may be to amend policies, acts and regulations to include the conservation and sustainable use of ecosystem services as relevant. A key step is multisectoral review of approved and draft policies and legislation to ensure that ecosystem services used and affected by

policies and legislation are explicitly addressed, with the aim of proposing specific text for amendments for State consideration. Recurrent across sectors is the need for (re-)investment in human capacity, knowledge generation, monitoring of the state and management of ecosystem services, and monitoring and enforcement of national regulations. Priorities include land tenure, waste management, agrochemical misuse, transparency of decision making at all levels, stakeholder participation in knowledge generation, governance and ecosystem services management.

The lack of implementation, identified throughout the NEA, ultimately reflects the weaknesses inherent in silo-based decision making. In Grenada, the State holds decision making power when it comes to applying national policy, enacting legislation, budgeting, and allocating personnel. These are actions only the State can take. Important developments at the global level such as the United Nations Convention on Biological Diversity's (CBD's) recently agreed Global Framework for Biodiversity can be timely opportunities to realign existing national policies, programmes and plans, which are important for all ecosystems in Grenada. Additionally, it also an opportunity to build on Grenada's global leadership in environmental governance, for which Grenada is known and recognised.

Foundational *Improving the knowledge base*

Management of Grenada's terrestrial and marine ecosystem services requires clear identification of the existing knowledge base and the priorities for filling gaps. Efforts to improve sustainable livelihoods and environmental governance are central to learning, improving and enhancing responses. Engaging with communities recognises the societal context for environmental decisions including social values and attitudes associated with ecosystems and their services that enable acceptance and adoption of responses.



Instrumental

Developing and implementing financial mechanisms

Natural ecosystems provide significant tangible benefits to the economy, but the value of goods and services of these ecosystems is not well accounted for in national budgets. As a result, there may be limited investment by the state in ecosystem health and ecosystem services. Diverse, innovative financing approaches are needed to go beyond traditional grant financing encompassing instruments like return based investments (microfinance, peer to peer investing, sovereign bonds), risk management tools (environmental insurance, pay for success vehicles), and economic instruments not currently used by the State (deposit-refund schemes, compensation and offsets).

The State can adopt several approaches to broaden income streams to support improved ecosystem services management. Some of these approaches include integrating Natural Capital Accounting in fiscal decision making, payment for ecosystem services, green levies, and using blue and green bonds. Versions of debt-for-nature and debt-for-climate swaps may also be explored to provide an avenue for some fiscal relief. Given the complexity of and opportunities with new and emerging finance tools and existing barriers to implementation, success will depend on building partnerships between the government, private sector, education sector, NGOs and individual landowners.

Response options to protect and maximise ecosystem services under climate change scenarios

Enhanced awareness and understanding of climate resilient management techniques and practices integrated with biodiversity, and effective land and soil management conservation are needed among practitioners and decision makers. Raising awareness and communicating scientific knowledge can be key

to equipping communities with the knowledge they need to adapt to climate change.

Long-term monitoring of climate, biodiversity, species and ecosystems is crucial. This includes improving access to existing data, establishing information systems, as well as sharing data among and within government departments and all stakeholders. Data collection (including the establishment of baseline data for ecosystems, climate and water quality monitoring systems, wastewater management reuse systems and Ecosystem-based Adaptation [EbA])¹ can be a direct response to address climate change impacts.

Data analysis and interpretation will lead to policy development that can influence behavioural change, legislation and enforcement, education and capacity building, and transparency and accountability tools. Education and capacity building can leverage existing platforms to share relevant climate information.

A priority should be maintaining intact PAs, ensuring effective management of existing PAs and sustainable practices in multi-use reserves and managed areas. These measures would reduce or eliminate other pressures such as overexploitation and habitat degradation. Community co-management of green spaces, forests, and coastal and marine ecosystems are important steps. Adaptive capacity of the fishing industry and coastal communities can be strengthened by providing training in business skills and safety at sea. Furthermore, fisheries cooperatives can be used to develop support schemes, spread risks and provide a financial 'safety net'. Building resilient communities by empowering them to play a leading role in the conservation, restoration and management of ecosystems in Grenada is a key response to the impacts of climate change.

