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No. 2

Rising to the climate challenge: Coastal and marine resilience in the Caribbean

Climate change poses a critical challenge for Caribbean small island developing states (SIDS). Rising sea levels and sea surface temperatures, ocean acidification and more intense hurricanes and storms, and the resulting impacts on coastal and marine ecosystems, pose significant threats to communities, livelihoods and key economic sectors that depend on these ecosystems. Building coastal and marine resilience is a priority for the region. While there have been significant strides to build resilience over the last decade, there remains a need for action ‘on the ground’ focused on the needs of the most vulnerable, including women, youth and key resource users such as fisherfolk. This issue paper highlights important lessons and innovations from work by the Caribbean Natural Resources Institute (CANARI) to build resilient coastal and marine ecosystems and livelihoods in Caribbean SIDS using a participatory and socially inclusive approach. It presents tools and methods that can be used by stakeholders responsible for or involved in management of coastal and marine resources – government

agencies, civil society organisations (CSOs), including community and resource user groups, and the private sector. It further presents recommendations for funding agencies, policy makers and technical partners supporting management actions, including through the design and delivery of regional and national programmes, projects and initiatives.

This issues paper draws on ten years of work by CANARI and its partners across the Caribbean, particularly under the following projects:

- **Climate Change Adaptation in the Fisheries of Anguilla and Montserrat**, 2017-2020, funded by the United Kingdom Government under the Darwin Initiative
- **Climate ACTT: Action by Civil Society in Trinidad and Tobago to build resilience to climate change**, 2015-2016, funded by Conservational International and BHP Billiton.



Sargassum clogging the coastline, Tobago, January 2018. Credit: CANARI

- **Engaging Civil Society in Strategic Action Programme Implementation** under the Catalysing Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) Project, 2017-2021, led by the United Nations Development Programme (UNDP) and funded by the Global Environment Facility (GEF) (32 countries and territories across Latin America and the Caribbean)
- **Powering Innovations in Civil Society and Enterprises for Sustainability in the Caribbean (PISCES)**, 2017-2020, funded by the European Union EuropeAid Programme (10 countries: Antigua and Barbuda, The Bahamas, Dominica, Grenada, Haiti, Jamaica, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago)
- **Regional Implementation of a Vulnerability and Capacity Assessment of Coastal and Fishing Communities** under the Climate Change Adaptation in the Eastern Caribbean Fisheries Sector Project (CC4FISH), 2017-2020, led by the Food and Agriculture Organization of the United Nations (FAO) and funded by GEF (5 countries: Grenada, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Trinidad and Tobago)
- **Strengthening Caribbean Fisherfolk to Participate in Governance Project**, 2013-2016, funded by the European Union EuropeAid Programme (17 countries: Anguilla, Antigua and Barbuda, The Bahamas, Belize, Barbados, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos)

Why build coastal and marine resilience?

With 70% of the Caribbean population living and working in coastal areas, where most of the infrastructure (including roads, airports and seaports) is also located, the impacts of climate change on coastal and marine resources and the communities, livelihoods and economic sectors that depend on these resources are of particular concernⁱ. Rising sea levels, increased air and sea surface temperatures, ocean acidification, rainfall variability and more intense hurricanes and storms are expected to trigger a series of interconnected and cascading biophysical and socio-economic impacts. The tourism and fisheries sectors, which are key contributors to employment, food security and gross domestic product (GDP) in Caribbean SIDS, will be affected by the erosion of beaches and loss of coral reefs

and mangroves due to sea level rise, coral bleaching with rising sea surface temperatures, more intense storms and storm surges and ocean acidification. The cost to Caribbean SIDS from increased hurricane damage, infrastructure damage and loss of tourism revenue due to climate change is projected to reach \$22 billion by 2050 or about 10% of the current regional economyⁱⁱ.

Climate change compounds existing challenges facing coastal and marine areas, including ecosystem loss and degradation from ad hoc development, pollution, invasive species, resource overexploitation, disease outbreaks and natural disasters such as earthquakes and volcanic eruptions. The combined effects threaten the long-term sustainability of coastal and marine resources and associated communities, livelihoods and economic sectors. Impacts are often hardest on vulnerable and marginalised groups, including poor coastal residents, community entrepreneurs, and subsistence and small-scale resource users such as fisherfolk.

