PART E
(OCTOBER 2020)

PART E: IMPLEMENTATION PROCEDURES

OVERVIEW

Implementation of this ICZM Plan will be a long term and continuous process that involves a range of agencies, institutions and authorities. Some elements require immediate action and will be straightforward to incorporate into the day-to-day operations of the responsible agencies. In certain situations, elements can be built onto existing arrangements or require private individuals and the general public to support implementation. There may also be the need for some new procedures and practices developed over time because of the considerable scope and variety of topics covered by the plan (including new emerging issues that may arise).

To assist with this, the following sections presents the essential requirements for successful ICZM Plan implementation, and from this, put forward recommendations on how these might be achieved. The actions proposed are the necessary starting point, but discussions surrounding implementation will go beyond this on occasions because of the need to take account of other initiatives, partner priorities, capacities and resources which will inevitably influence the delivery strategy for the current and future ICZM programme in order to create a favourable climate in which risk resilient ICZM can be advanced. The cross-sectoral nature of many objectives to be achieved in the Plan will require maximum coordination and collaboration amongst all Government levels and agencies, developers and Barbadian communities alike.

Role of the Plan

The ICZM Plan provides a comprehensive set of policies, strategies and standards for the management and conservation of coastal resources mainstreaming DRM and CCA approaches. When approved, the ICZM Plan will have the following functions established:

- provisions for protecting coastal resources, land and seascapes and standards for activities that may affect them;
- provisions to develop plans and strategies to reduce current and future risks from coastal hazards, taking into account the effects of climate change;
- promotion of sustainable land use planning decision making through the provision of standards for EIA;
- standards for coastal biodiversity and habitat conservation, including standards for managing marine areas and water quality;
- policies, strategies and standards for the development and the maintenance of coastal structures considering CCA principles;
- provisions to deal with emerging issues;
- recognition of the social and cultural values of the coastal zone;
- provisions for public access through and to the beach and other natural areas of the coastal zone;
- coordination of the policies and activities of government and public authorities relating to the coastal zone and facilitation of the integration of their management activities;
- provision for participation for all concerned persons in decision making with respect to coastal management and planning.

Approval process (included as text within this Draft ICZM Plan only)

This document constitutes the updated Draft ICZM Plan that, according to the CZM Bill (2020), shall cause a public enquiry for discussion and representations before its final approval by the Ministry of Maritime Affairs and the Blue Economy (MMABE) and its publication in the Official Gazette. The public enquiry aims at facilitating the dialogue with the different stakeholders including representatives of institutions and civil society organization and citizens. Their comments and inputs will be analysed and revisions ought to be made to the Draft ICZM Plan or order delimiting the CZMA in the light of discussions or representations resulting from the enquiry. The CZMU will then resubmit the amended plan to the Minister for approval and publication. The final ICZM Plan will be available for inspectors and the general public at the CZMU facilities or by electronic means.

E1. ENABLING ACTIONS AND PRIORITIES

E1.1. Enabling Actions

This ICZM Plan has the following set of enabling actions and priorities that are required to craft the necessary framework to show how ICZM may be delivered, in line with the administrative, legal and governance mechanisms required to support its delivery. These "Enabling Actions" are vital to make ICZM work in Barbados.

E1.1.1. Need for a Results Based Framework to measure ICZM success

Sustaining momentum for regional coordination, whilst supporting national collaboration to help implement the ICZM Plan, will be secured, in the future, through the production of a results framework which is needed to help measure the success of all activities identified within this ICZM Plan. The purpose of a results-based framework will be to formalise a regular process of evaluation and reporting on ICZM Plan implementation through a clear "theory of change" (ToC) approach. This results-based framework (and supporting costed action plan) shall seek to measure the progress of the GoB towards the ICZM vision (as set out in Part A of this Plan). It will be reviewed every 10 years, and shall guide the production of regular, high-level reports which can serve as a basis to inform and coordinate ongoing national efforts and priorities for the future. Appendix 4 of Volume 1 (ICZM Policy Framework (2020-2030)) presents draft performance indicator tables which are separated by Policy Outcome and separate Policy Goals.

E1.1.2. Need to coordinate monitoring and reporting in line with Agenda 2030

The development of a regional monitoring system for SDG Reporting, and specifically for SDGs 13 and 14[1], will assist with wider regional coordination efforts. This approach, when planned and implemented effectively, can help to support SDG14 indicator monitoring on, for example, "Matters of National Environmental Significance (MNES)". This in turn will allow for better insights into the effects of cumulative pressures and impacts on MNES values and how to respond to fluctuations in resources available for monitoring. CZMU will assist in the coordination and communication of SDG14 findings through the preparation of "State of the Coast" Reports. Appendix 4.5 of Volume 1 (ICZM Policy Framework (2020-2030)) presents indicator data collection tables to support production of a "State of the Coast" report. Indicative samples (taken from the Cook Islands) of summary "health cards" that could be produced to demonstrate coastal condition change over time are presented in Figure E.1.

[1] Under the Responsibility of MMABE

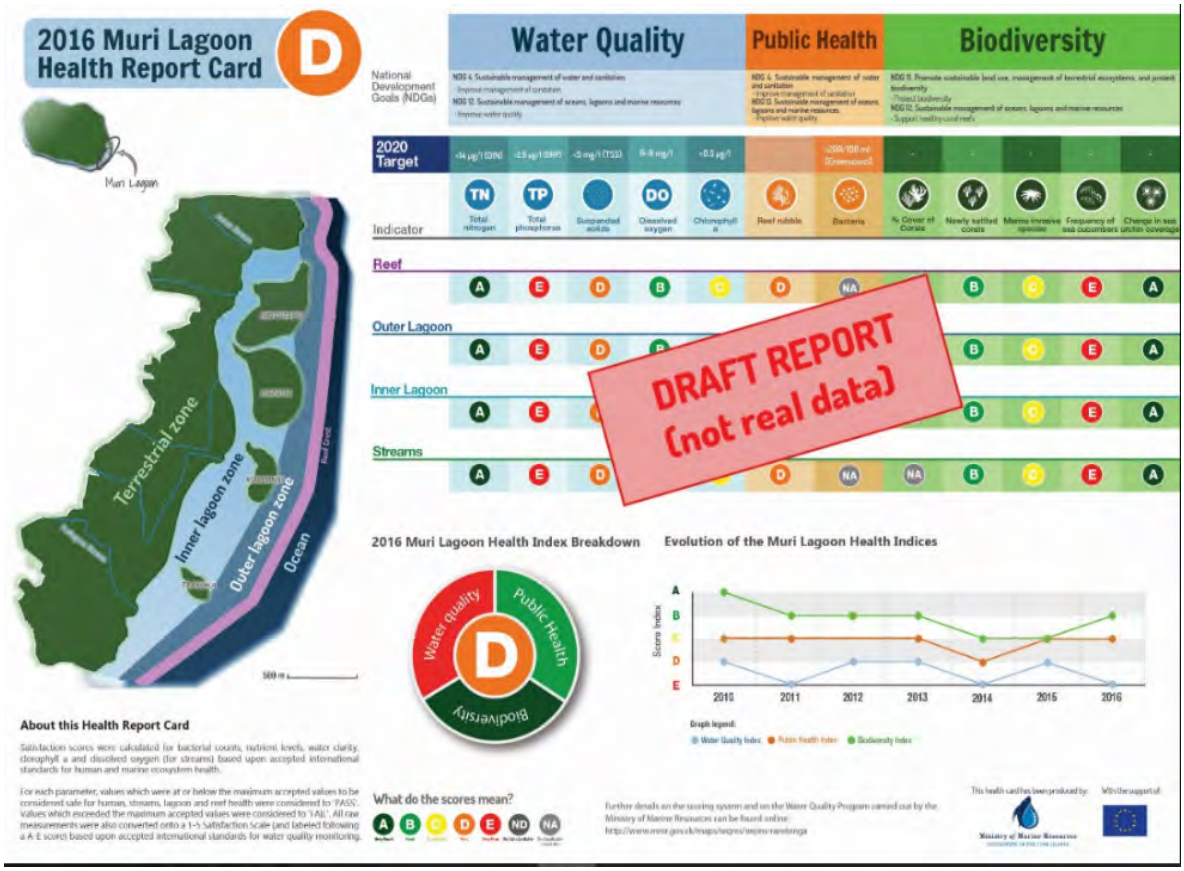

Figure E.1: Sample Style of Health Card adopted for Muri lagoon, Cook Islands (source AECOM 2018)2

E1.1.3. Implementation guidance to support ICZM principle delivery

The principles within this ICZM Plan (Part A) are there to guide all that needs to be done towards achieving the defined ICZM vision to ensure national alignment to different sector strategies and plans. New guidance on the implementation of these principles is required to ensure that national delivery is effectively aligned.

E1.1.4. Ensure sustainable institutional capacity for ICZM delivery

In the short term, the greatest challenge for Barbados continues to be the allocation of scarce resources to help support ICZM implementation through the provision of a sufficient number of staff trained and experienced in ICZM related matters. The role of CZMU remains pivotal here to help support this process through improved national support and coordination. Issues surrounding this aspect (required institutional strengthening capacity requirements etc) are considered in more detail within section E5.

E1.2. Action Priorities

Based on the above Enabling Actions (Section E1.1), a number of "Action Priorities" are set out which are now aligned to the ICZM Policy Outcomes (see Figure E.1) and the more detailed action briefs outlined in Parts C and D (see Figure E.2). Prioritisation was undertaken by reviewing a mix of actions that were nationally pressing (urgent), necessary and also those that could be easily achieved in order to maintain momentum for effective risk resilient ICZM delivery.

[2] Interdisciplinary Assessment of the Muri Lagoon Final Report Consolidating the Sanitation Development Upgrade for the Cook Islands Government (January 2018), AECOM.

Priorities are aligned to the ICZM Roadmap timelines set out in section E2 as being short (2020 – 2022) medium (2023 – 2026) and long term (2027 – 2030). The specific focus of each Action Priority is set out as follows:

- Priority 1: The need to improve the collaboration between sectors, institutions and stakeholders to better enable and support this ICZM Plan.
- Priority 2: The capacity for continuity and sustaining human resource training and capacity building to deliver the vision and objectives set within this ICZM Plan, the needs of the Government and regional and international agreements.
- Priority 3: Demonstrated commitment towards the implementation of regional and international agreements that seek to incorporate a range of instruments that help towards mainstreaming ICZM, adaptation to climate change and disaster risk management in tandem with future wishes for creating a framework for ocean governance into national sustainable development commitments (SDG14) and those of the climate change agenda.
- Priority 4: Improved awareness for all aspects of society from the highest level of government to local communities on ICZM related issues using a range of communication tools and techniques.

These four priority headers are articulated below to present the main areas of overarching support required. Reference to ICZM Policy Outcomes (as defined within Volume 1 – Policy Framework) are set out in Figure E2.

PRIORITY 1: COLLABORATION

A "Ridge to Reef" (Islands Systems Management) approach is essential in Barbados[3] to ensure that activities on land do not adversely impact the marine environment. To this end, specific guidance will be produced to help individual sectors to embody the 11 principles set out within this ICZM Plan (see Volume 1 - ICZM Policy Framework (2020-2030)) in a manner that will facilitate incorporation into government operations with minimal impact.

In order to create the necessary platform for future collaboration, all planning related ICZM activities and development application related issues will be coordinated through the Planning and Development Board, which is set up under the Planning and Development Act (2019). Activities shall include consensus on the design of EIA terms of reference to ensure that all future development proposals falling within the defined CZMA undertake the necessary studies to provide the evidence base for appropriate decision making to be made that supports the ICZM Plan. Decisions made shall be collaborative amongst relevant organisations, adhering to new or existing operational guidance manuals or advisories that may be produced to support all sectors and individual agency expectations.

It is the intention of the CZMU to formalise (in a collaborative manner) the annual review of coastal environmental health as defined within this ICZM Plan to ensure continued performance and delivery of ICZM Policy Framework expectations in a collaborative manner. This includes the development of clear actions, for various organisations, that shall help to provide the necessary updated information on regional and international commitments that Barbados are signatories to plus sectoral analyses to help in the production of an "State of the Coast" Report for Barbados.

A legal and regulatory review will be undertaken to establish and develop the legal mandate and governance structure that links this ICZM Plan seamlessly with the pending Blue Economy framework for Barbados that is being initiated by GoB (through MMABE). This shall assess the current governance

[3] This term encapsulates similar terms being used in Barbados such as "Roof to Reef" etc.

structures within which this ICZM Plan, and any future Marine Spatial Plan (MSP) for Barbados would operate to provide a consistent and collaborative institutional delivery approach.

Finally, a coastal and marine research strategy will be developed for Barbados in a similar vein to international models that exist such as the OECS Code of Conduct for Responsible Marine Research and Marine Research Strategy. A new and bespoke Barbados coastal and marine research strategy will have due recognition of the Government's climate change policy plus any ocean related research strategy designed by MMABE to move forward the Blue Economy in Barbados. In line with the implementation priority below (capacity for continuity) this should include a review of capacity, capability and partnership requirements for such a coastal and marine research strategy followed by subsequent mechanisms for implementation. In terms of collaborative partnership arrangements, an important short term task is to develop and implement regulatory mechanism for third party research permits and arising intellectual property. Issues surrounding the charging of fees for ay research vessel operating in Barbadian waters should be considered as part of the broader National Ocean Policy that is currently being developed by MMABE.

PRIORITY 2: CAPACITY (FOR CONTINUITY)

A key challenge remains over human resource capacity to take forward an ICZM across all departments and agencies in Barbados. With regard to the development of a Blue Economy, Barbados recently made a step forward by creating the MMABE in 2018. A new Blue Economy Policy and Strategic Action is being prepared for MMABE under a parallel IDB project. The outcomes of this institutional capacity will need to be embraced within the sentiments and intended actions set out within this ICZM Plan in due course.

The sustainable management, use and conservation of living and non-living coastal resources (see Part C), including fishing for local food security to aggregate extraction (onshore and offshore) are both of national importance to help develop and maintain a vibrant and sustainable economic sectors. In the main, coastal resource management (living or non-living) is challenged by limited human operational capacity for research, monitoring, compliance and enforcement. The GoB has recognised the need to better understand the potential for sustainable coastal resource management in tandem with improved conservation. For example, as part of this ICZM Plan, a role of Sensitive Marine Areas (SMAs) and MPAs are critical to better understand the role (and potential for) of these areas in future sustainable resource management and conservation. Future capacity to deliver their potential role will need constant assessment and update as appropriate to help identify new MPA locations as well as the management systems and capacity requirements needed in the future.

As stated above, the need to advance coastal and marine research has been recognised, including national and regional action. In line with Priority 3 below (communication), this is expected to include a review of capacity, capability and partnership requirements for such a coastal and marine research strategy followed by subsequent mechanisms for implementation. This seeks to build upon embryonic discussion on the establishment of a "Blue Economy Academic Program for professional development and the creation of new skills in support of Blue Economy in Barbados (using IDB donor funded support (BA-T1063-P002))[4]. In addition, other ongoing consultancies are underway to help move forward the Blue Economy in Barbados[5]. The outcomes of these must be recognised as future inputs to the ICZM Plan.

[4] "Consultant Firm to help design an Institutional Capacity Building Program – Eqo Nixus 2020"

[5] Anniver undertaking a Stakeholder sensitization Blue Economy project (2020); Integrated Sustainability Consultants undertaking an Integrated Blue Economy Policy Framework and Strategic Action Plan project (2020).

Finally, as part of this Strategy, the GoB (through MMABE) intends to focus attention on delivering on the potential of the Blue Economy , including a strategic approach towards strengthening public private partnerships and the sustainable use and management of ocean resources. This will give due consideration to sustainable finance mechanisms including those that exist whilst securing of budgets and opportunities for revenue generation (see Part E7).

PRIORITY 3: COMMITMENT

The GoB has recognised that future funding to tackle ICZM issues will be dependent on Barbados being able to demonstrate, through the cost recovery mechanisms identified within section E6 of this ICZM Plan, that it will lead to a beneficial legacy for citizens and the wider coastal environment in general. It is of priority importance, therefore, that a fully costed Results Based Framework (see section E1.1) and supporting Strategic Action Plan (SAP), endorsed by the Ministry of Finance, is suitably aligned to Government sectoral budgets, with due consideration of national circumstances and limitations (see Priority 1 "collaboration" above). In addition, finance and co-financing mechanisms will need to be clearly identified and disbursement modalities secured for relevant ICZM Plan delivery.

