Workshop on the Second Order Draft of the Grenada National Ecosystem Assessment

Thursday 29 September 2022

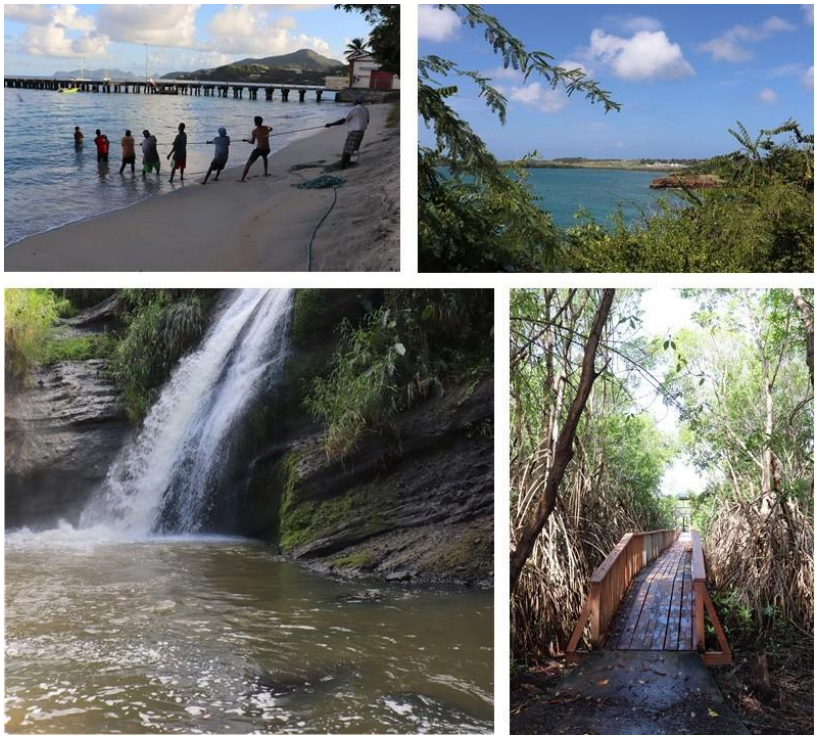
9:00am – 12:15pm

https://us06web.zoom.us/meeting/register/tZAqce-srjgiHNUYIMte6BwQc5OW7y5zryyP

Summary of Chapter 3
on
Contribution of Grenada's Ecosystems to Climate Resilience

and

Indicative Questions for Stakeholder Feedback



Summary of Chapter 3
CONTRIBUTION OF GRENADA'S ECOSYSTEMS TO CLIMATE RESILIENCE

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Introduction: Small Island Developing States (SIDS) such as Grenada collectively contribute less than 1% of global greenhouse gas (GHG) emissions but face disproportionate risk from climate change impacts. SIDS contributed 0.5% of historical cumulative carbon dioxide (CO_2) from fossil fuel combustion and industrial processes, CO_2 Fossil Fuel and Industry (CO_2-FFI) emissions, between 1850 and 2019. In 2019, SIDS emitted approximately 0.6% of global GHG emissions, excluding net CO_2 emissions from land use, land-use change and forestry, CO_2 Land Use, Land-use Change and Forestry (CO_2-LULUCF). The IPCC's Sixth Assessment Report (AR6) has amplified the urgency to combat climate change in SIDS.

Resilience: Ecosystem resilience refers to the ability of the system to continue its functioning amid and recover from a perturbation. Community resilience is closely interlinked with ecosystem resilience. Human actions which drive changes in land use, hydrology, nutrient cycles or increases in pollution can reduce ecosystem resilience, especially when synergised with changing climate conditions.

Climate Change in Grenada: Climate projections for Grenada (based on projections for the Eastern Caribbean) suggests a drying trend, increased drought conditions and increased hurricane frequency and intensity. A drying trend from decreasing rainfall and increasing temperatures is expected by 2050 together with increasing frequency and duration of droughts —with moderate to severe events occurring 26% of the time. Together with increased Sea Surface Temperatures (SST), the intensity of hurricanes is projected to increase, with an 80% increase of category 4 and 5 hurricanes over the next 80 years (A1B scenario).