Ecosystem specific response options

Table 3 below provides more specific details on possible response options for the different ecosystem types in Grenada.

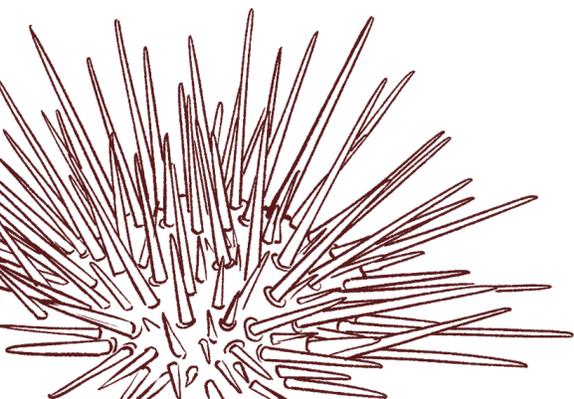
¹ Ecosystem-based Adaptation (EbA) uses nature's goods and services to reduce vulnerability and build resilience to climate impacts.

Table 3. Response options to protect and maximise ecosystem services under climate change scenarios

Ecosystem Type	Enabling response options	Foundational response options	Instrumental response options
Agriculture	<p>Adoption of a multi-sectoral/ institutional approach to sustainable land management, addressing land tenure security, adaptive governance and the inclusion of non-state actors</p> <p>Updating and revising legislation to support and implement the national land use policy. Emphasising nature-positive farming in policies for rural and urban areas.</p> <p>Policy framework to address agrochemical pollution; regulations to ensure monitoring and compliance, defining agroecosystems as multifunctional and shared spaces; linking climate change, disaster risk reduction, biodiversity, land use, and food security; gender sensitivity; integrating dimensions of equity and justice to support agricultural livelihoods; strengthening legislation to give more decision-making power to communities and cooperatives</p> <p>Capacity building to create adequate infrastructure/resources, technical staff/ expertise e.g. Ministry of Agriculture, Lands and Forestry (MALF) extension services staff</p> <p>Integrated resource management with all relevant Ministries/divisions working together, sharing resources and knowledge; improving co- management of agroecosystems; improving land use and land tenure management; integrating</p> <p>Nature-based solutions framework to improve delivery of ecosystem services</p>	<p>Mainstreaming ILK in agricultural policy</p> <p>Using a mitigation hierarchy approach (avoid, mitigate, restore, offset) to assess targets for ecosystem restoration as a proportion of degraded systems; integrating and promoting good restoration practices</p> <p>Educating farmers and entrepreneurs on dangers/ impacts of certain agrochemicals and best management practices in farming/agricultural processes; making safer/ healthier agrochemical options available; improving/strengthening knowledge transfer between stakeholders; and monitoring/ data infrastructure to support management of agroecosystems</p>	<p>Establishing sustainable supply chains</p> <p>Participation in Carbon Markets and participation in Ecosystem Certification Schemes (e.g. Fair Trade)</p> <p>Encouraging and incentivising organic farming</p> <p>Allocating support within the agricultural national budget for nature-positive farming, including support for citizen science, adoption of Information and Communication Technology (ICT) to address data constraints, and broader support for public awareness and education</p> <p>For climate change threats: utilising smart greenhouses, vertical farming, climate smart agriculture (CSA) practices; germplasm bank to protect local genetic resources; livelihood protection policy insurance schemes and other risk mitigation schemes</p>