The GoB will maintain the continued value of Barbados' natural capital, with further development of the understanding of the value of coastal resources overall. This is expected to include the continuation of natural capital evaluation studies of Barbados' marine and coastal environment and the production of new guidelines based on new findings of which are expected to be derived from the annual "State of the Coast" Reports.

Formal governance arrangements will be put in place, endorsed across Government, appropriately resourced with key parties given the power and influence to implement the vision and policy outcomes presented within the ICZM Plan. To achieve this, institutional, policy and legal arrangements to provide coordinating mechanisms for ICZM delivery will be reviewed and improved where necessary.

PRIORITY 4: COMMUNICATION

Continuation of on-going coastal and marine-related public initiatives is important. This should be coupled with the development of suitable engagement strategies for communities to ensure that ocean literacy is developed in all parts of society.

Increasing public awareness, understanding and appreciation of the importance of the coast, the ICZM Plan and the Blue Economy, through education and outreach is an important short term action. This is expected to embrace the creation of a process for active public participation in planning, policy and decision making which is likely to include the need for a public awareness, education and outreach strategy to be developed and implemented. This will include a range of options, such as the development of digital tools, accessible for the public to access information concerning ICZM issues and how citizens can better appreciate the benefits of the coast to health and wellbeing. This should include a focused programme, implemented by NCC, to improve coastal access through a formalised beach management and safety strategy for Barbados which builds on current international work to deliver an International Standard for beaches (ISO13009).

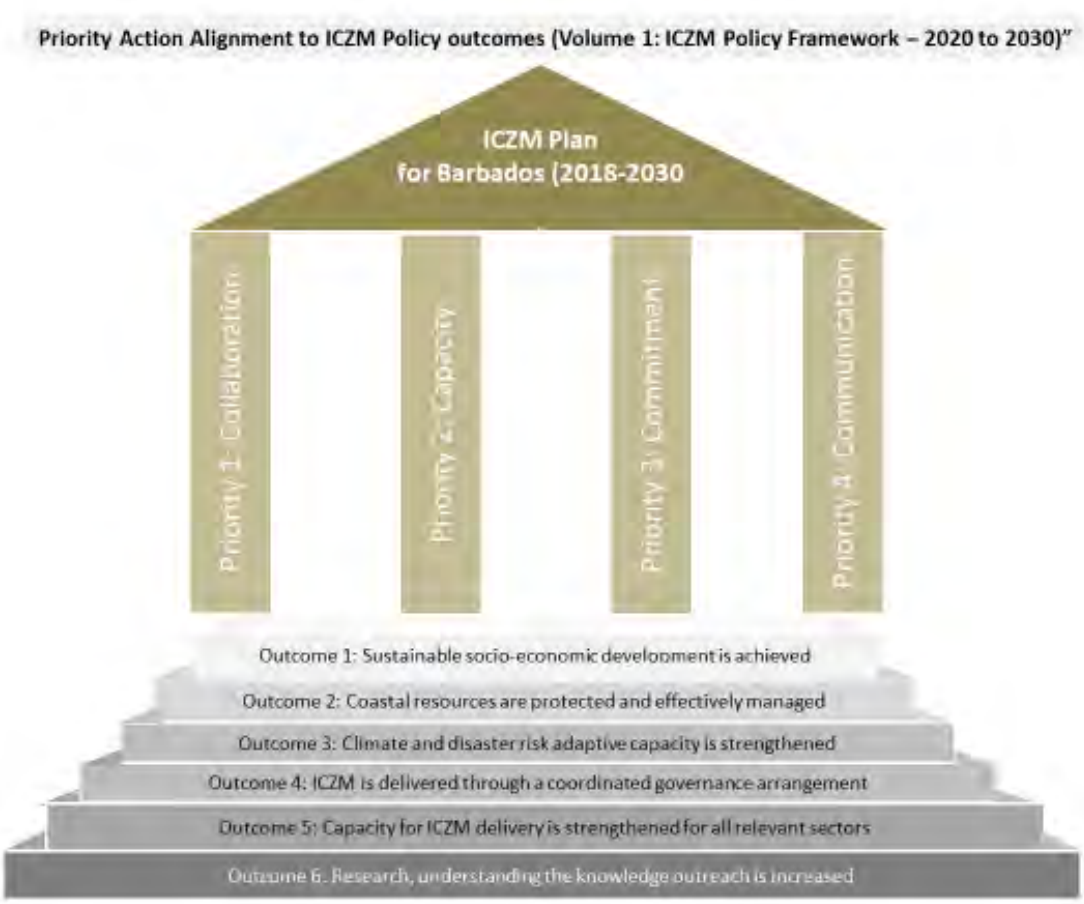

Figure E.2: Priority Action alignment to ICZM Policy Outcomes (2020).

E2. ROAD MAP FOR IMPLEMENTATION

The following Road Map (Figure E2) is designed to link the various National Guidance actions (in Part C) to the 6 ICZM Policy Outcomes outlined in Figure E1 above. Each specific action (per National Guidance) is then assigned to one (or a range) of ICZM Policy Outcomes as appropriate. These are then assigned a Road Map "timeline" (that reflects the timelines set in Part C for each activity) as follows:

a) Roadmap 1: Short Term (2020 to end of 2022)

b) Roadmap 2: Medium Term (2023 to end of 2026)

c) Roadmap 3: Long Term (2027 to end of 2030)

Additional commentary on the indicative delivery is presented in the following sub-sections E3 to E7 accordingly.

Table E1: Implementation Road Map of National Guidance Actions and compliance to ICZM Outcomes (Volume 1)

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
Disaster Risk Management and Climate Change Adaptation (DRM)						
1. Produce a specific roadmap to improve collaboration between DEM (national) and CDEMA (regional) that embraces the principles of the Sendai Framework.			★			
2. Elaborate and implement a plan for continuous maintenance and improvement of NCRIPP data and risk results.			★			★
3. Produce a National DRM and CCA Plan for the CZMA.	★		★			
4. Conduct the necessary interventions (physical and non-physical) to implement DRR measures defined in the DRM Plan.	★		★			
5. Conduct a specific training program, delivered by CZMU and DEM staff on DRR and CCA measures to other sectors					★	
6. Elaborate a financial plan for DRR and CCA measures			★			
7. Assign financial accessing functions to CZMU staff			★		★★★	
Beach Management (BM)						
1. Update the inventory and classification of beaches.		★		★		
2. Develop and implement a Barbados Beach Management Plan (BBMP).		★		★		
3. Develop and implement a National Beach Risk Management Framework (ISO13009).				★		★
4. Development of local beach management plan by Sub-Areas.		★		★		
5. Organize working meetings for the coordination of each National Programmes of Action defined in the BBMP.					★	
6. Create a Beach Access/ Enhancement Plan	★	★				
7. Coordination meetings with NCC to ensure the implementation of guidance related to				★	★	

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
commercial applications.						
8. Develop a procedure and implement bathing water profile.		★				
9. Organize working meetings with EPD and GIS to agree on technical aspects related to BM8.	★			★		
10. Disseminate access to public domain monitoring data.						★
11. Creation of a Beach use monitoring system				★		
Development Planning and Setbacks (S)						
1. Formally delineate the definition of HWM within statute.			★	★		
2. Agree on setbacks policies and required studies (set out within this ICZM Plan) with TCPDO.			★	★		
3. Map setbacks distances that embrace the newly defined HWM.			★			
4. Include setback distances within the NCRIPP platform to support the review and approval of applications/plans and official decisions.			★			★
5. Prepare a simple informative technical guidance note describing the setback approach to property owners and developers.		★		★		
6. Create a national inventory and assessment of coastal landscape /seascape values.		★				
7. Disseminate setbacks and recommendations through geo-viewer/website.						★
8. Update periodically setbacks based on updated coastal risks and coastal resources information and maps.			★ ★			
9. Agree a calendar to coordinate PDP and ICZM Plan provisions/regulations/updates relating to developmental setbacks and studies required		★	★	★	★	
10. Deliver bilateral meetings with selected staff					★	

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
and managers to discuss developmental planning issues and compliance aspects to the ICZM Plan.						
11. Agree on existing and new setbacks and provisions within the CZMA (based on new monitoring related information) and publish within the annual State of the Coast reporting system.				★		★
12. Prepare supporting documentation to update the PDP (2017) regarding the definition of the CZMA, HWM and development setbacks in the CZMA.			★			★
13. Prepare an indicator system to evaluate the success in setback implementation (linked to the CZMA (Enforcement) Regulations and the number of "coastal zone protection notices" submitted to offenders in any one year			★ ★ ★			
Compliance to Environmental and Social Safeguards (ESIA)						
1. Coordination meetings with TCDPO to agree on new requirements to update the ESIA process to help support and improve sustainable development within the CZMA.	★				★	
2. Revision, update and suitable dispatch of "The Applicant's Handbook and Guide to Coastal Planning in Barbados"		★	★	★		
3. Improved monitoring and evaluation procedures are adopted (with the endorsement of the Planning and Development Board) of current and future development applications	★			★		
4. Elaboration of an indicator system to assess the effects of ESIA procedures		★		★		
Construction and Maintenance of Coastal Structures (CS)						
1. Produce technical "White Papers" for wide dissemination to clearly articulate recent findings for the study on shoreline			★			★ ★

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
dynamics, considering CCA.						
2. Organize bilateral working meetings with TCDPO to agree on technical aspects related to CS1.			★		★	
3. Organize training activities undertaken by CZMU staff for public sector and private sector audiences to better incorporate CCA into the design of coastal structures					★	
4. Review (in partnership with TCDPO) all current and future planning applications that request the need for new coastal structures and other construction activities within the CZMA to ensure that they are consistent with the policies and CCA requirements of the plan	★ ★		★	★		
5. Support TCDPO to ensure conditions for the approval of coastal structures are incorporated in all development permits. Undertake site inspection during construction to ensure compliance.	★		★			
6. In partnership with DEM, support the preparation of new procedures for managing emergency maintenance works.			★			
7. Undertake assessment reports on the adequacy of existing infrastructures to projected SLR (feeding into the State of the Coast annual reporting system)			★			
8. Prepare Monitoring and Maintenance Strategy Instruction procedures/guidelines (for pre and post monitoring of coastal structures) in line with the updated ICZM Plan			★	★		
9. Update the existing NCRIPP architecture to establish a comprehensive database for the inventory and assessment of coastal structures.			★			★
10. Update the inventory and assessment			★			

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
database based on the results of monitoring activities.						
11. Formalize (through a new MoU) a collaborative arrangement /agreement between CZMU, EPD, Drainage Division and NCC for ensuring the monitoring and maintenance of beach facilities, beach and storm-water facilities cleaning.		★	★	★		
Emerging Issues (EI)						
1. Devise a National Policy Position Paper on Coastal transportation services and associated jetties	★			★		
2. Devise a National Policy Position Paper on Use of 4x4 Vehicles on coastal habitats		★		★		
3. Devise a National Policy Position Paper on Over water bungalows and other buildings	★			★		
4. Devise a National Policy Position Paper on Use of Quarried Sands for Beach Recharge	★	★		★		
5. Devise a National Policy Position Paper on Carrying capacity of beaches based on the National Beach Management Plan	★	★		★		
6. Devise a National Policy Position Paper on Water parks and use of inflatable structures		★		★		
7. Agree on analysing and applying approaches (screening tools) to identify possible emerging challenges and from this, shortlist those emerging issues of immediate importance	★			★		★
8. Automate existing screening approaches, tools, and formal sustainability assessments for the rapid analysis that responses to new issues will require						★
9. Create a searchable database of valuable lessons learned (identify, track, and address unintended consequences of an emerging issue).				★		★

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
10. Organize monitored on-line chat sessions that allow public input to be analysed and additional value to be derived from it. Use of passive "crowdsourcing" can be useful in identifying new issues.						★ ★
Biodiversity Conservation and Coastal Habitat Rehabilitation (BIO)						
1. Support the implementation of actions within existing and updated FMPs (Fisheries Division) with specific regard to reef fish, sea urchins and sea turtles	★	★				
2. Creation of strict protected areas/zoning schemes to help support delivery of effective "refuge areas" for marine biodiversity and fisheries schemes as other options for management.		★		★		
3. Initiate co-management demonstration projects to encourage sea urchin and reef fishery enhancement		★				
4. Initiate a programme of "State of the Coast" reporting to support SDG and NBSAP update and reporting requirements		★				★
5. Production of a series of "Health Report Cards" on the health of the national coastal ecosystems						★
6. Habitat rehabilitation/ re-stocking/EbA strategy to embrace all terrestrial/marine habitat damage mitigation measures in a gender sensitive manner.	★	★				
7. Improve public awareness on coastal biodiversity issues and workshops on coastal rehabilitation and EbA approaches					★	★
8. Improved biodiversity research and data management		★				★
9. Create a monitoring system to assess biodiversity conservation in the CZMA.		★		★		

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
Research (R)						
1. Elaborate a 2020-2030 Coastal Research Agenda.				★		★
2. Coordination with research institutions in Barbados.				★		★
3. Complete, update and normalize all geospatial information related to ICZM.				★		
4. Develop a web data catalogue to provide access to data.						★
5. Develop a web viewer to disseminate and provide access to Geospatial information.						★
Public Awareness and Stakeholder Participation (PA)						
1. Preparation of an operation manual to encourage the dissemination guidance /outreach approach to Coastal Communities *(internal and external communication)*			★			★
2. Formally adopt the draft Consultation Guidelines *(this Draft Guideline)*				★		
3. Preparation of a Strategy for Social Partnership engagement					★	
4. Prepare a Strategy to demonstrate message communication to persons with disabilities and other vulnerable groups						★
5. Establish school level inclusive play and art-based activities (focusing on Risk Resilient ICZM)			★			★
6. Develop a digital social media tool/ website for public to access information concerning ICZM, marine spatial planning and the marine environment.						★
Non Living Resource Exploration and Exploitation (REE)						
1. Adopt policies set out within the PDP (2017) to recommend the future location/relocation of non-living resource extraction operations away from OS2	★	★				

	Outcome 1: Sustainable socioeconomic development is achieved	Outcome 2: Coastal resources are protected and effectively managed	Outcome 3: Climate and disaster risk adaptive capacity is strengthened	Outcome 4: ICZM is delivered through a coordinated governance arrangement	Outcome 5: Capacity for ICZM delivery is strengthened for all relevant sectors	Outcome 6: Research, understanding and knowledge outreach is increased
Natural Heritage Conservation Areas (NHCA) or areas with lower coastal risks as identified within the ICZM Plan.						
2. Formalize CZM Regulations to designate incipient dunes, beach and fore-dunes as areas in which removal of vegetation or sand is prohibited.		★	★	★		
3. Mainstream the sustainable use of non-living resources within national policies and planning frameworks	★	★		★		
4. Develop a Blue Economy Valuation Plan including a strategic approach to strengthening public private partnerships and the sustainable use and management of non-living coastal and marine resources	★				★	
5. Strengthen national legal frameworks and guidance (guidelines) for integrated planning and management on non-living resources		★				
6. Develop a research strategy including national and regional action to support sustainable exploitation and exploration of non-living coastal resources			★			★

E3. INFORMATION NEEDS AND DATA MANAGEMENT

E3.1. Overview

GoB need to take stock to consolidate the new data and information presented within Part A2 of this ICZM Plan with regards to data and information management in order to help provide clear advisories on Risk Resilient ICZM topics. There is an immediate need to consolidating and streamline data capture programmes (on agreed ICZM topics) to help transform scientific data into meaningful and digestible policy statements for decision makers. To this end a new focus is needed that links scientific knowledge into the provision of relevant decision making product support to those who need it most.

New effort should therefore be placed on the use of new or developing technology innovations that can provide efficient and cost-saving solutions in data-poor contexts. For example, probabilistic risk assessment enables quantitative valuation of risk plus economic valuation of the coastal protection services obtained from ecosystems. In addition, innovation is required with regards to how best to integrate monitoring approaches that support (for example) the greater uptake of nature-based coastal protection solutions (and supporting data collection programmes) that will help support the sustainable design of coast protection schemes and flood conveyance (watershed) interventions that may help support the design of coral reef/wetland conservation schemes.