With changing climate conditions, projections for the islands of the eastern Caribbean (including Grenada) include increasing air & sea surface temperatures and changing rainfall patterns. These are expected to result in a range of threats including sea level rise, hurricanes, increasing drought and flooding. Synergies between these threats and the often-fragile ecosystems within many of these islands are expected to yield multiple negative repercussions and have the potential to negatively impact our way of life on these islands, including the ability of the land to support human life and livelihoods.

Human actions which lead to changes in land use, hydrology, nutrient cycles or increase pollution can reduce ecosystem resilience — especially when synergised with changing climate conditions. Such synergies have the potential to cause cascading effects which are likely to negatively impact our access to ecosystem services, social and economic wellbeing, and livelihoods.

Women are increasingly vulnerable to the impacts of changing climate conditions. Climate impacts are expected to increase both the frequency and intensity of economic shocks as global warming continues. Women are increasingly vulnerable to such economic shocks, for example, the devastation of the nutmeg plantations from hurricanes has destroyed an industry in which women earned their livelihoods.

Framework for Assessment: A Driver-Pressure-State-Impact-Response (DPSIR) Framework was used to assess Grenada's ecosystems in the context of climate change and climate resilience. Drivers are the economic and social factors that are driving forces (D) which exert pressure (P) on the environment affecting its state (S). These changes in the environmental state tend to have impacts (I) on the ecosystems or human health and well-being and due to these impacts, society can respond (R) to the driving forces, the pressure, state or impacts through preventive, adaptive or curative measures.

- **Drivers:** The economic drivers for ecosystem change in Grenada include government debt, vulnerability to external shocks (including financial and extreme weather) and external funding directed to priorities other than ecosystems. Other economic drivers originate from manufacturing at the local breweries, demand for resources such as hydrocarbons, tourism driven events and unsustainable agriculture. The social drivers include demographic trends including steady population growth, expansion of housing, and settlement in coastal/flat/lowland areas. Poverty, poor governance, including inadequate local resource management and weak institutional capacity, absent or incomplete land and sectoral policies, competition for the limited land space, and cultural drivers such as public perception and patterns of natural resource use are also social drivers of environmental change.

- **Pressures:** Environmental and societal pressures include land degradation and land use change caused by agricultural, tourism and residential development, and commercial activities leading to habitat loss, fragmentation, degradation (including erosion and sedimentation) and destruction (for example from increased incidences of wildfires or removal of seagrass beds and other coastal vegetation for development). Unsustainable land management, with increasing competition for resources, Invasive Alien Species (IAS) and pollution (chemicals, nutrients, sediments, ballast water, waste etc.) are also significant sources of environmental challenges. Land tenure is considered a pressure because problems arise when agricultural land is urbanized and farmers have to move to marginal lands, often near or in forested watershed areas. Unsustainable natural resource management and consumption rates, such as over abstraction of surface water and overharvesting of species, including seafood for local consumption and tourism demand, result in overexploitation of ecosystems. Pressures related to climate change include increased storm intensity and frequency, drought, sea level rise and increased SST.

- **Impacts:**
    - **Terrestrial Ecosystems:** Forest loss already observed on Grenada has led to increased flooding and erosion, particularly after hurricanes and droughts. Watershed degradation impacts water supply intakes and coastal water quality. Reduction in agricultural productivity through altered soil erosion, nutrient cycling, fire and hydrology, and drier conditions could lead to reduced future carbon sequestration. Sea level rise is already impacting Grenada and together with high development pressure in coastal areas, this could lead to an overall loss of species diversity, abundance and change in habitat composition, including abundance and composition of Non-timber Forest Product (NTFP) species, which could lead to disproportionately negative impacts for vulnerable groups whose livelihoods depend upon these species.

Dry forest composition suggests the expansion of drought-tolerant non-native and native edge species into intact communities. Increased fragmentation, edge effects and reduced connectivity could reduce a species' dispersal ability, creating a gap between species observed and potential ranges. The impacts of the resultant changes in species compositions, homogenisation of species diversity and increasing introduced species on ecosystems and their services in Grenada is poorly known.

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 lost 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 Aedes aegypti. Resource conflicts and internal or external migration due to scarce resources are increasingly likely due to climate change.