Recognising these challenges, building coastal and marine resilience is a priority for Caribbean SIDS. **Resilience refers to the ability of a community, organisation or economic or natural system to resist, absorb and recover from the impacts of a hazard or shock while maintaining its structure and function**ⁱⁱⁱ. Simply put, it is the capacity of a system to deal with change and continue to develop, or to ‘survive and thrive.’ Ensuring that coastal and marine resources, and the communities, livelihoods and economic sectors that depend on them, have



Coastal erosion in Guayaguayare, South Trinidad, May 2018.

Credit: Coastal Protection Unit, Trinidad & Tobago

the capacity to effectively withstand and recover from the impacts of climate change and other environmental and socio-economic changes is crucial for the region's development and long-term sustainability.

Building coastal and marine resilience requires:

- **recognising that humans and nature are closely interlinked, and that coastal and marine areas are integrated social-ecological systems.** Coastal and marine ecosystems provide critical goods and services for Caribbean communities and economies, which shape and alter these ecosystems. Attention must be paid to the multiple processes and impacts of climate change and other pressures on coastal and marine ecosystems, economies, livelihoods and well-being, and their interlinkages, to fully understand the impacts on the system and solutions for socio-economic and ecological resilience.
- **managing uncertainty** as climate change presents new and unexpected impacts and risks for Caribbean SIDS, including new infectious diseases, poor air quality (e.g. due to frequent Sahara dust plumes), mass sargassum strandings (e.g. due to increased soil erosion and nutrient inputs in the tropical North Atlantic Ocean) and unprecedented extreme weather events (e.g. the occurrence of back-to-back Category 5 Hurricanes in 2017). Robust climate information and monitoring systems are needed to enable planning for different scenarios and evidence-based decision-making.
- **innovation and shared learning** as new approaches, tools and practices are needed, which maintain socio-economic well-being and ecological integrity and build climate resilience. These approaches must draw on diverse experiences and interests, including of the most vulnerable and marginalised groups such as women, youth and the very poor. Further, enabling institutions, including policies, laws and governance structures, can facilitate integration, innovation and shared learning to build resilience.

Approaches to build coastal and marine resilience in the Caribbean

Caribbean governments have taken significant strides towards coastal and marine resilience over the last decade through climate modelling and information services, assessing coastal hazards and vulnerabilities, mainstreaming climate change into policies and plans and investing in large-scale physical infrastructure for coastal protection (e.g. sea walls and revetments) and addressing water and energy security (e.g. via desalination plants and solar powered plants). Regional agencies, including the Caribbean Community

(CARICOM) and Organisation for the Eastern Caribbean States (OECS), have also enabled coordinated action and access to finance for climate change adaptation, mitigation and resilience building. These national and regional efforts are aligned with global commitments under the United Nations Framework Convention on Climate Change (UNFCCC) and its Paris Agreement, the 2030 Agenda and its 17 Sustainable Development Goals (SDGs) including Goal 13 Climate Action and the SIDS Accelerated Modalities of Action (SAMOA) Pathway.

However, there has been less attention and action 'on the ground' focused on the needs of the most vulnerable coastal communities and groups. These groups include small-scale farmers and fisherfolk, small and micro enterprise (SME) owners and members, women and youth whose livelihoods and well-being depend on coastal and marine resources, and who are already being impacted by climate change. CANARI has sought to engage and empower these vulnerable communities and groups, and wider civil society, to build resilient coastal and marine ecosystems and livelihoods using a participatory and inclusive approach. This work has included awareness raising and advocacy, assessing vulnerabilities and enhancing local capacity and action to adapt and build resilience to climate change.

Issues and proposed solutions to build resilience 'on the ground'

Although the importance of building resilience 'on the ground' is well recognised, there are several challenges that discourage a focus at the local level. One such challenge is effectively engaging a wide range of stakeholders and sectors in resilience building efforts for an integrated and comprehensive response across all levels. CANARI has used a variety of tools and approaches in its work to build resilience of coastal and marine ecosystems and livelihoods using a participatory and inclusive approach. The following sections highlight CANARI's experiences, lessons learnt, best practices and innovations across Caribbean SIDS focused on community-based and ecosystem-based approaches.