Once targeted information has been collected, being able to communicate the outcomes and results requires a new shift in role for CZMU, changing from purely collecting information, to be the key "messenger" of new innovations for both risk resilient ICZM (see Part E4). In all instances an improved efficiency drive is needed across all GoB sectors on data collection and hence information provision. To this end, efforts to improve the accessibility of NCRIPP information online must be pursued to help improve message conveyance to help the private sector to have the latest information to hand to help in the design of future development applications that fall within the CZMA.

E3.2. Streamlining and targeting data collection Programmes

Being mindful of the challenging macro-economic context that Barbados is facing (from 2020), there is a strong priority consideration needed to better demonstrate value for money, return on investment and improved public sector decision making efficiency (across GoB sectors) as part of any new data collection programme. GoB must therefore demonstrate improved public sector efficiency in coastal data use/application.

Being able to focus on priority data collections programmes is critical to streamline workloads and focus on areas that Barbados (through the CZMU) expects to focus on. Whilst it is not viable to engage in long-term back catalogue collection programmes that gather historical data from various national and regional sources (e.g.: detailed historical hurricane data), improvements can be made to current and future data collection regimes from now and into the future. This may involve identifying opportunities to partner with private or regional entities to install monitoring facilities (on property or private land etc) to help collect information that may support risk resilient ICZM datasets to be enhanced. For example, to better understand coastal flood risk and inland flood limits (to better define the CZMA inland limits), topographic relief data, drainage and flow data may be required[6].

[6] The Drainage Unit of MTW is a critical strategic partner in this example, though this may require training of their staffs along with those of the CZMU. Tailored changes to agency specific work programmes may be required as necessary.

Presently, CZMU manages a sound coastal data collection and monitoring regime that provides data to support and improve the understanding of coastal processes, hazards and resulting risks facing the coastline. Key datasets currently monitored are presented within various sub-sections to Part C. More quantifiable baseline data with regards to coastal hazards and disaster impacts, which had been severely lacking prior to the onset of the CRMP project, has therefore significantly improved over recent years (Baird 2017) plus the use of this data to produce a series of supporting natural hazard risk maps presented within this ICZM Plan.

E3.3. Oceanographic and Coastal Engineering Data Collection

Oceanographic, engineering and coastal forecasting related data collection (collected by the Barbados Meteorological Services - BMS) remains critical for GoB to pursue under the role of the CZMU. Enhancing the existing ocean and nearshore wave data monitoring programme, both spatially and temporally, should be encouraged (where possible) to help provide CZMU to collate data to help with improved coastal model certainty through improved data calibration and validation. It is proposed that up to six Acoustic Wave and Current (AWAC) instruments should be in operation around the Barbados coast within the first few years of this ICZM Plan Roadmap (see Section E2). Two additional units are recommended to be used for swapping during retrieval/deployment and in the case of maintenance issues or damage. Cost savings are proposed through measuring shallow non directional waves/currents using a combination of the existing S4 gauges and newly purchased shallower water wave/current profilers, thereby costing less (capital cost and operation cost) than the AWAC. Regarding deeper water wave measurements, wave directions in the nearshore are generally well understood, with any site-specific directional validation being completed on an as-needs basis and funded by the private sector.

Due to a lack of wave overtopping data collection especially for post-storm events, there is a need to improve the measure the impacts of storm surges (inland spatial extent) to help ensure that current flood inundation maps (presented within this ICZM Plan) are updated to continue influencing development control policy in Barbados. Understanding the data output by models, particularly improved knowledge and training on coastal structure overtopping rates is also needed to better understand model design needs and the interpretation of joint probability (water level and wave) complexities plus any associated risks that may arise as a consequence. Through enhancing the existing CZMU wave monitoring programme with the collection of certain offshore and nearshore wave climate parameters, new data on overtopping rates, currents and water levels would become available for effective use within new coastal models. Without accurate data collection, incorrect data subsequently placed into numerical models can easily result in under or over calculation estimations of flood extent and hence risk. Improving this situation could then help to launch a new and robust platform from which the ICZM Plan and future developmental control can be used to best effect.

It is also beneficial to ensure that data collection (both quantitative and qualitative information) is undertaken during any storm surge event which occurs and associated impacts of such events on hard coastal defence structures where crest level data is known. Such results will support that the calculation of more accurate estimations of overtopping during any surge/flood events. Coastal flood mapping can also be greatly improved through the collection of new focused geospatial data on structural assets (structures etc) that occur within the CZMA (especially engineered or built structures found within or adjacent to villages and towns). This could be supplemented with improved and updated information on real-time storm precipitation intensity or wave overtopping frequency volumes etc during storm event situations (derived from BMS).

Finally, attention needs to be placed on monitoring post event coastal flooding episodes to more accurately record flood depth and extent (through photography, drone and/or video coverage etc) which can all be used to support the "communication" of what happens during such events to other stakeholders, emergency responders, decision makers, consultants and local engineers etc. In part, the Drainage Division currently is acting on this in tandem with the private sector to collect storm water/flooding data. CZMU will need to encourage closer collaboration with both the Drainage Division and BMS (along with having their own improved relationships with the private sector) to help achieve improved outcomes regarding this issue. The training of volunteers to help capture information on such events needs to be considered (possibly using specific Android "apps" as appropriate) in order to reduce surveillance costs whilst introducing specific activities whereby the public can feel engaged (see Section E4 – "Education, Training and Public Outreach Needs").

E3.4. Socio-economic Data Collection

Data collection programmes to collect socio-economic information represent a new technical area that would easily demonstrate added value to GoB. It is hoped that through the establishment of specific MOU's with agencies needs to be undertaken to assist in this process.[7] Annex 9 sets out a draft "Guideline" document to collect socio-economic data which may be used and disseminated to develop applicants by the CZMU as required. The use of probabilistic risk assessment should also be considered as this enables quantitative valuation of risk to be compiled plus new information regarding the economic valuation of coastal protection services obtained from ecosystems. These assessments (financial protection and risk transfer) can both be used to, for example, develop more affordable insurance schemes for developments proposed within the CZMA of Barbados. As empirical risk assessment relies exclusively on historical data and is usually insufficient to determine maximum probable losses or average annual losses, probabilistic risk assessment approaches therefore should be adopted into data collection and analysis systems as this often addresses these shortcomings and allows for a sound understanding of the processes and roles of different risk drivers. Probabilistic risk assessment also provides a quantitative estimation of the maximum probable losses and average annual losses, which support the identification of appropriate risk reduction measures. This approach could also embrace the economic values of Barbadian ecosystem services which can then be better mainstreamed into the scope of public budgeting to help justify future budgetary resource allocations to the CZMU into the future. Such an approach needs to be interpreted and/or provided to GoB economists in a useable and digestible form so they can shape the financial protection strategy for the country as well as to inform new public investments of options and alternatives.

E3.5. Geotechnical and Seismic Data Collection

Further studies are required to improve aspects of seismic hazard assessment plus soil classification parameters for specific sites (i.e.: development proposal locations). Currently, relatively little site-specific field investigation, in-situ and laboratory testing is available for use and hence this important information is not sufficiently embraced within the CRMP natural hazard risk mapping exercises (e.g.: within the maps presented within this ICZM Plan). It is recommended that a closer partnership arrangement is needed between CZMU and TCDPO (with the Energy Division and Soil Conservation Unit) to better communicate natural hazard risk developmental control needs on coastal cliff and landslide-prone areas.

[7] CZM Regulation 2020 sets out the legislative approach towards setting up MOUs to assist in this process.

In a similar vein to the above, as tsunami studies are broader in scale and require Caribbean wide physical information and historical data that cannot be collected solely by GoB. Any new data that is available should be included by CZMU within updated ICZM maps and within the NCRIPP database so that outputs can be better communicated accordingly to key decision makers. A comprehensive tsunami study for the entire Barbados coastline is recommended to more precisely determine inundation extent that is based on a pre-determined wave originating from a range of directions (i.e.: NE, SW and SE).

E3.6. Systems Required to Update the CZMA Inland Limits

In partnership with other key stakeholders, improvements towards delimiting natural hazard risk zone extents and limits could be achieved through additional work as follows;

- A more thorough understanding of the variability in the geotechnical conditions (by the Natural Resources Unit[8] and the Energy Division), the response of the slopes to extreme events (i.e. heavy rainfall, heavy sea states, seismic activity, etc.), and long-term slope stability behaviour (see E3.5 above);
- Additional automated weather stations (AWS) should be encouraged to be installed (by BMS) which coupled with long-term monitoring of groundwater levels, could be used to attempt to establish a trend between daily rainfall and response of groundwater levels in different areas geologic units.
- New geophysical investigations to measure the actual shear wave velocity to categorize soils by seismic site class (by SCU).
- Effective development and use of the CZMU NCRIPP system.

The following actions are proposed to help improve coastal data collection efficiencies:

1. Actively find opportunities to work under private and public partnerships (PPP) to install monitoring facilities on properties[9] to collect information will support risk resilient planning, particularly for wind and rainfall, or for monitoring purposes (i.e. CCTV, Argus beach surveillance, drone projects);
2. Facilitate the improved storage and access of coastal monitoring and mapped data for further analysis, working towards a data repository that has validated metadata and consistent data upload mechanism;
3. Improve the approaches towards the accurate prediction of coastal risk using early warning systems (EWS) such as improved numerical modelling and adopting online open access forecasting tools.
4. GoB needs to consider the creation of a National Coastal Data Policy which compliments the structure being set for the Barbados Statistical Survey (BSS) (see Annex 9).

In addition to the above actions, the development of a NCRIPP database platform, intended as the recognized national repository for coastal zone-specific disaster risk data, is required so that it is the primary instrument for data sharing and dissemination in Barbados. Whether the NCRIPP database is effectively used as the sole tool for coastal risk mitigation and development planning within Barbados will depend on its ability to adopt a new mechanism that enables it to store regular updates from

[8] NRU have capacity to understand variability in geological conditions through their geotechnical engineers.

[9] Issues including site access, maintenance and site clearance will be important aspects to include.

relevant departments. Improvements to data sharing protocols between agencies are also required to help promote the use of hazard data within sectoral plans (see Annex 10). The issue of implementing an Integrated Monitoring Programme (IMP) that uses the current NCRIPP database platform is discussed in sub Part E3.5).

E3.7. Creating Guidelines and State of the Coast Reports

A ***bespoke set of planning and support guidelines, rules and policies*** needs to be produced that reflects the new data collected (as set out in E3.2-E3.6) to help implement this ICZM Plan and hence steer sustainable development within the CZMA. A suite of guidance manuals (updating the current Coastal Planning Guide produced in 2010 with others as set out in Part C of this ICZM Plan) should help enable regulators and private developers to ensure that new coastal developments are designed in an appropriate sustainable manner (adhering to EbA and DRM principles) whilst ensuring that they are consistent with environmental and land related policies, laws and regulations (i.e.:). It also will provide consistency and transparency for decision makers and enables them to support their decisions with auditable evidence.

Through this approach, and supporting the improved communication concept (see sub Part E3.3), CZMU can offer strengthened support on updating existing planning regulations and be made more up to date with regards to climate predictions. Such guidelines, when produced, need to consider the setting of appropriate "rules" or "standards" for coastal development within defined boundaries. The outcome of the guidelines should be to establish a set of development controls for buffer and setback areas for watersheds and development behind mean high water. They also need to be written in partnership with all Ministries and Departments, whom have different yet related responsibilities.

"State of the Coast" reporting is a key recommendation that is central to ensuring the success of the ICZM Plan. Periodic reviews of data management arrangements or data collection protocols may be under-taken throughout this annual process to better take account of advances in technology whilst in addition, recommending specific audits are undertaken to assess conformance with draft Standard Operating Procedures (SOPs) or monitoring protocols. The "State of the Coast" reporting approach should also embrace SDG indicator assessment work for the country (see ICZM Volume 1 Appendix 4 for additional details). The production of a series of "***Health Report Cards***" (see Figure E.1) that help to capture the health of coastal resources are recommended that represent annexes to the "State of the Coast" annual reports which help to report on "ecological integrity" which determines how native, pristine, diverse and resilient a legally defined coastal resource is and if all of its components are present and functioning. Commonly used indicators to be used include water quality, the diversity of marine invertebrate species present and the number of introduced species found and the presence and health of sensitive species (in a healthy condition). They should be produced and designed to enable a reader (via print or online media) to quickly understand the status of a coastal resource, and to understand important species that may be found there plus the climate or man-induced pressures that are being upon them. A series of report cards sections (as part of the overall Health Card) should focus on the following Themes (see Volume 1 Appendix 4.5 for more details):

1. Theme 1: Water Quality (led by EPD);
2. Theme 2: Public Health (led by EPD);
3. Theme 3: Biodiversity(led by the Ministry of Environment and Natural Beautification with support from CZMU);
4. Theme 4: Land Use or Sea Use Change within the CZMA (led by TCDPO with CZMU support).

E4. EDUCATION, TRAINING AND PUBLIC OUTREACH NEEDS

E4.1. Education and Training Needs

In the short term, the greatest challenge for GoB continues to be the allocation of scarce resources to help support agencies (especially DEM) to safeguard life and property, particularly in coastal settlements and flood prone areas (especially in rural Parishes of Barbados). GoB is constantly challenged by the lack of institutional capacity within some departments to perform a staff capacity building and coordinating role. It is therefore critical that counterpart organizations in the private sector and the NGO community maintain an effective link to public agencies so as to ensure harmony in the development, implementation and monitoring of policies and regulations as they relate to entire spectrum of DRM activities. There is scope, however for greater coordination between DEM, the Ministry of Housing and the private sector in the areas of safer building construction. The role of the CZMU could prove pivotal here to help support this process should avenues for improved inter-departmental staff coordination be pursued and stated within updates to the existing CZM Bill (2020).

CZMU, for example, must improve its role as a "train the trainer" body, ensuring that a percentage of its staff component are not only able to undertake and take ownership of training delivery to other Departments, but also be financially compensated to help GoB to better transfer or export certain skillsets. To support this requirement, CZMU need to recognise the capacity that does exist at a national, regional or wider Caribbean level and determine what needs exist or will need to be met in the future which is likely to need the services of coastal resource economics[10]. . Upgrading skills and understanding of decision makers and professionals is therefore still needed for continuity purposes for all sectors.

One key challenges facing both TCDPO and CZMU relates to the need to ensure that employees are well-versed in a new planning processes (linked to the new PDA 2019), and how this may be applied to the benefit of all Barbadians. CZMU are encouraged to help TCDPO by introducing a formalized management system that includes tools, training and monitoring activities to implement within the current planning system. This "system" should guide employees to ensure appropriate consideration of the coastal environmental effects of a relevant decision. Training and awareness sessions, consistent templates and tools, quality tracking, and monitoring are all key parts of CZMU's commitments towards improving risk resilient ICZM within this Plan. To this end, a Risk Resilient ICZM Environmental Compliance Awareness Program should be initiated by CZMU in partnership with a range of organisations including EPD, NCC, DD and TCDPO. GoB should initiate activities to ensure that staff members are trained in new environmental compliance whilst all organisations are able to demonstrate how they are incorporating this new knowledge and regulation into daily work regimes. A draft training course module could be designed to educate stakeholders on risk resilient ICZM awareness issues. The training content should include updates to any legislation, compliance and liability, as well as due diligence issues. The work and decisions of individuals who comprise a more environmentally conscious and knowledgeable public service culture will, over time, have beneficial and cumulative impacts towards sustainable development.

The continual improvement and development of numerical modelling capacity within the CZMU, building on the NCRIPP studies by consulting firm Baird (2017). These models can be used to train and

[10] Financial risk management experts fall within the expertise required in the Ministry of Finance only.

learn, and then further developed with new data as it becomes available internally. Training in numerical modelling, statistical analysis, and - data analysis needs to be continued in partnership with private engineering consultants or regional expertise as appropriate, to ensure that the proposed Data and Information team are capable of analysing model outputs or re-running coastal models, communicating the updated findings to key stakeholders and from this, providing "train the trainer" events using new and updated DRR/CCA related information.