Ecosystem Type	Enabling response options	Foundational response options	Instrumental response options
Coastal and deep ocean	<p>Integrated, multi-sectoral and participatory approaches to address issues of national concern e.g. the establishment of a National Sargassum Task Force to effectively manage Sargassum influxes. Finalisation and implementation of protocols and management strategies which have been drafted related to the Sargassum influx in Grenada</p> <p>Formal designation of proposed Marine Protected Areas (MPAs) and Marine Managed Areas (MMAs); Adoption and implementation of key plans e.g. Marine Spatial Plan</p>	<p>Formalised monitoring efforts to provide spatial and temporal data as it relates to fisheries, Sargassum influxes, marine litter, IAS, coral diseases, etc.</p> <p>Citizen-science and community-based initiatives to boost data collection efforts, monitor and evaluate the effectiveness of policy and law enforcement in the coastal and marine zone, and simultaneously raise awareness and public support for ecosystem services in the marine environment</p>	<p>Blue carbon, nature-based solutions and blue bonds relevant to coastal and deep ocean ecosystems</p> <p>Promotion of private-sector driven initiatives to develop and commercialise Sargassum products</p>
Forest Ecosystems	<p>Revise as needed and implement draft policies and legislation e.g. Revised <i>Forest Policy, Protected Area, Forestry and Wildlife Legislation, Land Use Policy, Environmental Management Act</i></p> <p>Mainstream ecosystem services in existing policies and legislation (e.g. National Adaptation Plan, Energy Policy, Agriculture Plan)</p> <p>Revision of existing legislation to include Other Effective Area-Based Conservation Measures (OECMs) as a potential mechanism for engaging private landowners within the Terrestrial Protected Areas network, to mitigate the challenges of further PAs development</p> <p>Capacity building within existing institutions (e.g. Forestry and National Parks department)</p>	<p>Knowledge, Attitudes and Practices (KAP) surveys, citizen science and knowledge transfer at the local, national and regional level to address knowledge gaps regarding forest ecosystems</p>	<p>Strengthen existing financial tools e.g. environment levy and national parks development fund</p> <p>Adoption of new tools e.g. Payments for Ecosystem Services (PES) targeting private land owners</p>

Ecosystem Type	Enabling response options	Foundational response options	Instrumental response options
Freshwater	<p>Update and enforce policies for construction and road development projects to prevent indiscriminate land clearing and better manage soil erosion, stormwater runoff, landslides and flooding</p> <p>Enact stricter regulations to prevent backfilling and destruction of wetlands</p> <p>Reduce freshwater pollution by prohibiting importation and use of chemicals that are banned in other countries and creating an enabling environment for the proper disposal of waste chemicals</p> <p>Greater coordination among key Ministries, agencies, and organisations that play a role in watershed management</p> <p>Implementation of relevant policies and frameworks e.g. the <i>Grenada National Water Policy</i>; <i>Grenada Integrated Water Resource Management Plan</i></p>	<p>Enhanced water quality monitoring e.g. through a collaborative approach with local universities as well as citizen science approaches involving local communities</p> <p>Knowledge transfer to communities and citizens on the importance of freshwater ecosystems and services</p>	<p>Increasing communication, and incorporating technology to improve access to data and highlight the importance and value of transparency in managing freshwater</p>



Synthesis

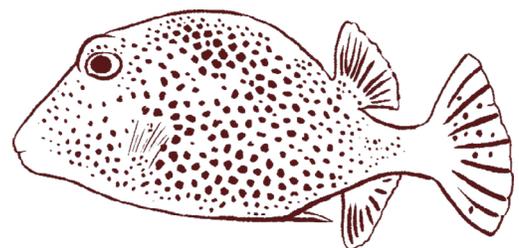
Traditional sectoral planning, budgeting and management of the economy is an accepted norm in national-level governance. However, a recurrent message in this summary document is that the optimal use of ecosystem services can only be achieved by explicitly accounting for the value and mainstreaming of such services into all national plans, policies and programmes. Recurrent across all sectors is the need to (re-) invest in human capacity, knowledge generation, monitoring of the state and management of ecosystem services, and monitoring and enforcement of national regulations. Priorities identified include addressing issues associated with climate change, land degradation, land clearance for

housing and industry, IAS, poor waste management and misuse of agrochemicals.

High-level governance engagement in the implementation, monitoring and evaluation of the activities identified in the NEA is needed. This may involve an explicit Cabinet-level responsibility and/or cross-party parliamentary committee for such coordination. Building a cross-party consensus on the institutional frameworks for the management of ecosystem services free from frequent political disturbance is needed. At the same time, it is important to ensure accountability, transparency and participatory approaches as part of long-term approaches to ecosystem services management.

Reference

Agard, J., St. Louis, A., and Boodram, N. (eds.) (2023) *Grenada National Ecosystem Assessment. St. Georges, Grenada: Government of Grenada; Barataria, Trinidad and Tobago: Caribbean Natural Resources Institute.*



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