1. Integrating local and traditional knowledge and practices into decision-making

Climate change impacts are felt differently across communities and sectors in Caribbean SIDS. Understanding the local impacts and vulnerabilities of communities, their livelihoods and supporting coastal and marine ecosystems is critical to develop solutions that are culturally appropriate and viable. Yet, the most vulnerable groups are often under-represented in decision-making processes, including



Completed Anguilla P3DM on display, March 2018.

Credit: CANARI

women, youth, indigenous peoples, poor coastal residents and small-scale fisherfolk. The result is their local and traditional knowledge, values and practices are not fully taken into account and their priorities for action are not addressed in projects and programmes. Decisions based solely on scientific information also tend not to effectively capture local realities or identify key opportunities and solutions as the available information is limited and not downscaled for use at the local level.

CANARI has been piloting innovative participatory information and communication technologies (ICTs) as tools to capture, manage and share local and traditional knowledge and practices to address climate change. Tools used include participatory three-dimensional modelling and participatory video (see Box 1).

These participatory ICTs have been effective for engaging coastal communities, fisherfolk and other typically under-represented groups in identifying their own vulnerabilities and key priorities and actions to build resilience. They provided creative and accessible ways for visualisation of climate change impacts and vulnerabilities, and allowed for collective analysis, learning and sharing of experiences by fisherfolk and other coastal and resource users and managers. They also contributed to local resilience through improved awareness raising and advocacy on climate change impacts and vulnerabilities and the need for urgent and collective ‘on the ground’ action.

A key lesson from applying participatory ICTs is that, while local and traditional knowledge and practices are a key resource, **there is need for integration of local and scientific knowledge for effective evidence-based decision-making.** Relying solely on either form of knowledge does not offer a holistic picture of climate change impacts and vulnerabilities and the appropriate solutions to build



Handover of completed P3DM to Montserrat stakeholders, February 2018. Credit: Government of Montserrat

resilience in a specific local context. Integration of local and scientific knowledge enhances credibility and ensures responsiveness to local needs and priorities. Participatory three-dimensional modelling and other geographic information system (GIS)-based tools are particularly useful in supporting integration of local and traditional knowledge, such as observed changes and management practices, and scientific knowledge, such as climate and ecological data. Further, to ensure uptake and use in decision-making, there is need for **greater innovation and investment in knowledge management and sharing** via appropriate products and pathways to coastal and marine resource managers and users such as mobile apps, social media, on-line portals and other ICTs.

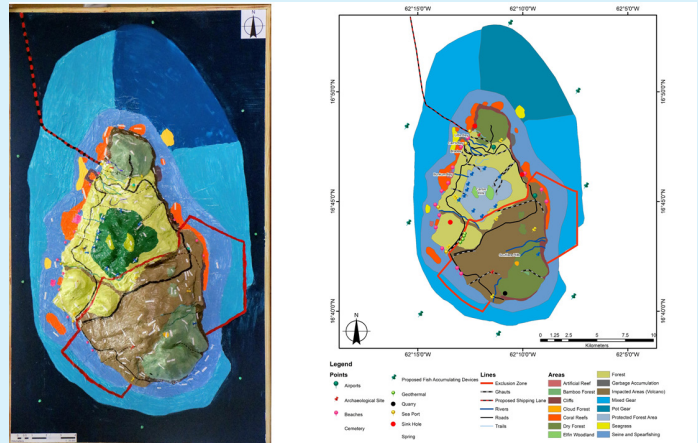
2. Empowering local communities and resource users to take action

Governments and the private sector cannot address climate change alone. Civil society engagement and leadership is needed to effectively build resilience to climate change and other disasters and ensure sustainable resource use and management. Enhancing the capacity of local community-based organisations, resource user groups and other CSOs is key so they can play a significant role in planning and implementing resilience building actions. Although this is widely recognised, many capacity building efforts are framed as one-off technical training events that target individuals and do not address the need to have strong CSOs that can take climate action. These types of capacity building efforts also do not provide support and opportunities for applying new knowledge and developing skills through practical experience, and often use top-down approaches and training materials that do not meet the needs and context of many Caribbean CSOs.