Of specific relevance is that GIS training will still be required as the type of information collected (by CZMU) will continue to be different to that of BSS. With BSS being the national repository for risk information, DEM and/or CZMU need to consider how to collaborate efforts towards delivering this repository plus data and knowledge exchange mechanisms. Agreements need to be reached on which organisation is best placed to expand its full-time staff in terms of hiring extra GIS specialists. This is important in order to understand who is responsible to develop the national capacity and to update and disseminate information on national hazard maps produced by CZMU through the NCRIPP. Therefore, it is proposed that careful collaboration is required by setting out a national Integrated Monitoring Programme (IMP) that designates functions between GIS teams in the BSS and within the CZMU or DEM. The GIS framework should be supported by appropriate coherent training programmes in hazard identification and risk assessment for staff within all three organizations.

A new training area for GoB staff (especially for staffs within MMABE is on the importance of cost: benefit analyses work. Cost benefit analysis (CBA) approaches (in many countries including Barbados) often show a bias towards environmental concerns leading to a divide that usually emerges between ecologists and economists, yet identifying and implementing robust adaptation approaches that are cost-effective and build resilience across a range of potential future climates remains critical for Barbados. To date, the dominant approach has been a mix of direct engineered interventions such as sea walls, offshore breakwaters or novel designs to create "boardwalk" related infrastructure coupled with more indirect interventions such as early warning systems and awareness raising. However, there is growing recognition that nature-based solutions (i.e.: restoration and protection of natural habitats) when applied strategically and equitably can not only safeguard biodiversity and ecosystem services but also help people adapt to the effects of climate change. CBA should continue to be used in Barbados to better embrace social aspects as a method for creating a "decision rule" for choosing a preferred alternative, and/or as a component of a comprehensive policy analysis with a heuristic purpose. This requires CBA to fully consider the financial flows between stakeholders to include the social and economic aspects of a strategy or policy.

Efforts are currently underway (using IDB donor funds) to produce a Blue Economy Training Programme that addresses identified staffing knowledge and capacity gaps for Blue Economic development and promotes professional development for the public and private sector in Barbados and in the region. This academic program will be designed in robust coordination with UWI, MMABE and IDB in order to define aspects such as target audience, type and length of courses offered, learner experience and interaction, instructional delivery modalities, visual appearance of course brand, course syllabus, learning objectives, annotated outlines of curriculum content, curriculum resources, formative assessment instrument preferences and choice of learner credentialing process. Potential collaboration with other providers in the region may include:

- SDG Academy, author of the online course "One Planet, One Ocean"
- The Centre for the Blue Economy and Innovation (CBEI).
- The Caribbean Natural Resources Institute (CANARI).

- Caribbean Maritime Institute.
- The Caribbean Institute for Meteorology and Hydrology (CIMH).
- The Caribbean Meteorological Organisation (CMO).
- Government Meteorological Departments.
- The Caribbean Environmental Health Institute (CEHI).
- Caribbean Community Climate Change Centre (CCCCC).
- University of the West Indies - Mona Campus (UWI).
- St Georges University, Grenada (Marine Biology Dept).
- Bellairs Research Institute (McGill University);
- UNDP Blue Economy Accelerator "Laboratory" (Barbados).
- International Oceanographic Commission (IOC).
- NOAA.
- UK Met Office.

The production of a future academic training program is needed to ensure that:

1. MMABE staff receives required training for their organizational development purposes.
2. A wider public composed of associate undergraduate, early career professionals, technical college students and experienced professionals, through the UWI structure, enhance their knowledge and technical capacities on ICZM and Blue Economy development.

From this, the GoB will possess the necessary skills, qualifications knowledge and overall capacity to fulfil its mandate and new developed strategies for ICZM and Blue Economy development and also a wider professional community of professionals will be able to work both at public and private level on Blue Economy development.

Finally, no organization has the trained staff to best address psychological and socioeconomic impacts of individual climate induced or disaster events as well as multiple disasters occurring simultaneously. This is a new training area that could help assist both DEM and CZMU during recovery times (post event).

E4.2. South-South Cooperation (SSC)

SSC is a process whereby two or more developing countries pursue their individual and/or shared national capacity development objectives through exchanges of knowledge, skills, resources and technical knowhow, and through regional and interregional collective action. This includes partnerships involving governments, regional organizations, civil society, academia and the private sector, for their individual and/or mutual benefit within and across regions[11]. In fact, the UN 2030 Agenda and its Sustainable Development Goals (SDGs) acknowledges the critical role that SSC plays in global development. This is also reflected in other important global agendas, notably the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on Climate Change, and the Addis Ababa Action Agenda on Financing for Development.

[11] UN High Level Committee on South South Cooperation, Framework of operational guidelines on United Nations support to South-South and triangular cooperation SSC/17/3 (2012).

The aim of SSC is to generate both new ideas and concrete projects and also as a means to enable voices from the Global South to drive innovation and promote development. The division of "North" and "South" is used to refer to the social, economic and political differences that exist between developed countries (North) and developing countries (South). Although most of the high income countries are indeed located in the northern hemisphere, the division is not totally faithful to the actual geographical division. North-South cooperation, which is the most traditional type of cooperation, occurs when a developed country supports economically, or with other kinds of resources, a developing country. Hence whilst the Wider Caribbean is not within the Southern Hemisphere, the principles of SSC apply to the region.

Together with political dialogue and financial cooperation, SSC may prove a valuable "tool" for Barbados to pursue as it has promoted a large number of knowledge and expertise exchanges through programs, projects and initiatives that have helped solve specific problems in the countries of the Global South. For example, the UN Office for South-South Cooperation has published the "South-South in Action Series" gathering more than 100 successful experiences that have contributed to the development of countries around the world[12]. SSC may therefore prove to be a useful tool to help GoB agencies to collaborate and share knowledge, skills and successful initiatives in specific areas such as climate change and ocean governance.

A specific recommendation is to initiate dialogue between OECS and the GoB (specifically with the MMABE), to enhance SSC on how climate and disaster resilience can be inculcated into the development of ocean policy, coastal and marine spatial planning with direct implications on governance arrangements required to help deliver a Blue Economy. Barbados currently is developing its own National Ocean Policy (NOP), whereas OECS have recently initiated the production of a series of NOPs[13]. Lessons learned from the Barbados experiences (over 25 years of taking forward ICZM culminating now in their work to pioneer "Risk Resilient ICZM" out to their territorial limits (12 nautical mile limit) could be of high value to better disseminate for wider reflection and adoption within the wider Caribbean region.

E4.3. Public Outreach Needs

CZMU have experienced a mixed response to their public outreach programmes over recent years. Despite this, the programmes adopted are critical as caring for the coastal and marine environment is the responsibility of every Barbadian. However, insufficient awareness and lack of environmental education and outreach can result in low levels of personal accountability. Public participation is key to promoting and instituting a duty of care for the coast. By adopting a range of stewardship initiatives, the GoB can encourage and empower citizens to recognise their responsibilities, be part of the management process and take action where necessary. Encouraging the active and meaningful participation of Barbadians can enhance wellbeing and provide benefits for coastal environmental health.

An informed public increases participation in the successful delivery of this ICZM Plan. To support this, the CZMU and supporting partners will engage with civil society and local communities to ensure that literacy on coastal matters is increased and that the social and cultural benefits of their coasts are fully realised.

[12] https://www.unsouthsouth.org/library/publications/south-south-in-action-series/

[13] NOPs prepared for Saint Lucia, St Vincent and Grenadines, Dominica, Grenada and St Kitts and Nevis (Howell Marine Ltd and Sustainable Seas Ltd 2019).

There is a need for awareness raising among the general public and among sectors in government, civil society (such as school and university students and researchers), and the private sector. Cross-sectoral awareness raising among government sections should address coastal risks, coastal management priorities, and the effects of coastal climate change and adaptation needs. Communication tools such as videos, factsheets, and posters could facilitate this process.

As stated in the latest PDP (2017) the GoB is committed to creating an environment which encourages citizens to become more involved in the planning process. To this end, the process will be transparent and the public will be encouraged to participate. This thereby also applies to the implementation approach for this ICZM Plan.

Specific recommendation or actions that may be adopted by key public sector bodies to help improve public outreach on ICZM related matters include the following:

- Develop communication materials to inform other sectors such as tourism, investment companies, infrastructure, and transport agencies
- Raise awareness among the population and district administrators of the importance of maintaining coastal ecosystems and resources for resilience and flood prevention using visuals, videos, and info-graphics describing the functions of this natural infrastructure;
- Education programs in schools focusing on the impact of climate change and the importance of coastal ecosystems for Barbados;
- Strengthen collaboration with NGOs and other partners on the communication of adaptation projects and use new outreach techniques and tools to better inform stakeholders of stipulations for coastal construction.
- Document stories, scenarios and challenges encountered during work or consultations and from this, a database may be compiled to store this information for future re-use and update. The database should highlight issues or problems that are being experienced by the public or are specifically expressed by stakeholders as it relates to coastal construction and other coastal related issues. The database will help with developing a "Frequently Answered Questions (FAQs) segment for the CZMU website[14] and social/ traditional media platforms and also for the story-telling aspect at national consultations.
- The ICZM message to the general public will resonate with some and not others but that doesn't preclude CZMU doing as a good a job in sharing the message or story. It might take multiple efforts or reframing the message because it is not a one size fits all approach. Therefore, it is imperative for the message to be repeated in various formats.
- Assessment tools or procedures are needed in terms of measuring how the ICZM "message" is being delivered so that success can be measured more meaningfully.

[14] http://www.coastal.gov.bb/

E4.4. Communication

E4.4.1. Improving Message Communication

Reporting and communication is an essential, yet currently under-used function within current GoB departmental workloads. The results and findings attained from the recent donor funded CRMP project (Baird 2017) must now be better used to a better understand the "message" of risk resilient ICZM. A range of communication tools (including mobile phone applications etc) should be used to convey new science and technical facts that make the message more digestible and understood by non-experts, policy makers and Cabinet members. Summarized and comprehendible information (e.g.; simple sound-bites/"White Papers" or fact sheets etc) need to be prepared to help support (for example) updates to building standards regulation so these may be more easily inculcated into development planning. CZMU play a key coordinating role on this matter which can help to implement improved climate compatible development interventions within the CZMA.

Delivering messages that are founded on the integration of monitoring data from numerous monitoring programs need to be improved as it helps to provide key messages that support information about new scientific findings. A commitment to regular "State of the Coast" reporting is therefore required (see Section E3) through new and meaningful data collection and monitoring programs. The types of monitoring reports and information products to be used should include data summary reports, trend analysis and synthesis reports, coastal resource "health" score cards (see Figure E.1), report cards, simple summary reports (annual) and in depth periodic reports (inter-annual) that synthesise long-term trends from larger data ranges. Therefore, reporting and communicating skills within GoB need to be developed. This can be achieved by creating a single fully searchable, open access, online system which can be accessed and interrogated by a range of beneficiaries including school children, consultants and public bodies alike. Such a system may hold all reports, manuals, model outputs and historical data and be held in one central repository.

An Integrated Communications Plan (between CZMU, EPD, DEM, TCDPO and NCC) should also be produced to help provide the necessary clarity, certainty and transparency for internal and external users. It should identify clear aims and target audiences, match reports and communication products to targeted audiences, identify any necessary standards (e.g. templates for communications or reports) and identify necessary roles and responsibilities.

E5. INSTITUTIONAL AND CAPACITY REQUIREMENTS

E5.1. Government Responsibility and Authority for ICZM

The lead agency for overseeing the implementation of this ICZM Plan is the CZMU (within MMABE) whose remit and powers on this matter are stated clearly within the updated CZM Bill (2020). Once this Bill is turned into an Act, and after Ministerial approval, the Plan will become a statutory document. The CZMU will lead this process by firstly presenting the draft Plan and a draft Order delimiting the CZMA to a public enquiry. They will also carry out any required revisions before the Plan receives final approval (see Part A for a summary of the key stages).

The institutional requirements to implement ICZM in Barbados will vary depending upon the stages in the cycle of the ICZM Plan (i.e.: implementation, monitoring, evaluation, review and revision etc – see Figure B.1 in Part B) but it will be the CZMU, with their overseeing and coordinatory role, who will be the focal point throughout the process.

When the ICZM Plan has statutory backing, the CZMU will have an enforcement as well as an advisory role. Staff, for example, may be called upon to act as enforcement officers or be requested to initiate "Coastal Zone Protection Notices" with others[15]. Procedural Guidance (in additional to agency specific Operational Manuals to guide day to day work standards and expectations) should be developed to guide the national approach to ICZM implementation to provide consistency and rigour, which are both essential is legal action is to be taken as a result of infringements of coastal zone related legislation or regulation. This guidance shall be prepared to help communicate compliant issues and regulatory expectations for developers or equally for user groups to convey what activities and behaviours are deemed suitable within the CZMA. These may also promote mitigation strategies or advisories for how compliant solutions or control measures (such as Nature based Solutions - NbS) may be inculcated within individual planning applications, designs or specific interventions to help promote best practice.

Regarding the future implementation of a Sustainable Ocean Based Economy (SOBE - or alternatively referred to as the "Blue Economy"), anything proposed (be it a policy, a plan, a regulation or institutional arrangement) that either contradicts or jeopardises ICZM Plan implementation (especially with regards to Blue Economy related activities falling within the core CZMA and associated ZoI) may need to be carefully and respectively reviewed and amended to ensure compliance. An integrated and all-encompassing delivery model must therefore be established that ensures institutional, planning and regulatory synergies (under the responsibility of MMABE) to anything already legally established to support ICZM delivery in Barbados from 2020 onwards.

E5.2. CZMU Restructuring

In light of the points raised in sub Part E5.1, and appreciating that institutional re-structuring of MMABE is underway as part of a specific Blue Economy assessment for Barbados, a revised institutional arrangement for CZMU is recommended to assist with the future delivery of the ICZM Plan (2020-2030). This re-structure, building on the work of McCue (2018[16]), minimises unnecessary wholesale alterations to CZMU though is designed to allow CZMU to operationally function to deliver its legal obligations whilst embracing any new focus that MMABE may require in the future within the

[15] As defined within the "CZM Bill (2020)" and the supporting "CZMA (Enforcement) Regulation (2020)"

[16] McCue JW (2018) "Preparation of a Strategic Action Plan (SAP) for Disaster Risk Management and Climate Change Adaptation" MMABE, 2018.

life span of this ICZM Plan (i.e.: 2020-2030). The intention is to ensure that the CZMU have the capacity to enable the transition from an organisation has been focused on coastal conservation and engineering, to one that is now better able to take forward (through improved coordination) a cost effective support role for GoB with regards to Risk Resilient ICZM implementation.

As part of this new proposed institutional structure, in addition to consolidating on the existing Marine (now entitled "Marine and Coastal Resources"), Engineering and an enhanced Planning and Economics Section, a new *Data and Information Section* needs to be set up and formalised within CZMU. It is also recommended that a new *Communications and Outreach Section* is formalised to help sensitize and educate Barbadians about risk resilient ICZM.

Finally, the introduction of a formal Project Team is proposed. This should be a stand-alone and permanent team whose role is to identify and pursue new project opportunities, assist in securing future project funding as well as supporting any programme performance monitoring as required and on behalf of MMABE.

Exact internal specifications for operation should be written within a formal CZMU Operations Manual that outlines the specific roles and delivery activities of each team in more detail. The required CZMU teams (and their purpose, proposed additional staffing needs) are summarised in Table E.2 as follows with more detailed information and organogram presented separately in Figure E.3.

NB: the above does not take into consideration any initiative that GoB may need to rapidly undertake as a consequence of the global COVID 19 pandemic.