- **Agricultural Ecosystems:** Declining diversity and abundance of pollinators have a negative effect on agricultural production. Too much abandoned or idle land can also affect productivity of adjacent farmlands leading to food production loss and a consequent reliance on food imports. Increased abundance of pest species would also impact agricultural productivity and biodiversity. Climate change effects such as saltwater intrusion due to sea level rise could result in agricultural land abandonment. Freshwater inundation has either compromised the running of coastal farms or resulted in complete land abandonment.

- **Coastal and Marine Ecosystems:** Coastal areas may experience physical damage by extreme storms and communities may be unable to respond to sea level rise due to little option for landward retreat. Additionally, sea level rise is expected to transform fringing mangroves to basin mangroves, diminishing defence against storms and winds. Saltwater intrusion from sea level rise is also increasing the salinity in salt ponds, backwaters and estuaries, reducing available oxygen and limiting their ability to support brackish water species and 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.

  Coral bleaching will occur more frequently, and last longer as mean ocean temperatures increase. Increased ocean warming also favours conditions for coral disease outbreaks. Increased storm intensity and strong storm surge may dislodge and damage corals in coastal lagoons. Extreme storms and wave surges are expected to erode seagrass beds, removing seagrasses. Sea level rise will also increase the depth of seagrasses in the tidal frame, limiting the amount of light that is available for photosynthesis. Sea level rise coupled with storm surges also threaten to transform beaches to open ocean and increase coastal erosion threatening people and property. Increased acidification negatively affects corals reducing the amount of sand available for beach formation.

- **Freshwater Ecosystems:** Impacts to freshwater ecosystems will affect crop yields, in turn threatening food security and economic stability, resulting in vulnerable livelihoods and income. Other impacts include lack of drinking water (e.g., in St. Patrick), changes to precipitation (causing decreased multisectoral resource accessibility and/or availability for tourism), loss of cultural services (e.g., river tubing and baptisms), reduced irrigation for agriculture, reduction in freshwater species, biodiversity loss and homogenization of

species diversity (e.g., tilapia), and changes to water quality from wastewater discharge from livestock and mixed farming. Barriers in rivers placed for flood risk management result in poor floodplain habitat (e.g., in River Road), habitat fragmentation and unnatural morphology of the river. Reduction in water availability and quality adversely impact tourism and potentially intensify existing gender inequalities. Generally, ecosystem health is decreasing, and species diversity and abundance is reducing. This can lead to resource conflicts within communities.

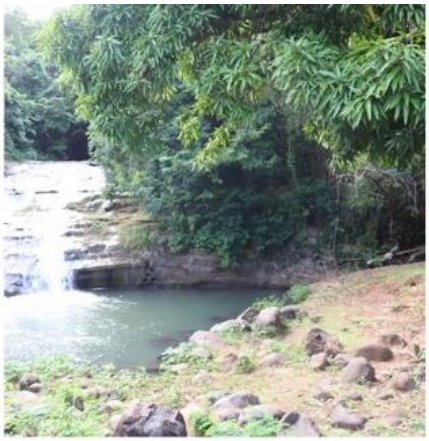
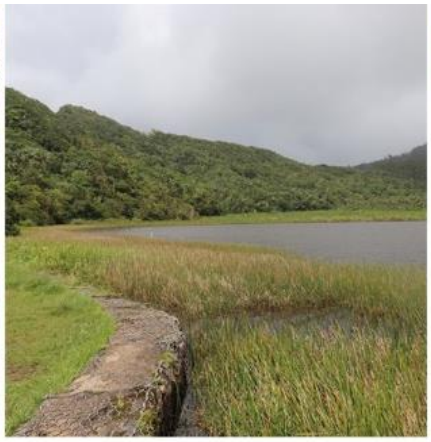
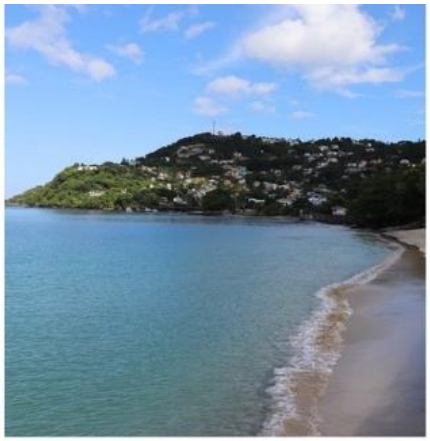
- **Responses:** To improve resiliency, responses can take place through national governance and policy responses, institutional and sectoral systems, technological responses and socio-economic conditions.