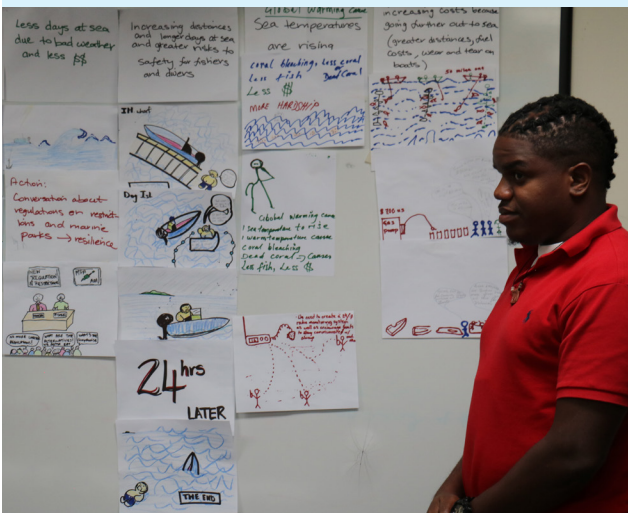
Box 1: Participatory three-dimensional modelling and participatory video in Anguilla and Montserrat

In 2018, participatory three-dimensional (3D) modelling was used in Anguilla and Montserrat to engage fisherfolk, other coastal and marine resource users and local authorities to conduct vulnerability assessments of their fisheries sectors. Through a facilitated process, stakeholders built physical 3D models of the islands of Anguilla and Montserrat and the surrounding marine areas to document local knowledge on resource use, livelihoods and areas critical to fisheries, including fishing communities, landing sites and fish habitats. The 3D models were used to identify priorities to adapt and build the resilience of Anguilla's and Montserrat's fisheries sectors. These priorities included: strengthening fisherfolk's adaptive capacity through safety at sea training, accessing insurance and developing alternative livelihoods; improving systems for monitoring changes; and protecting and restoring coral reefs that support fisheries to address identified threats from coastal erosion, more intense storms and storm surges and sargassum influxes. As the models were geo-referenced, the data was digitised to produce GIS databases and maps, which can be integrated with scientific data and support coastal and marine spatial planning.

Additionally, local fisherfolk in Anguilla and Montserrat were trained and supported to create participatory videos to showcase their own perspectives on the local impacts of climate change, their vulnerabilities and priorities for adaptation. This process included creating story boards and capturing footage and audio to develop short videos. Fisherfolk used the videos to advocate for changes in policy and practice for improved fisheries management.



Montserrat 3D model and the digitised map. Credit: CANARI



Story board developed by Anguilla fisherfolk and their partners for their participatory video, Anguilla, December 2018. Credit: CANARI

Montserrat fisherfolk capture and review footage for participatory video, Montserrat, November 2018. Credit: CANARI

Over the last five years, CANARI has strengthened the technical and organisational capacity of coastal communities, resource users and CSOs (including over 250 fisherfolk, rural women agri-producers and CSO staff) engaged in coastal and marine conservation and management to adapt and build resilience across eight countries (Anguilla, Dominica, Grenada, Montserrat, St. Kitts and Nevis, Saint Lucia, St. Vincent and the Grenadines and Trinidad and Tobago).

CANARI has used a **multi-pronged capacity building approach** involving training of trainers, coaching and mentoring, peer exchanges and small grants to support 'learning by doing' and demonstration projects. Key aspects of this approach include:

- Technical training on climate change including awareness raising and advocacy, assessing vulnerability, and planning and taking action using community-based and ecosystem-based solutions. To support the technical



CSO representatives participating in a four-day training workshop to enhance their capacity for assessing vulnerability and building resilience to climate change under the Climate ACTT project. Credit: CANARI



PISCES CSO mentors at mentor training workshop, Saint Lucia, 29 Jan-1 Feb 2019. Credit: CANARI

training of Caribbean CSOs, the toolkit on *Implementing Climate Change Actions* was developed^{iv}. This has tools appropriate to the Caribbean context and includes examples and case studies from the Caribbean.