Table E.2: CZMU Team Structure to support ICZM Plan implementation

CZMU Team Title	Purpose of Section	Indicative Staffing Needs (2020-2030)
Marine and Coastal Resources Section	Continue delivering the existing coastal water quality and coral reef monitoring programmes plus support for marine protected area management (notably for Carlisle Bay), diversifying into new marine and coastal resource data collection programmes as required and as mandated by MMABE (in partnership with other agencies). New section tasks shall be to promote (through the production of new guidelines etc) the supply of practical advisories on the implementation of habitat rehabilitation, ecosystem-based approaches and coordination of "Health Cards" to support production of "State of the Coast" reports to a wider audience. Within existing workloads, the Section staffs should also be able. Upon the request of MMABE, and budget dependent, extend marine biodiversity knowledge advisories (and water quality assessment work) to help future delivery expectations of a SOBE strategy and policy framework whilst extending the support to help deliver the expectations of SDG14 with regards to offshore marine ecosystem health and condition (supporting extensions to the "State of the Coast" reporting approach as budgets dictate.	Within existing workloads, the Marine and Coastal Resources Section staffs (led by the Senior Marine Biologist) should also be able to appraise likely impacts on all marine and coastal resources and the roles this Section would be required to play within the context of preparedness, response, risk reduction, risk identification, recovery, financial protection and risk transfer. Appraisal of these actions would then constitute the strategic action basis for how they bring DRM and CCA into ICZM operational planning of this Section. Under the leadership of a Senior Marine Biologist, he/she would be supported by an additional 2 Research Officers plus 2 Field Inspectors, (a support marine biologist and a support water quality analyst) are required to help the Senior Marine Biologist on matters relating to biodiversity conservation, resource management and SMA/MPA regulation and management delivery.
Planning and Economics Section	This Section takes full responsibility (on behalf of CZMU) to lead the implementation of the ICZM Plan. This will include providing the Director with advice on whether Coastal Zone Protection Notices (as defined within the CZM Regulations 2020) should be made on non-compliant actors or activities. The Section will continue delivering coastal policy support on existing hazard and risk developmental control reviews in line with the ICZM Plan, plus supporting legislation and regulations, Policy Framework and associated CZMU mandate. The Section should, however, relinquish its role on public education and outreach (see new Communication and Outreach Section below) in favour of diversifying into new marine spatial planning support programmes as required and as mandated (in partnership with other agencies such as MMABE). New focus on probabilistic risk transfer and assessment support is proposed as an additional area of supporting expertise. In support of the new probabilistic risk expertise proposed, a new "Economics" sub-team:) is proposed for inclusion within the Section to help on matters relating to economic valuation/return on investment/cost effectiveness/cost recovery roles for Risk Resilient ICZM etc. Upon the request of MMABE, help support delivery of a SOBE and SDG14 reporting approach as budgets dictate. The new sub-team Economics – see above) may be able to provide a critical new function to support economists within the Ministry of Finance and Economic Affairs on specific issues regarding coastal resource economics etc.	Within existing workloads, the Planning and Economics Section staffs should be able to support on all coastal planning matters plus also to appraise likely climate or disaster risk scenarios that may face Barbados. Their roles should be to support on issues relating to disaster preparedness, response, risk reduction, risk identification, recovery, financial protection and risk transfer. The Section will continue with its important partnership relationship with DEM (on the Coastal Hazards Committee or similar) and the role played regarding CTIC. Under the leadership of a Senior Coastal Planner, he/she would be supported by an additional "Coastal Planner" (to support the current Senior Coastal Planner) plus a "Resource Economist" whom shall be supported by two separate Research Officers to help deliver the new expected support roles needed in this topic area (including support on coastal planning and development control plus data collection regarding socio-economic data collection etc (see Section E3.4 and Annex 9).
Data and Information Section	A new "team" is recommended to be formalized to support all Sections of the CZMU on data and information related issues. The key management tool for the new Section shall be the NCRIPP, the management, update and development of which shall be responsibility of this new Section. The NCRIPP shall be developed in an iterative manner to support the effective and efficient use of a cross sectoral Integrated Data	A key task of the team should be able to provide new formats for data collection for different reporting requirements. Production of user-friendly data representation maps and figures for publication will be needed that includes integrated outputs of data representation as required. Development of automated approaches may also be required to quickly capture post event

CZMU Team Title	Purpose of Section	Indicative Staffing Needs (2020-2030)
	Platform for all future Risk Resilient ICZM datasets required. Key delivery roles shall include support to the Project Team (see Figure E.3) and to help with the provision of maps/data to support the annual "State of the Coast" information production and reporting. Training of Data an Information Section staff in ways that the NCRIPP could be used to streamline the generation of maps for assessment may be needed. Data and information management (including data archiving of all data in the office such as NCRIPP data) may also be required. If requested of MMABE, the Data and Information Section could provide key support towards the delivery of SOBE for Barbados and as mandated under updated ICZM Plans and laws (in partnership with other agencies) to help support SDG14 "State of the Ocean" information production and reporting (as budgets dictate).	disaster data in the field. This could include the integration of real time risk assessment and or damage assessment data collection. Under the leadership of the Senior Data Manager, a Deputy Data and Information Manager position should be created to support the Section lead. The role of the Deputy Manager (as the Registry Clerk for the Section) shall also be of support to the Planning and Economics Section on data related matters as required. They both shall be supported by research officers, one land valuation officer and one support statistician whom shall both help the Senior Data Manager to deliver and implement the new requirements and expectations of NCRIPP as set out within the updated Policy Framework and updated ICZM Plan (2020 onwards).
Engineering Section	The team shall continue in terms of collecting existing (and updated) beach profile, tide, wave, geotechnical and structural and landscape monitoring and maintenance programmes as dictated by updated ICZM Plans, legislation and mandate, (in partnership with other agencies). Within existing workloads, the Engineering Section staffs should be able to appraise likely disaster risk scenarios and the roles their Section would be required to play within the context of preparedness, response, risk reduction, risk identification, recovery. Appraisal of these actions would then constitute the strategic action basis for how they bring DRM and CCA into ICZM operational planning of their Section. Upon the request of MMABE, the Engineering Section shall provide key support towards the engineering requirements and delivery of SOBE for Barbados. This would involve adopting a new marine engineering focus to help collect necessary offshore datasets/engineering advice which may include new design work for offshore structures, platforms, maritime engineering support (should this not exist in other agencies in Barbados).	Under the leadership of the Senior Coastal Engineer, one additional "Technical Officer" position is proposed who is supported by part time Draughtsman (as required) to assist in field data collection as well as a part time hydrographer who shall support on deploying oceanographic equipment and retrieval as required as well as validating engineering structures conditions etc. These shall help the current Hydrographer to deliver and implement the necessary pre- and post-structure maintenance works plus support for drone pilot training as required. Possible consideration for drone pilot training for Hydrographer as required. Additional divers may be required (though these may be seconded from the private sector as required to reduce costs) to assist with field surveying to assist in beach profiling and marine ecosystem mapping.
Communication and Outreach Section	Communications need to be an ongoing outreach initiative and hence a new Section is proposed within the CZMU organisational structure. This section will be the Public Relations (PR) "face" of the CZMU specifically (not for MMABE overall), though if required, it should contribute towards improving data and knowledge/message conveyance to MMABE. It will be responsible for dealing with general enquiries, attending school invitations to do presentations and job fairs and career show cases, liaising with different ministries when looking to put on "expos" or participating in expos and also to promote the function of the CZMU as well as developing information in a user friendly form for all social media platforms and web page. This new "team" set up is proposed to help support all Sections of the CZMU on matters relating to external stakeholder communication and outreach delivery (from a CZMU organization perspective to governmental and non-governmental groups)	Within existing workloads, this Section should also be able to appraise likely disaster risk scenarios and the roles they would be required to play within the context of preparedness, response, risk reduction, risk identification, recovery, financial protection and risk transfer. Appraisal of these actions would then constitute the strategic action basis for how they bring DRM and CCA into ICZM operational planning of the Section. Under the leadership of the Senior Communications Manager, minimum compliment of 1 "Communications Manager" is recommended who has support from 2 separate 'Research Officers", 1 public liaison officer and 1 environmental officer. Their roles shall range from informing, to researching, to consultation whilst also include stakeholder data analysis that may embrace all economic data of relevance.

CZMU Team Title	Purpose of Section	Indicative Staffing Needs (2020-2030)
	with regards to Risk Resilient ICZM related topics and as mandated under updated ICZM Policy Framework and ICZM Plans and laws (in partnership with other agencies) and to help support "State of the Coast" knowledge dissemination.	Any videography services or similar would need to be sub-contracted.
Project Team	The Project Team should be a permanent team that is created to play an important and specific role towards ensuring that CZMU have the critical technical supporting individuals to deliver the required Project Management support to donors/GoB teams as related to future ICZM projects. Specific new capacity requirements maybe required on such individuals who understand budget support related financial modalities. It is necessary to be as multifaceted as possible seeing the project proposals writing and project execution will require a different complement of skillsets leading to a team that is diverse in its function. Expanded staffing competencies will therefore be essential for independent project proposal and project implementation with the core team being responsible for the overarching supervision and execution.	The staffing make up (excluded from the organogram in Figure E.3) of this Team shall mirror similar structures already adhered to through the implementation of ICZM. Individuals selected (originally "seconded" from other CZMU Sections as required) shall be made permanent within the Project Team to help support the technical requirements of CZMU and others to help implement and monitor progress against possible Project Proposals that are pursued and implemented (e.g.: Regional GCF focused projects etc). The likely organogram structure for this Team is better outlined in Figure E1. Should demands be significant (more than 1 project underway at any one time), potential secondment of Senior Staff from other Departments may be necessary. The Project Team shall be populated (in the first instance) with core members of the Admin Section (see below) namely an accountant and secretarial support as a minimum. Admin staff may be replaced on short term contracts (to supplement the other CZMU Sections ongoing workloads) if required. The core staffs needed should include the following: (Project Manager/Deputy Project Manager/Project Officer/Senior Accountant/Senior).1 Research Officer 1 Technical Officer 1 Clerical Officer 1 Economist (project proposal preparation) may also be required.
Admin Section	To continue to provide the administrative support (accounting, secretarial, human resource support to GoB etc) as required for the successful continued delivery of Risk Resilient ICZM	Under the leadership of the Administrative Executive Coordinator. It is recommended that a Registry Clerk and Executive Officer (personnel matter as well as office equipment maintenance etc) are required. The Accounts section i(led by the Accounts Officer and supported by a separate Accounts Clerk) s needed in the office to expedite all aspects of accounting procedures as well as local procurements,

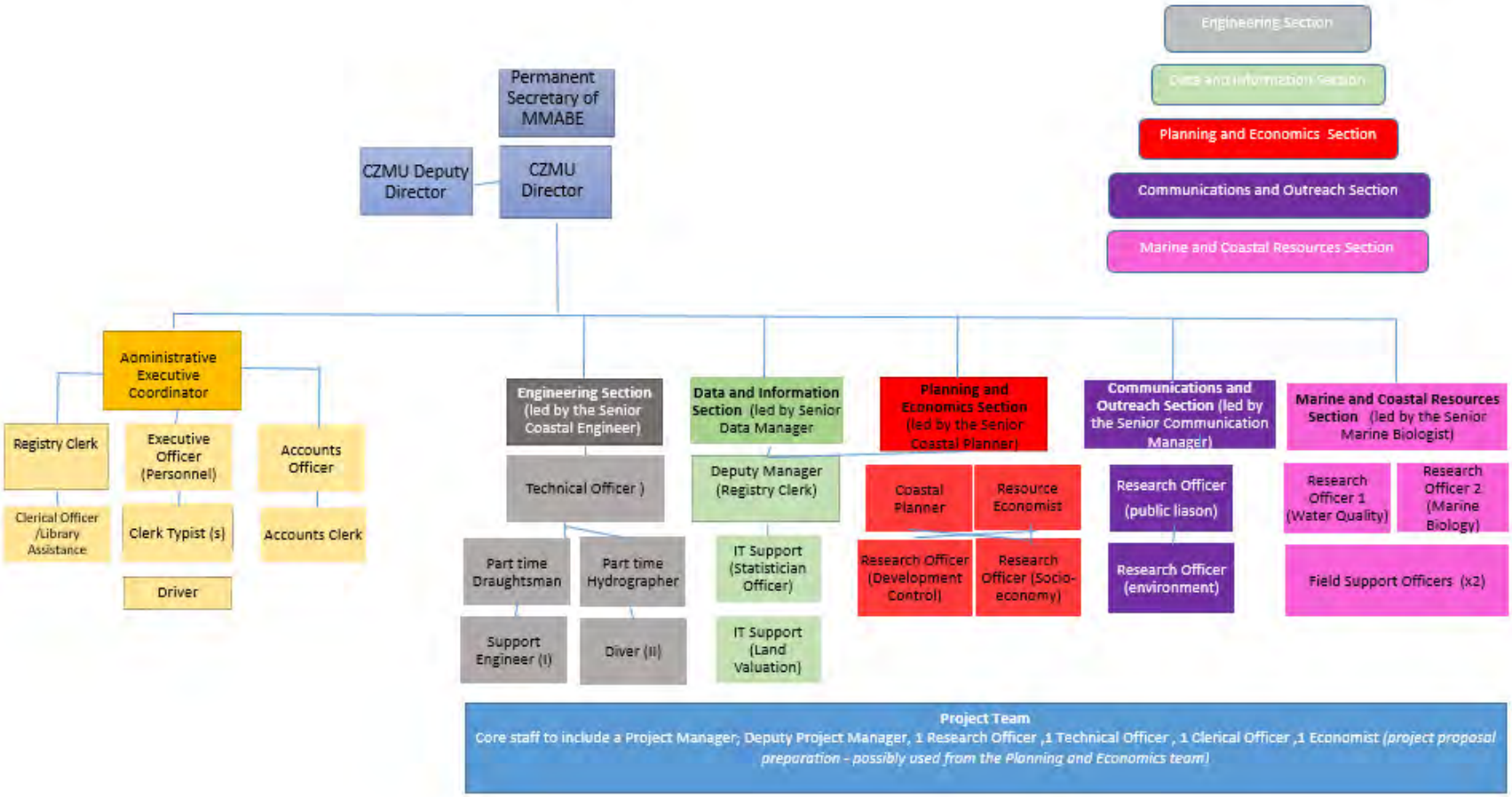

Figure E.3: Future CZMU Organogram (adapted from McCue 2018)

E6. EVALUATION AND MONITORING PROCEDURES

E6.1. Performance Management and Evaluation

Details on Performance Management and Evaluation (PME) as part of the future ICZM process in Barbados is clearly set out in Appendix 4 of Volume 1 (ICZM Policy Framework). That Volume includes a set of governance related performance indicators that are designed to help assist implementation of the ICZM Policy Framework (up to 2030) plus also to measure the performance of the responses to adapt to climate induced pressures and impacts facing the CZMA of Barbados. They focus on variables that relate to inputs, processes, outputs, outcomes and impacts of a Risk Resilient ICZM programme.

The indicators proposed within (as set out in Volume 1: Appendix 4) are also designed to measure the progress and quality of the governance process itself, that is, the extent to which Risk Resilient ICZM is addressing the issue(s) that triggered its initiation in the first place. Four main areas of performance evaluation proposed include:

1. **Institutional coordination and coherence** to ensure that (i) the functions of administrative actors are properly defined, including through the establishment of a coordinating mechanism; a legal framework exists to support ICZM and the pursuance of coherent objectives; the impacts of sectoral plans, programmes and projects potentially affecting coastal zones are taken into account through procedures for environmental impact assessment (EIA), and carrying capacity assessment; and conflict resolution mechanisms are available to anticipate, resolve, or mitigate conflicts over the use of coastal areas and resources;
2. **Quality and effectiveness of management** by (i) the formal adoption of the ICZM Plan (Volumes 1 and 2); (ii) active implementation of these via agreed Action Plans; (iii) routine monitoring and evaluation of management and its outputs, outcomes and impacts, as well as the consideration of results in adaptive management; and (iv) the sustained availability of human, financial and technical resources to enable effective management;
3. **Improved knowledge, awareness and support** by ensuring (i) the production of results from scientific research, its use for management and its dissemination to a wider audience; (ii) the participation of stakeholders in decision-making processes; (iii) the activities of NGOs and CBOs; and (iv) the introduction of ICZM related subjects into educational and training curricula for the formation of ICZM cadres;
4. **Mainstreaming ICZM into sustainable development** by (i) the development and application of technologies that can enable and support ICZM; (ii) the use of economic instruments to promote ICZM objectives through the private sector; and (iii) the incorporation of ICZM objectives into broader sustainable development strategies.

E6.2. Integrated Monitoring Programmes

GoB (through the coordinatory role of the CZMU) needs to focus efforts on implementing an Integrated Monitoring Programme (IMP) that uses the current NCRIPP database platform and updating its functionality accordingly to support implementation of a national IMP approach. This would provide GoB with three primary benefits:

- better understanding of cause-and-effect relationships within social-ecological systems and the response of these systems to management actions (represented by a Driver-Pressure-State-Impact-Response model).
- cost-effective use of available resources for monitoring the status of coastal resources (see E3.7 – "State of the Coast" reporting)
- improved insights into the effects of cumulative pressures and impacts on coastal resources.