  Policy: Coordinated national and multisectoral policy, laws and regulations, harmonised policies between sectors that reduce overlaps and gaps to address adaptation, and integration of ecosystem services into national governance, land use planning, policies and legal frameworks are responses to climate change. Systemic and institutional interagency coordination requires augmented financial resources for personnel, technical capacity and equipment. Aligned sectoral policies with adaptation planning would include, for example, the emphasis on future proofing climate resilient Protected Areas (PAs) including Forest Reserves and Marine PAs. A priority should include maintaining intact PAs, ensuring effective management of existing PAs and sustainable practices in multi-use reserves. These measures would reduce or remove other pressures such as overexploitation and habitat degradation.

  Incentives: At a local level, incentives (such as payment for ecosystem services (PES)) and access to financial mechanisms which currently limits investment in sustainable agricultural/ land management planning and practices. Given the high proportion of private land ownership, small local actions can promote ownership of climate adaptation and have island-wide cumulative benefits.

  Knowledge and awareness: Enhanced awareness and understanding is needed among practitioners and decision makers of climate resilient management techniques and practices integrated with biodiversity and conservation. Awareness raising and science communication can also be fundamental to providing communities with the knowledge they need to adapt to climate change. Filling knowledge gaps on 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 between and within government departments and all stakeholders. Data collection, such as the establishment of baseline date for ecosystems, and climate and water quality monitoring systems, wastewater management – reuse systems and ecosystem-based adaptation, is a direct response to mitigate or adapt to impacts due to climate change. Data analysis and interpretation will lead to policy development to influence behavioural change and, among others, influence legislation and enforcement, education and capacity building, and transparency and accountability tools. Education and capacity building can use existing platforms to share relevant climate information. Adaptive capacity in the fishing industry and in coastal communities can be strengthened by providing training in business skills, or safety at sea.

  Community Involvement: Community co-management of coastal forest afforestation and mangrove restoration is an important initiative. Furthermore, fisheries cooperatives can be used to develop support schemes, to spread risks and provide a financial 'safety net.' Building resilient communities by having them play a leading role in the conservation, restoration and management of ecosystems in Grenada is a key response to the impacts of climate change.

Indicative Questions for Stakeholder Feedback during Breakout Sessions

The information presented in the Grenada NEA is largely based on the available literature including peer reviewed journal articles, national reports, records and databases. This information has been supplemented by surveys and interviews where possible and relevant.

The breakout sessions will be used as one avenue for stakeholder feedback and local knowledge in terms of their "on the ground" observations and experiences relevant to the material presented in the chapter. Stakeholders are also welcomed to continue to provide feedback on the workshop material after the event which can be emailed to project officer Aditi Thanoo Aditi@canari.org. Stakeholders are also invited to serve as official chapter reviewers, to be credited as such in the final published National Ecosystem Assessment document. Reviewers will receive the draft copy of the chapter with the expectation that they will review the entire chapter and submit detailed written comments. If you are interested in becoming an official reviewer, please email Aditi Thanoo at Aditi@canari.org

The breakout sessions for Chapter 3 during the workshop on Thursday 29 2022 will aim to address the questions below.

INDICATIVE QUESTIONS

The indicative questions are intended to guide the sessions, but stakeholders are encouraged to share any additional information that is relevant to this Chapter of the NEA and may be important for this assessment. The indicative questions are:

With regards to the following ecosystem types: forest/terrestrial, agriculture, freshwater, coastal, marine,

1. Are there any areas of disagreement with the information presented and/or any important information you think may not have been considered?
2. Which impacts of climate change on these ecosystems are of particular concern to you?
3. Do you have any stories or examples of how this ecosystem/nature has been contributing to climate resilience in Grenada?
4. What specific measures should be taken to increase the resilience of this ecosystem and communities to climate change impacts in Grenada?