- Providing local communities, resource users, CSOs and community enterprises with small grant funding to pilot innovative approaches and take practical actions to build resilience. Since 2012, CANARI has administered over US\$600,000 in small grants and over US\$5.3 million in large grants to support biodiversity conservation, climate change adaptation and resilience and sustainable livelihoods, benefitting over 75 CSOs across 18 Caribbean countries. With mentoring in project development, management and evaluation, these small grants have successfully enhanced capacity and action by these CSOs (see Box 2).
- Establishing a regional network of mentors, with 47 mentors trained across 17 countries, to support organisational strengthening of CSOs including fisherfolk organisations. Mentors have provided one-on-one coaching and mentoring to CSO staff and their boards, including on good governance, human resource and financial management and strategic planning. This organisational strengthening has been key in enabling CSOs to effectively function and implement technical work on climate change and building resilience.

- Creating platforms for diverse stakeholders, including local communities, resources users, women and youth, to have a voice in coastal and marine decision-making and climate action. At the community to regional levels, CANARI's work has promoted multi-stakeholder mechanisms for coordination and decision-making, including women, youth, the disabled and key resource users such as fisherfolk (See Boxes 3 and 4).

Box 2: Supporting civil society and local enterprises through the Caribbean Sea Innovation Fund

In 2019, CANARI established the Caribbean Sea Innovation Fund (CarSIF) as a small grant facility providing dedicated support for coastal and marine management by civil society and community enterprises, with funds from the European Union and United Kingdom Government's Darwin Initiative. This facility has supported practical actions by fisherfolk organisations in Anguilla and Montserrat to adapt and promote ecosystem stewardship from 2019-2020. In Anguilla, the Anguilla Fisherfolk Association in collaboration with the Anguilla National Trust and fisheries authority helped restore coastal and marine habitats in the Prickly Pear Marine Protected Area by constructing lobster casitas to create a habitat for the Caribbean spiny lobster and create an artificial reef. They also conducted safety at sea training for fishers, given more extreme weather events and rougher seas due to climate change. In Montserrat, the Montserrat Fishers and Boaters Association conducted climate smarting of fish aggregating devices (FADs) and fish traps to make them more resilient and environmentally friendly. Ecosystem stewardship was also encouraged through organising a 'fishers against marine litter' campaign including a beach clean-up.

Under CarSIF, CANARI is also providing small grants to a further nine CSOs and micro grants to nine SMEs to take practical actions for coastal and marine conservation, climate resilience and sustainable livelihoods from 2020-2021. The small grants include support to Fondation pour la Protection de la Biodiversite Marine in Haiti to develop mangrove-based apiculture and honey production as alternative, sustainable livelihoods for coastal communities within the 3Bays Marine Protected Area and to the Caribbean-Coastal Area Management Foundation in Jamaica for coral gardening and restoration in the Portland Bight Protected Area. The micro grants include support to the Petit Martinique Women in Action to promote aquaponics and sustainable agriculture among young rural women in Grenada, Eco South Tours to expand its eco-tour operations in Saint Lucia and the Liamuga Sea Moss Group to strengthen seamoss farming operations and provide a viable, alternative livelihood in fishing communities in St. Kitts and Nevis.



FoProBiM is working with local communities to support mangrove-based apiculture within 3Bays MPA, Haiti. June 2014. Credit: FoProBiM



Members of Montserrat Fishing & Boaters Association showcasing fish traps with escape doors installed. Credit: Montserrat Fishing & Boaters Association



Anguilla fisherfolk and members of the Anguilla National Trust make lobster casitas to attract lobster to artificial reef sites. Credit: Anguilla National Trust

Box 3: The Gender in Fisheries Team

At the regional level, the Gender in Fisheries Team has been actively promoting gender equality in small-scale fisheries as part of the adoption of Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines) and working with women fishers, fish processors and vendors to enhance their representation and leadership in the sector. Members of the Gender in Fisheries Team include the Centre for Resource Management and Environmental Studies of the University of the West Indies (UWI-CERMES), CANARI, Caribbean Network of Fisherfolk Organisations (CNFO), Caribbean Regional Fisheries Mechanism (CRFM) Secretariat, FAO and the Gulf and Caribbean Fisheries Institute (GCFI). In 2016, the team led a participatory process to advocate for the inclusion of a protocol into the Caribbean Community Common Fisheries Policy that incorporates human rights-based approaches and gender mainstreaming as well as other aspects of the SSF Guidelines^v. This participatory process included fisherfolk leaders from the CNFO, whose capacity for policy influencing and communication were strengthened with the support of the team, to advocate for the changes in policy.