One suggested improvement to the NCRIPP dataset (as part of a future IMP) should be through improved coastal asset inspection and reporting for all structures within the CZMA (built and natural – see Part C5). A new improved focus could perhaps be placed on how the coastal assets (defences, manmade or natural features) perform under storm conditions as this would (for example) would additionally support the understanding of climate resilient performance with regards to climate/disaster induced risks (e.g.: wave or flood overtopping early warning systems – see Sub Part E3.3).

The creation of an asset register to record the state of all natural (typically soft and rocky shorelines i.e. reef, beaches, mangrove, cliffs etc.) and man-made (hard structural engineering and artificial beaches) assets is highly recommended for the reduction of risk on the coast. Known weak spots should be identified and focused upon for monitoring under storm event situations such as where drainage infrastructure (i.e.: fluidizers for watercourses etc) is needed to protect assets or if poor drainage is impacting upon the ability of key (post event) drainage mitigation related machinery to operate efficiently.

Finally, the inclusion of socio economic data into NCRIP would also be highly beneficial at the individual property level. A guide as to how this information may be collated is presented in Annex 9.

E7. FINANCIAL CONSIDERATIONS

E7.1. Overview

This part of the ICZM Plan considers how the implementation of Plan might be paid for. MMABE, on behalf of the GoB, is concerned not only with economic instruments, but also in mechanisms through which the private sector can be brought to play a larger role in paying for ICZM, and more broadly in ways that the GoB can raise the funds needed to finance its own investments.

This sub-Part places emphasis on the economic understanding of "economic instruments"; however it also considers mechanisms for encouraging private sector contribution to the financing of coastal zone management. It therefore considers a range of possible instruments as a mechanism for encouraging behavior that will protect the coast of Barbados, and mechanisms for raising funds (cost recovery) with which to finance the investments that may be needed.

There are many possible financial pathways to help support the financing of this ICZM Plan. One approach that is often preferred by economists is by “stacking” or “blending” several funding and financing sources to fully address the lifecycle requirements of public infrastructure assets. To this end, a range of potential funding and financing sources for supporting the implementation of this Plan (including a range of coastal/flood resilience projects into the future) are considered within this sub Part for potential consideration and adoption.

KEY MESSAGE

For several reasons, this ICZM Plan cannot accurately estimate the cost of protecting the Barbados CZMA. This is because there are many possible coastal management technologies that may be used, all with widely varying costs. The Plan does not determine which approach is most suitable for each stretch of coastline, which in fact is for the existing Barbadian planning and EIA process to determine. Rather, this sub-Part considers the strengths and weaknesses of the different technologies and their suitability for different types of landscape, and then sets forth a process that the GoB can use in choosing among them for each site. Consequently, it is uncertain, at this time, which interventions will be chosen, nor is it known the time frames required for addressing the problems along different parts of the coastline, hence it is not possible to estimate without detailed site-specific analysis, the cost of a given intervention. As GoB begins to set priorities for where to begin work, and to evaluate the options for the coast, it will be able to estimate the actual costs of each option and compare that with the benefits it should achieve; this however cannot be completed at this juncture. Consequently, the ICZM Plan cannot accurately state how much money the government needs to raise in order to address ICZM.

Despite this, there is a general sense of what the money will have to cover. Major capital investments will be required to construct structures that can protect specific stretches of coast. Somewhat lower investments will be required for "soft" coastal protection. All of these investments will require ongoing maintenance to keep them operational, both as storms and sea level rise affect them and as human activities may cause further degradation. In addition, funds will be needed to educate coastal communities about how to protect their resources and how to adapt to avoid the harm that will unavoidably be caused by increasingly severe storms. Without knowing precisely which investments will make most sense, no monetary figure can be placed on these costs; nevertheless, the Plan anticipates that these will be high, and will increase over time as our knowledge on climate change evolves.

Finally, the COVID 19 global pandemic is likely to place unprecedented economic pressures for all nations of the world for the next decade. At the time of writing this Plan, nations are in lockdown and national budgets are being stretched to keep sectors afloat. This crisis may have significant ramifications on the extent that any of the economic measures presented may have in practice over the coming decade.

E7.2. Current Macro-economic Situation

As a consequence of the current debt situation within the next 3 years (up to 2023), the GoB will need to focus all of its sectoral efforts on improved reform, efficiency, productivity and debt management. This commonly means more prudence in relation to the justification and use of key public resources (i.e.: budgets etc). As for many countries facing similar economic challenges, in many instances it is those Units or Departments that can better embrace and justify their service value (within an IMF structural reform program) that are the ones that will garner the most political and hence financial budgetary support. In light of this, the GoB (through this ICZM Plan 2020 – 2030) intend to create the necessary platforms to be able to put necessary technical requirements in place (e.g.: economic valuation models) to help its core work requirements to be mainstreamed into annual public accounting and associated budget lines. This work will set Risk Resilient ICZM on a financially sustainable footing, whilst seeking to support the foundation for an all-encompassing sustainable ocean based economy in years to come (i.e.: post 2024).

Tourism still remains one of the main driving forces behind the current Barbados economy. It currently accounts for about 12.9% of the GDP and is the leading sector within the economy. The tourism sector employs about 26,000 persons and about 13,000 persons are employed in the hotels[17]. Consequential losses to coastal ecosystems services and the public and private infrastructure that depend on them represent significant threats to the resilience of the economy (Barbados National Assessment Report 2010). The economic impact of climate change on the coastal zone is very significant as it has exposed assets that will reach an estimated to US$4.7 billion in 2020 under an A2 scenario in 2020 with a maximum of US$44 billion for 2100 under a B2 scenario[18]. For these reasons, and mindful of GoB policy and CZMU interventions, the ICZM Plan must be designed to support this national position by deriving an innovative approach towards integrating coastal protection needs, improved longitudinal beach access and marine conservation. The ICZM Plan also seeks to identify the "signposts" for "added value" new technical areas that if pursued effectively and efficiently, will benefit the nation economically. This is especially of relevance based on recent new tourism surcharges which GoB have imposed from late June 2018 whereby additional tourist fees were introduced ranging from $2.50 (£1.90) to $10 (£7.60) per room per night, depending on accommodation class. The money will be collected in resort and is applicable to all existing bookings though money will not be released for environmental improvements.[19] The new levy follows the introduction of an "airline travel and tourism development fee" of $70 (£53) to be imposed on travellers leaving the country from October 1 2018, while VAT in the tourism sector will rise from 7.5 per cent to 15 per cent in 2020.

Complementing the discussion on tourism presented above, Barbados has already begun to take steps to 'green' its economy by incorporating renewable energy into its energy mix (including tourism). Barbados is one of 22 countries in the Partnership for Action on the Green Economy (UNEP 2014) which aims to put sustainability at the heart of economic policies and practices to advance the 2030 Agenda for Sustainable Development and support the reframing economic policies and practices around sustainability to foster economic growth, create income and jobs, reduce poverty and inequality, and strengthen the ecological foundations of economies. The "Green Economy" framework (UNEP 2014) will hopefully assist in delivering sustainable development, and it is expected that as part of this

[17] Clyde Mascoll 2013, The Promotion of Greater Inter-Sectorial Linkages with the Tourism Sector in the Barbados Economy. Barbados Private Sector Association, ATN/ME-11627-BA; BA-M1007.

[18] A2 and B2 scenarios are from the Special Report on Emission Scenarios (SRES) for the period 2010 to 2100 and as detailed by the Intergovernmental Panel on Climate Change (IPCC). See http://www.eclac.org/publicaciones/xml/7/45297/LCARL.326.pdf.

[19] https://www-telegraph-co-uk.cdn.ampproject.org/c/s/www.telegraph.co.uk/travel/destinations/caribbean/barbados/articles/barbados-tourist-tax-cost/amp/

reconfiguration of the national economy, very strong links will be forged between environmental management, CCA and DRM in order to achieve national goals for social and economic well-being. All financial institutions are seeking to consider CCA and DRM in their economic models[20].

E7.3. Possible Financing Mechanisms

Many different mechanisms (see Appendix A) have been developed either to create a financial incentive for better coastal management, or to raise funds to cover the costs of protecting the coast (i.e.: often referred to as "cost recovery"). This sub-Part briefly reviews a number of economic instruments for environmental protection being used to fund coastal zone adaptation elsewhere in the world. For each option, it also considers how it is now being used in Barbados (if at all), and whether it represents a viable measure as part of a national ICZM cost recovery exercise.

E7.3.1. Environmental taxes

A common economic approach to environmental protection is to charge for the right to make use of environmental services, with the objective either of reducing the use of those services to a sustainable level, or of generating revenue, or both. "Environmental services" could mean several things; the pollution-absorbing capacity of the environment (this would be an emissions tax), the production of renewable resources (this could be a charge for fishing quota or a stumpage fee), or the right to use land with particular amenities such as being on the coast. In its theoretical form, such charges are the only tool used to reduce the use of the services; there would be no quota.

Environmental taxes could also be imposed on non-renewable resources, to slow down their consumption or create an incentive to use them more sustainably. Various land-based taxes could operate in this way. A tax on impervious (paved) surfaces might encourage leaving as much space as possible unpaved (green), which could facilitate absorption of water into the ground, reducing runoff, flooding, and coastal pollution. An increased tax value on all coastal land might encourage developers to move inland from the defined CZMA whenever possible, reducing coastal pollution and reducing the risks from storm surges and sea-level rise. Where the demand for land within the CZMA is high and most of it has already been developed, as in Barbados, such a tax might however be more effective as a way to generate revenue than as a way to reduce development.

Usually such measures are designed both to reduce activities to a sustainable level and to raise revenue. The revenues raised could be placed directly into the GoBs' general fund or could be earmarked for environmental protection activities. Economists typically prefer that they become part of general revenues, arguing that the priorities for how government money should be spent are unrelated to how the funds are generated. Environmentalists argue for such funds being allocated to environmental protection, often because they suspect that they will guarantee more funds for the environment this way than through the priorities guiding the general government budgeting process.

The design of these taxes involves finding a balance between reducing undesirable activities and generating revenue. A very high fee will reduce environmental harm altogether but generate no revenue. A very low fee will neither reduce harm nor generate substantial revenue. At the fee level that maximizes revenue in the short run, too many actors in the industry may choose to make use of the service (emitting pollution, catching fish, etc.), which will not be environmentally sustainable. Alternately, the fee level that maximizes revenue could lead consumption to be below sustainable yield, unnecessarily reducing the level of economic activity. Setting the level of such taxes is often

[20] http://www.preventionweb.net/files/31056_brb_NationalHFAprogress_2011-13.pdf

difficult, and calls for a detailed understanding both of the physical or biological nature of the environmental services and of the market for those services.

Designing environmental taxes that actually do create incentives for better coastal management would not be straightforward. While threats to the Barbados coast coming from land management practices, land-based pollution, or fishing, other more serious long-term threats are being derived from climate change. While this might be affected by environmental taxes in the major greenhouse gas emitting countries, it will not be addressed by taxes imposed on consumers in Barbados. Taxes that are borne by those making use of the coast, notably tourists, serve only to generate revenue, not to create economic incentives to engage in activities that actually resolve coastal management problems.

E7.3.2. Cap and Trade Schemes

Cap and trade schemes have the same objective as environmental taxes; that is to create an incentive to reduce pollution or resource use to an acceptable level. Instead of using the tax level to achieve that goal, these schemes set a ceiling on the total amount that can be emitted or used, and then issue marketable permits to pollute or to use the resource. When the system is introduced, those permits are either given away (usually based on previous level of emissions or use) or auctioned off. From both an economic and a financial perspective, the latter is better, since it ensures that those who have the most to gain from either polluting or harvesting resources will purchase the permits. It also provides a one-time infusion of income to the government, ensuring that the public sector is compensated for private use of the resources. However, in practice permits are usually given away rather than auctioned off, because politically this is much more acceptable.

Once permits are allocated, companies can sell them if they wish. The sale price is set by the market. As with environmental taxes, this ensures that the companies with the most to gain (i.e. those facing the highest costs to reduce pollution or those with the highest profits from resource use) will end up buying the permits, since they will be willing to pay the most for them. Those who do not buy permits will reduce their emissions or stop using the resources. This means that emissions reductions will be achieved at the lowest possible cost to the total economy, i.e. in the most efficient way.

Barbados currently has no cap and trade schemes in place, though with the onset of a SOBE (Blue Economy), issues linked to the control of pollution plus limiting the harvest of a renewable offshore resource may need to be better considered in the Barbados context in the future as a way of improving management of the coast.

E7.3.3. Environmental Fees

Environmental fees can be similar to taxes; however the concept here is that the user of a service is paying for the costs involved in providing that service. This is the principle behind waste disposal (trash) management fees, drinking water charges, or sanitation charges; in all of those cases the public sector is providing a service that the user should pay for as if it were provided privately. If the logic of such fees is followed closely, the level is set based on what it costs to provide the service, and the revenue is used to cover those specific government costs.

However, revenues do not always go to cover the costs of service provision. For example, international experience with national park entry fees shows that there is often some disagreement about whether parks are a public amenity that should be available to everyone, or simply a form of recreation that should be fully paid for by those who engage in it. Historically, national parks and protected areas have been regarded as a public amenity paid for out of general revenues. The entry fees are often not sufficient to cover the full costs of the park system – or even its operating costs, not including the direct

or opportunity cost of the land – and they often go to the treasury rather than being dedicated for park management.

A *"Coastal Zone Management Area Housing (or Resort) Scheme*" and/or Permanent Resident Scheme could be introduced to encompass an environmental fee, in the form of the registration fee of an agreed amount that is required on each property sold within the defined Barbados CZMA. This fee could be regarded as a disincentive to coastal development, intended to slow down the rate at which the limited resource of coastal land is consumed. This, however, is often not the case as most developable coastal land in Barbados has already been allocated and developed in one way or another, and these schemes simply change the form of that development. Such a scheme could be set up primarily to create a way for the government to raise money from wealthy people who have the funds to purchase very expensive residences. The Scheme, in particular, could be regarded as the sale of the right to live in the country in return for a large contribution to the real estate market and high tax payments.

Because these schemes depend on access or proximity to the coast, a case could be made that the resulting tax revenues should be used for coastal management purposes. For at least a few years, until the demand for high-end residences is saturated or the available land has been built on, this could generate enough funds to cover some of the capital costs of improved ICZM.

E7.3.4. Payments for Environmental Services

Payments for Environmental Services (PES) are mechanisms through which individuals or companies that rely on an environmental service (often related to access to clean water or sea water) pay those upstream from them to stop engaging in activities that might disrupt that service (typically to reduce sedimentation or pollution from upstream or within a catchment). The key feature of PES as an economic instrument is that it involves a willing seller of services (in the private sector), and a willing buyer (in the private or public sector), exchanging at a price they agree on.

In the case of PES systems related to clean water (as an example), the downstream user is facing high costs to treat water for drinking or food processing, and it would cost less to pay those upstream not to pollute than it would cost to treat the water prior to use. The classic case of such a PES system is the payments made by the New York City to communities near the city's water supply reservoirs, in return for those communities not allowing development of land whose runoff would flow into the reservoirs. This ensured that the water flowing to the city would be clean enough that the city would not have to invest in a water treatment plant. While this is economically rational from the perspective of the city, it is worth noting that it runs directly counter to the polluter pays principle, which virtually all governments say they subscribe to; it implicitly says that the upstream residents have a right to use their land as they wish, and those downstream who want clean water must pay them not to pollute.

The New York example is a "pure" PES system, in that the direct beneficiaries of the clean water (New York City taxpayers) are paying those who can ensure access to clean water (the communities in the Catskill Mountains where the reservoirs are located) to continue providing that service. In some cases, however, the government payments to upstream "providers" of environmental services are not directly linked to benefits from the services. Those are not market-based economic instruments, because there is not a clear beneficiary of the service who is willing to bear the cost of ensuring that it will continue to be provided, as there is in the New York City case. Rather, it is simply the taxpayers, many of whom may not benefit from upstream environmental conservation activities, who are paying. These could be simply considered subsidies, if PES is actually defined as a measure that depends on

the working of a market in a way that leaves both the sellers (those protecting the environment) and the buyers (those paying to ensure that environmental services will be available) better off.

There are currently no PES systems in place in Barbados. If threats to the coast clearly come from economic activities, such as rapid land development or polluting industry, a PES system to prevent that harm would need to involve those who want to make use of ecosystem services (e.g. clean beaches – managed for a number of specific beaches by NCC etc) paying the developers or polluters to change their behavior. This implicitly assumes that the developers or polluters have the right to do whatever they want on the coast, and other users have to pay to ensure their access to the same resources. With the onset of a SOBE (Blue Economy), issues linked to PES may need to be better considered in the Barbados context in the future as a way of improving management of the coast.

E7.3.5. Insurance

Insurance has been proposed as a way to manage the costs imposed by coastal flooding or other weather-related disasters, particularly as climate change worsens. This would fund the response to disasters; it would not fund the coastal zone management tools that could prevent them. It would shift the burden of the cost from those who are actually affected by them to the pool of people (or organizations) that have purchased insurance. As climate change impacts become more prevalent, the risk will increase, and the insurance premiums will go up; even now, premiums for flood insurance are typically too high for most at-risk property owners to be able to afford it. While this may seem like a useful short-term approach, it does not replace coastal adaptation; in fact, it can create an incentive not to invest in adaptation, if those at risk expect their homes or other property to be replaced by the insurance company when there is a flood. It also does not generate the funds needed to implement this ICZM Plan.

Notwithstanding these caveats, there is considerable appeal for insurance as a way to eliminate the financial shocks from hurricane events impacting on Barbados. The GoB may investigate the possibility of purchasing a so-called "parameterized" insurance policy that would pay out in the case of a storm exceeding specified levels of wind, water heights, or other measures. However the premiums are likely to be so high that it may not prove viable. If any companies were, for example, to offer climate change insurance products, they would be required to build the capacity to analyze whether the industry could actually afford to pay out on claims without bankrupting itself. Elsewhere around the world, some insurance companies are using differential pricing to create an incentive to invest in adaptation measures, since those will reduce the risk of disaster and thus the probability that the insurance company will have to pay out. This highlights the limited extent to which Barbados can rely on insurance alone to address the risks imposed by climate change. The country must focus on adaptation in order to prevent disaster in the first place; insurance cannot change that, and is likely to be unaffordable even if it is available.

E7.3.6. Public-Private Partnerships (PPPs)

Public-private partnerships (PPPs) typically involve a private company that builds and operates some kind of public facility under contract to the government. The facility – for example, a trash incinerator or a water treatment system – generates revenue from the fees paid by all citizens for the services it provides. The company operates the plant and keeps the revenue for a pre-determined period of time, during which it recovers its investment plus a reasonable profit. At the end of that period the facility reverts to the government, which then operates it and earns the revenue. Such a system enables the public sector to get the facility built without having to put in the investment capital itself.

It is not clear that this kind of system is a viable mechanism for developing coastal zone management infrastructure, however, because such infrastructure does not generate revenues. One could imagine such a partnership between, for example, a resort (or large hotel) owner on the south or west coast of Barbados and the government, to cover the costs of infrastructure needed to protect the resort. The "revenue" could be construed as a portion of the resort charges. However, it is likely that the resort developer would not want to turn management of the infrastructure (and associated revenues) over to the government after some period of time, because that would put them at risk if the government did not maintain it well enough. Since the resort (rather than the community as a whole) would be the beneficiary of the infrastructure, the developer (or later resort owner) has a much greater incentive to ensure maintenance of that investment than the government does. To this end, PPPs certainly play a potentially significant role in supporting the implementation of ICZM in Barbados. Perhaps the best example internationally is that undertaken at Pevensey Bay (southern England) which provides a very interesting framework “model” for which Barbados may potentially follow. For the government (i.e. specifically CZMU), the advantage of a PPP approach is that for engineering projects, the fixed costs of the coastal protection/adaptation approach is paid over an extended time period, and the care and maintenance are undertaken by a third party. Here, contractual agreements and division of risks are important. The PPP model, with relevant authorities cooperating with private partners to provide public services under contracts, sharing responsibility, risks and benefits will be an optimal model. However, there is a need for setting up such system in place as well as investing in protective measures for which long term maintenance will be secured through the PPP contractual arrangement.

E7.3.7. Debt for nature swaps

Debt for nature swaps are mechanisms through which an impact investor – sometimes an environmental NGO such as the World Wildlife Fund (WWF) or The Nature Conservancy (TNC) buys back a portion of a country's debt at a discounted rate and issues a new, lower loan to the country on condition that the country spend the savings on some form of conservation. The greater the risk that the country has defaulting on an original debt, the greater the discount available to the purchaser of the debt, thus the more the debtor country can gain from the transaction. In addition to the direct financial benefits, the restructured debt is typically repaid in local currency, allowing the debtor country to retain its foreign exchange reserves for purposes other than loan repayment. Debt for nature swaps were first developed by the World Wildlife Fund (WWF) in the 1980s, and have been used by many countries (including small island developing states) to generate funds for biodiversity conservation. While the country benefits from the debt reduction and restructuring, these mechanisms require them to spend more on conservation than they would have done otherwise, even if this would not be their highest priority for use of the resources.

Such a mechanism has recently been developed by the Nature Conservancy (TNC) in the Seychelles, to fund marine conservation and coastal zone management. Using a combination of debt refinancing and grant, TNC, through its “Nature-Vest” finance arm, has arranged to purchase $21.6 million in debt for $20.2 million, a rather modest discount on the overall value. This has been funded with $15.2 million in loans from impact investors and a $5 million grant from TNC. A portion of the proceeds – essentially the grant amount plus the savings on the debt – will be put into marine and coastal conservation measures.

Whether such a mechanism might be viable in Barbados depends on whether holders of the country's debt would be willing to sell it back at a discount; i.e. on whether they expect to get paid back what they have invested in the country. While on the whole the higher bond rating is good for the country,

this suggests that debt for nature swaps is not that likely to be a useful strategy for raising funds for ICZM in Barbados.

E7.3.8. Blue bonds

"Blue bonds" are bonds whose revenue is to be used for activities related to ocean conservation, ICZM, or similar issues. They are analogous to the "green bonds" that have become a relatively common conservation finance mechanism. These bonds attract investors who have a moral commitment to putting their funds into projects that will benefit the environment or who have some regulatory or certification requirement mandating that they do so. Green bond funds are being used for a variety purposes, including pollution reduction, brownfields clean-up, and reducing greenhouse gas emissions. As the market has grown, concerns have arisen about whether the bonds actually benefit the environment. In response, both international and national certification systems have been developed, with third-party verification, to ensure that the environmental goals are actually being achieved.

Similar financial instruments are under discussion to raise funds for "blue" issues such as marine conservation and ICZM. The Seychelles is taking a lead in this arena, through the bonds that they are issuing in connection with the debt for nature swap discussed above. Because these instruments are new, the certification systems are not yet fully in place; more work will be needed before this become a routinely accessible source of financing for ICZM. Moreover, while bonds may be a useful tool for obtaining capital needed for coastal zone management, this does not address the question of how the money will be paid back. Such bonds do not increase the total funding available; they only offer a way to borrow money that must be repaid later out of government revenue.

E7.3.9. Lotteries

In some jurisdictions, lotteries are routinely used to raise funds for conservation or other environmental activities. The UK Heritage Lottery Fund and the State of Oregon Lottery (in USA) are examples of well-established systems raising funds that are allocated to community projects including environmental protection, conservation of rivers and marine areas, and other activities. The amount that can be raised from a lottery depends on ticket price, how many tickets can be sold, how much of the revenue goes to prizes, and the administrative cost. According to the UNDP, just under 30% of the revenue usually funds projects, the rest going to prizes and administration.

Barbados has had a national lottery that was established in 2005 to support Youth, Sports and Culture. Lottery proceeds support many youth, sports and cultural programs throughout the community, including its biggest benefactors-The Barbados Cricket Association, Barbados Turf Club, Barbados Olympic Association and the National Sports Council. The Lottery currently offers players a suite of seven games: Super Lotto, Pick 3, Pick 4, Double Draw, Mega 6, Scratch & Win, Caribbean Keno and its newest game coming in October 2016 “Express Cash.

It is possible that a separate lottery could be established to raise funds for ICZM and coastal adaptation. Such a lottery would have to be distinctly different from the national one in order to avoid being in direct competition with it. This might be done by presenting the purchase of those tickets much more explicitly as a social act rather than as gaming. If the funds were clearly earmarked for something of public interest, such as maintenance and protection of public beaches, the public might be interested in buying the special tickets, possibly even if they cost more than the national lottery tickets and the expected payoff were lower. If this were of interest, it would make sense to consult with the Barbados Lottery; if they could take on the management of a second lottery, with tickets sold through the

vendors with whom they already work, it would probably be more efficient than trying to create a second network for selling tickets.

E7.3.10. Premium plates or stamps

Some countries use premium license plates or postage stamps to raise funds for specific social programs, including environmental protection. In the USA, the states of Maryland and Virginia both offer special license plates that support the protection of the Chesapeake Bay, Maryland charging an initial $20 premium for the plate and an annual $10 premium each time the registration is renewed, Virginia charging a $25 premium each year. A portion of the premium in each state goes to a special trust that supports projects related to the clean-up of the Bay. In Maryland, the plates brought in about $3.6 million per year for environmental activities in 2015 and 2016. In Virginia, the plates have brought in only about 10% that amount; the reason for the difference is not clear.

In Barbados, such a scheme would probably bring in less money, primarily because its population is much lower than that of Virginia or Maryland. Although vehicle registration fees are low in Barbados, the road taxes are much higher than vehicle registration charges in either state. This might make people less willing to pay a premium to support conservation, reducing the potential to generate revenue in this way.

Some countries use premium stamps to raise money for specific causes, referred to as semi-postal or charity stamps. In Europe and the United States, they have commonly been used to raise funds for health-related causes. More interestingly for Barbados, several SIDS have used them to raise funds for disaster relief after major storms, including St. Vincent and the Grenadines and Tonga. Given Barbados's history as a key country in the world of philately, it is possible that such stamps might be of interest to collectors, as well as being used to send letters. However, the potential of such stamps to raise significant revenues for coastal zone protection is probably limited.

E7.3.11. Subsidies

Subsidies are public funds provided to cover the costs of actions considered desirable, without anything given in return. In a country like Barbados they would typically be paid either out of national government revenue or with foreign grants, i.e. paid by the taxpayers of another country. In the first case, the question becomes one of where the government would get the funds, which private sector actors should receive compensation, and why. Since the government's primary focus in considering how to finance coastal zone management is to find a way to induce the private sector to contribute more than it does now, using tax revenue to subsidize private actions to protect the coasts does not address the problem.

The second option (international donor support for ICZM) is obviously of relevance to Barbados. Substantial funding is, of course, available for climate change adaptation in developing countries (for example through the Green Climate Fund – GCF). However, because Barbados is defined as a developing "high income" economy[21], the expectation is that international funds will become increasingly difficult to obtain, which is why the government is currently focused on how to generate more money from private sources.

E7.3.12. Voluntary contributions

The possibility of using voluntary contributions to fund ICZM has received a fair bit of attention in Barbados. Voluntary contributions to support coastal zone management are an interesting idea, but

[21] https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2020_FullReport.pdf

should not be part of the government's strategy for raising funds. Rather, the government should encourage an NGO to work with the hotels to set up such a system nationwide, and to manage the allocation of the proceeds to support targeted coastal zone investments. This seems a more appropriate approach to voluntary donations than running it through government, because the establishment of a government-run voluntary contribution system would create an undesirable mixing of mandatory and voluntary funding systems. Moreover, because voluntary contributions have been initiated by the private sector, other companies may be more willing to participate if the scheme remains in their hands. This is particularly true because of the private sector discomfort with the shifting of a majority of their Corporate Social Responsibility (CSR) levies into the public treasury, leaving them unable to continue supporting communities who had previously been receiving their CSR contributions, and blurring the distinction between the CSR funds and any other taxes

In the case of other tourist focused SIDS, such as Mauritius (Lux Hotel group case), about two thirds of the revenues are used for energy efficiency projects, and the remainder to offset the company's carbon emissions with forestry projects. Since improvements in energy efficiency benefit the company financially, that portion of the voluntary contributions is paying for something that the company would presumably choose to do even without them; it amounts to giving the company the capital needed for those investments rather than the company using its own capital or borrowing funds for that purpose. Thus it essentially saves the company the interest on borrowing money for those investments, or allows them to show a higher profit margin because they do not have to pay for their own investments in energy efficiency. The carbon offsetting investments involve tree planting, insofar as possible in communities near the hotels. This is presumably of benefit to the communities themselves, or they would not allocate land for the trees to be planted. It may or may not have any financial payoff for the hotels, depending on where the trees are planted and whether they contribute to reducing erosion that affects hotel properties.

If such voluntary contributions could be collected at a similar rate from all visitors to the country, this measure might generate a significant amount of money. For a number of reasons, actual collection rates from a national program would be lower than that. Firstly, as Lux observes, visitors staying in the most expensive hotels are most likely to contribute while those in less expensive hotels contribute less often. If Lux represents the top of the market, the overall contribution rate should be lower nationwide. In addition, while Lux is enthusiastic about encouraging its guests to contribute when the company will control use of the funds, they might be less enthusiastic about it if the funds were to go to a national trust of some sort, and were to be invested in coastal zone improvements that might not benefit the hotel itself. Moreover, at present Lux can use this voluntary contribution as a way to set their company off from the competition. They may be more enthusiastic about it this way than they would be if all hotels were doing the same. It is also likely that not all hotels would choose to participate in this scheme, especially smaller ones or those offering less expensive lodging.

Nevertheless, this strategy might be worth considering, as a national or perhaps an NGO-sponsored venture in Barbados, with the revenues going into a “Coastal Zone Trust” or something similar. Participating hotels might be offered the opportunity to retain a modest portion of the funds, to allocate according to their own priorities, with the rest going to the trust. Participation would give the hotels both reputational benefits and some funds; if participation were made as simple as possible, so the administrative costs were low, many of them might be willing to join the scheme. The revenues they retain might in some sense offset the CSR funds that they no longer control because of the recent changes in the structure of that revenue source, enabling them to continue supporting projects in the communities around them. The trust would manage the bulk of the money, using it to address coastal zone issues that benefit the general public rather than the hotels themselves.

E7.4. Summary of Recommended Options

Whilst none of the options considered above are flawless, some of them do offer some potential to help fund implementation of ICZM in Barbados. In addition to the list of options presented in Annex 9, the following financing mechanisms are identified as being suitable to help raise funds for ICZM for Barbados:

- Mechanism 1: Pursue "Debt for Nature" swaps. The greater the risk that Barbados may have regarding any defaulting on original debts, the greater the discount available to the purchaser of the debt, thus the more the debtor country can gain from the transaction. In addition to the direct financial benefits, the restructured debt is typically repaid in local currency, allowing the debtor country to retain its foreign exchange reserves for purposes other than loan repayment.
- Mechanism 2: Consider setting up an Environmental Protection Fee (EPF); possibly in tandem with Mechanism 3 below. Expanding the base of the EPF to include additional sectors that benefit from or rely on the environment in general and the coastal zone in particular is an appropriate strategy for increasing revenue and reducing private sector opposition to the levy.
- Mechanism 3: Earmark all or a portion of the EPF (in its current form or a broader version) for coastal zone management, following the procedures now being used for the Corporate Social Responsibility (CSR) revenues. Additional analysis is needed to determine exactly the fee would be designed for each new sector, particularly how it would levied on second homes that benefit from proximity to the coast. The revenues from the EPF should be 100% earmarked for environmental protection, and a significant share of those levies should be earmarked for coastal zone management in particular. This is essential in order for industry to accept a broadening of the base of the fee. This should be feasible if management of the fee is patterned on the mechanism now being used to manage revenues from the CSR levy.
- Mechanism 4: Voluntary contributions by hotel guests that are collected by an independently managed "Coastal Zone Trust". Whilst this mechanism may be an effective way to raise additional funds for coastal zone management, this should be left in the hands of the private sector and NGOs, and should not be managed by GoB.
- Mechanism 5: Private Public Partnership (PPP) arrangements should be pursued further. This initiative is not new to Barbados as a quasi PPP was executed as part of the CRMP for the Holetown area where the private sector paid for the costs of baseline studies and preliminary engineering design costings for the study area. GoB evaluated the preliminary components (having developed the TOR) and from this set the design standards and requirements for TCDPO application procedures. The government then reviewed the project to make it socially equitable before approaching donors (IDB) for construction funding. Care and maintenance of the final structure remains the responsibility of the GoB.