These capacity building activities have highlighted a number of key lessons. In particular, the **need for a twin focus on technical and organisational capacity building of CSOs and local resource user groups and enterprises** to enhance resilience building efforts. Without strong and effectively run organisations, efforts by CSOs, local resource users and enterprises to take action on climate change and build resilience cannot be sustained or scaled up for impact. Five key areas to address in building organisational capacity are ensuring good governance, a clear strategic direction, transparent and accountable financial management, financial sustainability through effective fundraising, and human resource management^{vii}.

Effective capacity building also requires sustained effort and commitment from both the target groups and their partners and funders. CSOs and local resource user groups and enterprises need to have buy-in and commitment across their organisations, and the human and financial resources to invest in capacity building. Longer-term programmatic support is needed from partners and funders rather than the typical one-off activity or project for effective capacity building. This programmatic **support also has to be flexible and tailored to the needs of CSOs and local resource user groups and enterprises**, recognising their diversity and drawing on comprehensive needs assessments and capacity building

strategies^{iv}. This requires a shift by donors and technical agencies away from narrow and short-term project-based support to long-term programmatic support and partnerships. Funding streams must facilitate direct access by CSOs, local resource user groups and enterprises to empower them to direct their own development and work in collaboration with governments and other actors.

3. Applying ecosystem-based solutions

Ecosystem-based solutions involve the conservation, sustainable management and restoration of natural ecosystems to help communities, organisations and economic sectors build resilience to climate change and disasters. Coastal and marine ecosystems can serve as natural defences. For example, coral reefs and mangroves reducing wave energy and protecting against coastal erosion, flooding and storm surges. These natural defences are often more cost effective

Box 4: Enhancing Civil Society Engagement in Managing the Caribbean and North Brazil Shelf Large Marine Ecosystems

CANARI facilitated the development of a regional Civil Society Action Programme (C-SAP) titled 'People Managing Oceans' in 2018 to strengthen civil society's participation in the 10-year Strategic Action Programme for the sustainable management of shared marine resources within the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) region, which was endorsed by 25 governments and 6 overseas territories^{viii}. The C-SAP was developed by and for civil society, fisherfolk and community enterprises to guide their engagement in decision-making processes and their own practical actions for a healthy marine environment in the Caribbean Sea and North Brazil Shelf and ensure livelihood benefits and well-being in the region. This recognised technical and organisational capacity building requirements for civil society to effectively play a role in partnership with governments and other stakeholders. The programme was developed through a participatory process led by CANARI, bringing together civil society representatives from across the region to collectively analyse the strategies and actions in the politically endorsed 'Strategic Action Programme' and identify areas where civil society could contribute to its implementation. To date, 51 CSOs operating across 11 countries have endorsed the C-SAP. CANARI further facilitated the establishment of a Small Grants Coordination Mechanism to support the implementation of priority actions in the C-SAP. This mechanism will be taken forward in governance arrangements for management of these important marine ecosystems.

compared to engineered solutions such as sea walls. Coastal and marine ecosystems also help mitigate climate change through carbon sequestration by mangroves and seagrass beds. Further, they provide important goods and services to support local livelihoods and key economic sectors including tourism and fisheries. Investing in and sustaining coastal and marine ecosystems therefore provides multiple benefits in terms of building ecological, economic and social resilience^{viii}.

However, despite these benefits, there remains a heavy reliance on engineered solutions that use hard infrastructure for coastal and flood protection such as sea walls and revetments. Ecosystem-based solutions are perceived to be more complex to execute, as they are less widely applied and known, and require a longer time to function and achieve impacts^v.



Mangrove replanting underway in Haiti, April 2015.

Credit: FoProBiM

Coastal and marine spatial planning, the ecosystem approach to fisheries (EAF) and integrated coastal zone and watershed management are examples of approaches that support ecosystem-based solutions to climate change in Caribbean SIDS. These approaches take into account the ecological, economic and social context and drivers of vulnerability from ‘ridge to reef’ or within the wider oceanscape to inform planning and actions to address climate change and other shocks holistically. They also seek to engage and bring together the diverse stakeholders that use, manage and impact on coastal and marine ecosystems for coordinated and collective action.