APPENDIX A. REVIEW OF FUNDING AND FINANCE OPTIONS FOR RISK RESILIENT ICZM IN BARBADOS

FUNDING TOOL		GENERAL CHARACTERISTICS		
TYPE	SOURCE	LIKELY APPLICABILITY TO SUPPORT BARBADOS COASTAL RESILIENCE	EXPLANATION OF TOOL[1]	NOTES ON APPLICABILITY
DIRECT FEES	User fees and charges	*Medium*	User fees include the fees charged for the use of public infrastructure or goods (e.g., a toll road or bridge, water or wastewater systems, or public transit). Fees are typically set to cover a system's operating and capital expenses each year.	Public infrastructure or goods that can collect a user fee (e.g., a toll road or bridge, water or wastewater systems, or public transit).Fees can then be used to cover debt service for improvements to the system or to pay directly for capital or operating expenditures.
	Property taxes/general fund revenues	*High*	For uses that don't have revenue- generating potential, the implementing Agency could devote some of its scarce General Fund revenues, generated from property taxes or General Fund operating reserves/surpluses, to help get activities started. With voter approval, special taxes could also be considered which could enable a dedicated source of funding. Examples include an open space millage structured around a Metropolitan District, or a Community Preservation Fund.	For current general fund revenue, uses that do not have revenue-generating capability. Special millages would have greater flexibility based on how they are structured.
	Public benefit funds	*Low*	Public benefit funds are the collection of funds generated by a small surcharge on a customer's electricity bills, without regard to who the electric provider is.	Have mostly been used to support energy efficiency and energy renewal projects.
	Ground lease financing	*Medium*	Agency would lease land for resilience infrastructure use and securitize future lease payments using any proceeds to acquire or develop future land.	
	Transfer fee fund	*Medium*	Private fees levied in certain real estate transactions where a transfer of property ownership occurs, typically as a percentage of the transaction price. Community Preservation Funds (CPF) are tax programs implemented by US states and municipalities to fund their open space protection and enhancement. New York's was established largely with a transfer fee. CPF is then used to purchase land or development rights from willing sellers in order to protect community character.	Likely will have greater support if it is framed around a use with a clear public benefit and one that may increase property value. This can be argued for coastal resilience delivery.

FUNDING TOOL		GENERAL CHARACTERISTICS		
TYPE	SOURCE	LIKELY APPLICABILITY TO SUPPORT BARBADOS COASTAL RESILIENCE	EXPLANATION OF TOOL[1]	NOTES ON APPLICABILITY
DEBT TOOLS	Industrial loan companies, industrial banks, Industrial revenue bonds	*High*	A debt instrument issued by an agency, most commonly issued as part of an economic development initiative in which the municipal agency issues IRBs and then gives the proceeds to a private firm for development. The private entity is responsible to repay the debt over time.	Because IBs issue loans that must be repaid, they appear to be most applicable to infrastructure types that generate revenue, such as sewer or water projects that charge a user fee. However, IBs appear to be largely untested in financing more general public infrastructure.
	International Finance Institution (Bank) Loan'	*High*	Long-term debt issued by a bank such as the Inter-American Development Bank (IDB). With appropriate documentation, loans are sometimes offered at rates favorable in comparison with some other long-term financing options when projects are confirmed to be financially viable and support development in a sustainable, climate resilient manner.	The Barbados coastal/flood resilience programs are in strong alignment with goals of international banks like IDB. In particular, the full National Program, when more fully documented in planned studies, would seem to fit scale and purposes of interest to agencies like IDB, if a sufficient basis for repayment can be detailed and confirmed.
	General obligation bonds	*High*	Bonds issued by municipalities that represent an obligation of the full faith and credit of the property owners within the municipality.	Can also be used for projects that do not generate revenue; either for large projects or grouping several to many smaller project together as transaction costs are expensive.
	Revenue bonds	*Medium*	Bonds issued by municipalities that are secured by a dedication of an identified revenue stream (e.g., water and sewer system bonds are typically repaid through user fees from system customers).	Assets that will generate reliable revenue.
	Green bonds	*High*	Bonds that are issued specifically to address projects that accomplish identified 'green' objectives, such as clean power, carbon reducing projects and environmental restoration. There are various levels of green certification, with the most rigorous requiring independent certification and ongoing monitoring. Green bonds appeal to some classes of investors who are specifically interested to support sustainable solutions as part of their investment portfolio.	Projects that investors see as "green", but generally utilize underlying type of bond (aka, general obligation or revenue). Several utilities in the US have issued green bonds to address stormwater management issues. Some of these have included external verifications, following models used in certifying bonds as "green" in Europe and some other parts of the world. Resilience focus of the Barbados program seems well suited to satisfying green certification requirements.
	Pooled bond financing	*Medium*	Regional/National agency acts as bonding agency on behalf of multiple municipal entities, typically for similar or related projects (e.g. water or wastewater projects, public building projects).	Potential application if multiple Barbados municipalities can develop resilience programs in parallel.
	Certificates of participation	*Low*	Tax-exempt bonds usually secured with revenue from an equipment or facility lease; issued by state authorized entities (e.g. state public works boards, joint powers authorities, municipalities, or transit agencies).	Have been used in public finance to support a broad variety of projects and programs, including acquisition of land or equipment, transportation (e.g., light rail and toll bridges), water and wastewater treatment facilities, and real estate (e.g.,

FUNDING TOOL		GENERAL CHARACTERISTICS		
TYPE	SOURCE	LIKELY APPLICABILITY TO SUPPORT BARBADOS COASTAL RESILIENCE	EXPLANATION OF TOOL[1]	NOTES ON APPLICABILITY
				parking facilities, public buildings). Not suitable for funding operations and maintenance activities.
	Revolving loan funds	*Medium*	A revolving loan fund (RLF) is a pool of money dedicated to specific kinds of investments. The money used to repay loans replenishes the fund and is loaned out again.	RLFs can provide access to capital markets for projects that have poor risk profiles to meet economic development (e.g. new business development), environmental (e.g. safe drinking water), or other public policy goals. RLF financing can also be useful for projects where the revenue stream might be irregular. RLF customers can include local governments, special districts, state agencies, private corporations, or nonprofit organizations.
	Linked deposit programs	*Low*	Below market bank loans subsidized by corresponding 'linked' state deposits. The source of capital is state tax surpluses.	Can be used for numerous things, including upgrade infrastructure; depends on the state for eligible uses.
CREDIT ASSISTANCE	Credit assistance tools or loan guarantees	*High*	Credit assistance improves local agencies' creditworthiness and thus lets them access better borrowing terms and reduce financing costs. US Federal and state agencies have developed a variety of financial tools to help local governments access credit to expedite projects. This credit assistance can take several forms.	For socially beneficial projects with reasonable expectation of private market success, but little history (Tesla is an example). When a project cannot get reasonably priced capital to get to scale.
	On-bill financing	*Medium*	Utilities bill customers a monthly fixed charge to recoup costs of required property-level upgrades.	Energy efficiency and other improvement benefits that stay with the property, not the resident or current property owner.
PRIVATE SOURCES/ EQUITY	Public-private partnership	*High*	(P3) is defined as "a contractual agreement between a public agency (federal, state, or local) and a private- sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public.	Projects that generate revenue and can write a strong contract for; parking facilities, toll roads, airports, and ports; schools, hospitals, or libraries; These bundled projects could involve parks; streetscaping; road, bicycle, or pedestrian improvements; sewer, water, storm drain, and other utilities; or parking.
	Program- related investment (PRI)	*High*	Generally, foundation or public investment offering longer and more flexible investment terms, as compared to tradition private financing. PRIs can be structured as debt tools or equity stakes.	Could pool PRI investment to a fund for the benefit of entrepreneurial ventures utilizing open space.
	Impact bonds/Social impact bonds	*High*	A bond instrument in which the payment is contingent on the outcomes agreed upon by the investor and issuer. Impact bonds have a broader range of public benefits, including environmental, social, and economic. Private investors assume the risk for improvement to outcomes. SIBs reference a category of investments focused more squarely on social impacts.	Require negotiated criteria for measuring success in determining funding; could have multiple measures of success. Based on some recent precedents in the US, might have some applicability for the Barbados program, including initial pilot projects.

FUNDING TOOL		GENERAL CHARACTERISTICS		
TYPE	SOURCE	LIKELY APPLICABILITY TO SUPPORT BARBADOS COASTAL RESILIENCE	EXPLANATION OF TOOL[1]	NOTES ON APPLICABILITY
	Pay for success	*High*	Similar to social impact bonds. A pay for success or pay-for-performance option is a contractual relationship in which the private sector is engaged to accomplish a public objective, with incentives for the private entity for performance above an agreed-upon minimum performance level.	Could be adapted to coastal resilience around provision of amenity and environmental benefits Based on some recent precedents in the US, might have some applicability for the Barbados program, including initial pilot projects.
	Pooled lease-purchase	*Medium*	A government agency purchases property or equipment on an annually renewable contract basis.	Particularly beneficial to states because smaller projects can be combined to receive longer loan terms and beneficial interest rates. However, forming a pooling agreement can be difficult when attempting to combine projects at the same time for financing.
	Loan loss reserve funds (LRF)	*Medium*	LRFs improve under-banked consumers' small dollar loan options by expanding the number of responsible lenders and products available in the marketplace. The source of capital is a combination of the public sector and private banks.	Where financial institutions make a series of small loans for projects such as energy efficiency improvements or residential solar.
	Infrastructure Investment Funds	*Medium*	A pool of funds collected from many investors to invest in infrastructure, often in the form of a public-private partnership. An infrastructure investment fund can be the financing tool that pays for a public project's capital cost under a public- private partnership.	Have supported projects in a broad range of sectors such as transportation (e.g. toll roads, airports, ports, and transit), regulated utilities (e.g. water and power), cable and wireless communication, and social infrastructure (e.g. schools, hospitals, public and military housing, and civic buildings); seek projects with stable, predictable, and long-term income streams.
	Securitization and structured funds	*Medium*	A "structured fund" is a loan fund that pools money from different investors with varying risk and return profiles. Structured funds have a very specific dedicated purpose, which is clearly defined prior to forming the fund, and are managed by professionals with fund formation and loan underwriting experience. Structured funds often combine both equity and fixed- income products to provide investors with a degree of both capital protection and capital appreciation.	Applicability for the coastal resilience will depend in part on the types of investors that the agency focuses on to support development and their resulting level of interest in this program.
	Greenhouse emissions allowance auctions	*Low*	States pool their total emission allowances and sell them in an auction format.	Market-efficient way to have polluters pay for pollution emitted.
	Stormwater/ green stormwater	*Low*	Cities enable and administer a market in which developers who accomplish documented stormwater management objectives are allowed to sell credits to	No established stormwater management objectives set for Barbadosan developments.

FUNDING TOOL		GENERAL CHARACTERISTICS		
TYPE	SOURCE	LIKELY APPLICABILITY TO SUPPORT BARBADOS COASTAL RESILIENCE	EXPLANATION OF TOOL[1]	NOTES ON APPLICABILITY
	infrastructure credit trading programs		property developers who need to accomplish stormwater management objectives on site for new development.	
	Green Stormwater Infrastructure Bank	*Low*	An alternative to credit trading, enables developers to purchase retention credits from the green stormwater infrastructure bank that invests in large green stormwater infrastructure projects.	Would be focused on larger sites being developed by a single entity.
	New Market Tax Credits	*High*	Allows corporate or individual investors to receive a tax credit for investing in a community development entity (CDE) in a low-income community.	Proven financing method for some open space uses, such as urban farming and biofuel, but has wider applicability.
	Carbon credits	*Medium*	Not specifically a funding mechanism, but may provide value for carbon capture in the future depending upon regulations.	Likely need to be for large, permanent projects, though tree farms could be applicable.
	Individual or peer-to-peer funding	*Medium*	Pooling monetary investments, loans or donations from a large number of private individuals. More commonly referenced as "crowdfunding" or "crowd lending/investing." These can be structured as donations, equity positions, loans or investments receiving some form of return (product or monetary).	Likely more successful when a tangible good can be returned in a short period of time or where there is some broader social or public benefit.
VALUE CAPTURE MECHANISMS	Developer fees and exactions or impact fees/tap fees	*Medium*	Developer fees and exactions include: Impact fees, which include system development charges and connection or facility fees, and Negotiated exactions and agreements.	Impact fees impose a fee on developers to fund additional service capacity required by the development. New development can instigate the need for coastal resilience measures/investment.
	Value capture	*Medium*	Value capture is the identification and capture of increased land value resulting from public investment in infrastructure.	Applicable for situations where substantial increases in land value are likely in response to public investment. This may be the case for coastal protection measures protecting backing development, raising property values.
	Linkage fees	*High*	Agency or municipality charges developers a fee for new development, typically based on a percentage of the sales price.	Pay for the secondary effects of development. This could include mitigating the impacts of mangrove clearance and provision of flood infrastructure to reduce risks to development.
	Developer dedication requirements	*Low*	Where imposed, developers are required to donate land and/or facilities for public use.	Theory behind these requirements is that a City's existing residents should not subsidize developers who bring in new residents.
	Special districts/ Improvement districts	*Medium*	A value capture tool that can include benefit assessment districts, business improvement districts, business improvement areas, business revitalization zones, community improvement districts, local improvement districts, special services areas, and special improvement districts, are formed to include a	Commonly used to fund infrastructure such as sewer, water, utilities, or streets. Special districts can be used either for pay-as you- go improvements or to finance the issuance of bonds backed by the assessment revenue; can be used to fund

FUNDING TOOL		GENERAL CHARACTERISTICS		
TYPE	SOURCE	LIKELY APPLICABILITY TO SUPPORT BARBADOS COASTAL RESILIENCE	EXPLANATION OF TOOL[1]	NOTES ON APPLICABILITY
			geographical area in which property owners or businesses agree to pay an assessment to fund a proposed improvement or service from which they expect to directly benefit.	infrastructure that does not generate revenue, so the tool is applicable to a wide variety of uses. However, there must be a clear benefit to property owners who will be paying the assessment. Because assessments do not need to be tied to revenue- generating infrastructure, they could be particularly useful coastal resilience measures that provide protection to an area.
	PILOT bond	*Medium*	Bond that is repaid by some or all property taxes for properties bordering major open space developments to fund construction of open space. These are similar to improvement districts but more binding.	Most applicable to uses with clear benefit to surrounding property owners, most often major parks, but could also be considered for coastal resilience.
	Tax increment financing	*Medium*	Enables the public sector to "capture" growth in property taxes (or sometimes sales taxes) from new development and increasing property values. Tax increment is collected for a set period, usually between 15 and 30 years. It can be used either on a pay-as-you-go basis over time or can be bonded against to provide an upfront source of revenue.	Most common uses of TIF are for environmental clean-up, land assembly, or local infrastructure; to help pay for major development initiatives or infrastructure investments that catalyze private investment and increase property values; can be applied to infrastructure that does not generate revenue. Typical items financed include street improvements; sidewalks; street lighting; utilities, including water lines, storm and sanitary sewers, and plant expansions; parks and open space; and off-street parking.
	Joint development	*Medium*	A real estate development project undertaken by a public agency and a private partner; many joint development projects are designed to meet multiple goals such as providing affordable housing, local jurisdictions can also help finance aspects of the project; requires a strong real estate market and a specific development opportunity.	Could be applicable in specific contexts where a developer's interests in a specific project coincides with public agencies' interest to support the open space reuses such as parks and greenways or tree farms.
GRANTS	National Govt. grants	*High*	Money made available by the National government, typically to address specific public purposes through a specific National Agency	Worth at least exploring opportunities for grants from the National government to support some portions of the Barbados resiliency program.
	Foundation grants	*High*	Money made available to test or implement solutions to public challenges by philanthropic entities.	Worth at least exploring opportunities for grants from foundations or other philanthropic sources to support some portions of the Barbados resiliency program.

[1] Taken or adapted in some cases from the TOD and Smart Cities Guides. Smart Cities Financing Guide (Smart Cities Council, 2014), http://smartcitiescouncil.com/resources/smart-cities-financing-guide. Infrastructure Financing Options for Transit-Oriented Development (US EPA, 2013), http://www2.epa.gov/smartgrowth/infrastructure-financing-options-transit-oriented-development