CANARI has been supporting fisherfolk and governments in applying EAF to enhance the sustainability and resilience of fisheries and marine resources and related livelihoods (see Box 5). EAF recognises that fisheries are social-ecological systems. It involves an integrated approach

Box 5: Applying an Ecosystem Approach to Fisheries in Anguilla and Montserrat

From 2017-2020, CANARI worked to mainstream climate change adaptation into fisheries management in Anguilla and Montserrat using EAF, in collaboration with UWI-CERMES and Anguilla’s and Montserrat’s fisheries authorities. This work involved facilitating institutional and vulnerability assessments to understand climate change impacts on various aspects of the fisheries sector and readiness to adapt. The vulnerability assessments involved participatory three-dimensional modelling to capture climate change impacts from ‘ridge to reef’ and inform the EAF work. The institutional assessment revealed a lack of relevant data to inform decisions, weak coordination mechanisms and gaps in the policy and legal framework to support adaptation in the fisheries sector. Coastal and resource managers and users, including the fisheries authorities and fisherfolk leaders, were then trained in EAF and supported to integrate climate change adaptation and disaster management considerations into fisheries management plans and interventions using EAF. This included updating Anguilla’s Small Coastal Pelagics Management Plan and Montserrat’s National Fisheries Plan. Fisherfolk organisations were provided with small grants and mentoring to design and implement practical actions to adapt and build resilience and promote ecosystem stewardship in Anguilla and Montserrat, including helping create artificial reefs and organising a beach clean-up to raise awareness of marine litter. These efforts helped reduce pressure on coastal and marine ecosystems that support nearshore fisheries.



Participants complete group exercise during EAF training in Montserrat, January 2019. Credit: CANARI

to fisheries management to ensure ecological integrity, human well-being and good governance. This integrated approach is focused on flexibility, balancing multiple objectives and interests, coordination and stakeholder participation, managing uncertainty and addressing impacts at the appropriate scales.

A key lesson from this EAF work is that **integrating community-based and ecosystem-based solutions is key to achieving coastal and marine resilience and sustainability**. Without effective engagement of local communities and resource users, ecosystem-based solutions are unlikely to be responsive to local needs, especially of the most vulnerable. **Processes for meaningful stakeholder involvement in decision-making and the use of local knowledge alongside scientific knowledge help to achieve fair and equitable outcomes** that balance conservation and development goals for socio-economic benefits, especially for vulnerable groups. **Improved practical tools and systems for monitoring the long-term changes and outcomes of ecosystem-based solutions and measuring success** of actions ‘on the ground’ are also key to better understand what is working and why and identify best practices and actions to scale up impact.

There is also need to **explore the potential to combine ecosystem-based and engineered solutions as a low-regret and cost-effective approach**. For example, both mangrove replanting and revetments can be used for coastal protection. The restored mangrove helps reduce the level of coastal erosion and allows for small revetments to be used instead of a large, more costly sea wall^x. This reduces the high up-front cost of investment in building and maintaining hard infrastructure, which often requires Caribbean governments to source loans from multi-lateral banks and other financiers and take on significant debt. Capturing the value of other ecological and socio-economic co-benefits also helps to build the case for ecosystem-based solutions.

4. Climate proofing enterprises and livelihoods

Building the resilience of livelihoods and economies is crucial to realise the potential for development and prosperity. In particular, it is important to enable SMEs that drive local economies and contribute significantly to household incomes and livelihoods to adapt and build resilience to climate change and disasters. However, SMEs face a number of challenges in building resilience and exploiting market opportunities. These challenges include: limited awareness of climate change, its risks and locally-appropriate resilience measures; weak capacity (including skills and tools) for small business development and management;



Barbados fish vendor. Credit: CANARI

limited access to appropriate finance and risk-transfer mechanisms; unfavourable business environments; limited market access; and socio-cultural barriers that constrain their operations^x.

In response to these challenges, CANARI has developed and piloted a ‘climate proofing’ methodology^{xi} for community SMEs to build their resilience to climate change and related impacts and add value to the enterprise’s operations and products. The methodology considers the entire value chain of the enterprise including all the activities to develop a product or service from inputs to processing to marketing and sales. Using the value chain, climate change impacts and vulnerabilities can be systematically assessed at each step of the chain and potential resilience building measures identified for the enterprise. These measures not only seek to help the enterprise reduce vulnerability to climate change but to add value to its product or service. Value adding includes measures that make activities or processes more efficient with respect to time, human resources or other factors that in turn reduce costs and increase profits. For example, adding solar panels reduces vulnerability to

Box 6: Climate proofing SMEs based on fisheries and marine resources

CANARI and FAO engaged fisheries-based SMEs and national fisheries authorities in Barbados, Dominica and Saint Kitts and Nevis from 2019-2020 to better understand climate change impacts on the poor and most vulnerable in fishing communities and enhance their livelihoods and food security. Applying the 'climate proofing' methodology, local fishers, processors and vendors analysed their fisheries value chains and impacts of climate change and other shocks and identified measures to build resilience and add value to their operations and fish products. The main shocks identified were coastal erosion, rough seas and more intense storms, higher air and sea surface temperatures, drought affecting water security, and declining fish catches that affect the SMEs' operations. 'Climate proofing' measures included: shifting the focus to underutilised fish species that are less climate-sensitive; acquiring training and equipment for drying and salting fish as value added products; and improving cold storage and water access through installing rainwater harvesting systems. This work has contributed to understanding of the climate change and poverty nexus and identifying responsible practices for reducing poverty and vulnerability to climate change and disasters in the Caribbean small-scale fisheries sector.

power outages, reduces carbon emissions from the enterprise and makes processing more efficient by providing a constant power supply (see Box 6).

Strengthening and building the resilience of SMEs based on coastal and marine resources is a key pathway towards a blue-green economy in Caribbean SIDS, which is based on inclusive, environmentally sustainable and resilient economic development that delivers the 'triple bottom line' of ecological, economic and social benefits^{xiii}. However, there are three key areas to address to effectively strengthen SMEs. Firstly, **SMEs will need to adopt sustainable business models and practices in addition to resilience measures**, including making their products, services and value chains environmentally sustainable. Secondly, **access to finance and technical assistance needs to be significantly increased** to support the transition of SMEs to sustainable and resilient business models. Targeted micro-financing via credit, grants and low-interest loans from financial institutions, including national and multi-lateral banks and other funders, are needed for SMEs. SME incubators need to provide technical assistance on sustainable and resilient practices and core business management functions such as business planning, financial management and supplier and consumer

relations. Thirdly, **governments must provide an enabling policy and regulatory framework** to support SMEs and the transition to a blue-green economy, including coherent policy and tax regimes and a clear strategic direction for investment and growth.

Conclusion

Building coastal and marine resilience is a priority for Caribbean SIDS in the face of climate change, which compounds existing challenges due to development pressures, pollution and habitat degradation. While there have been significant strides over the last decade, there remains a need for action 'on the ground' focused on the needs of the most vulnerable, including women, youth and key resource users such as fisherfolk. A socially inclusive and participatory approach is needed to engage the full range of actors in building coastal and marine resilience.

Drawing on the experiences of CANARI and its partners, a strategic focus and investment in these four areas will be key in scaling up best practices and innovations and enhancing impact:

- 1) **Documenting and integrating local and traditional knowledge and practices** as a key resource in understanding local climate change impacts and vulnerabilities and developing resilience building measures;
- 2) **Strengthening the technical and organisational capacity of coastal communities, resource users and SMEs** so they can play a significant role in planning and implementing resilience building measures, and in climate change advocacy and policy development at community, national and regional levels;
- 3) **Using community-based and ecosystem-based solutions** to build resilient coastal and marine ecosystems, communities and livelihoods, with fair and equitable outcomes;
- 4) **Supporting SMEs based on coastal and marine resources to 'climate proof' to build livelihood resilience and adopt sustainable practices** as a key pathway to the blue-green economy.

Leveraging strategic partnerships among civil society, the private sector, policy makers, academia and funding agencies will further foster knowledge exchange on best practices and innovations, build synergies and support coordinated action to enhance resilience and scale up impacts.

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Our mission is to promote and facilitate stakeholder participation in the stewardship of natural resources in the Caribbean.

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