Integrating digital technologies and participatory tools to support coastal community resilience in Trinidad & Tobago (Tech4CoastalResilience)

Speyside Community Resilience Plan

April 30, 2025

Acknowledgements

CANARI would like to thank the Department of Marine Resources and Fisheries, Tobago House of Assembly for their support in conducting action planning in Speyside, Tobago, as well as the community and other key stakeholders from the public and private sector for generously giving of their time and sharing their knowledge and perspectives, to develop this community resilience plan.

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Cover photo: Aerial view of Speyside Beach, Tobago, Credit Shanice Mark 2024

1. Overview

The Speyside Community Resilience Plan aims to guide coastal planning and resilience actions and identify ways to reduce vulnerability and adapt to climate change and other coastal changes in Speyside, Tobago. It is based on the key findings from the vulnerability and capacity assessment in Speyside completed in January to October 2020 and the inputs from community residents and other key stakeholders from an action planning workshop held on July 19, 2024.

The Plan has been developed under the "Integrating digital technologies and participatory tools to support coastal community resilience in Trinidad and Tobago (Tech4CoastalResilience)" project, which is being implemented from 2023-2025 by the Caribbean Natural Resources Institute (CANARI) in partnership with the Fisheries Division, Ministry of Agriculture, Land and Fisheries and the Department of Marine Resources and Fisheries, Tobago House of Assembly (THA). The project aims to improve the resilience of vulnerable coastal communities to climate change impacts in Trinidad and Tobago (T&T). It is supported by the "Harnessing Innovative Technologies to Support Resilient Settlements on the Coastal Zones of the Caribbean (HIT RESET Caribbean)" programme. HIT RESET Caribbean is funded by the ACP Innovation Fund implemented by the Organization of African, Caribbean and Pacific States (OACPS) and European Union (EU).

2. Approach and methodology

The process to develop the Plan was facilitated by CANARI and the Department of Marine Resources and Fisheries, THA. It was designed to be interactive and participatory, engaging the community in practical exercises and discussions to support action planning for coastal resilience. See Appendix 1 for the agenda for the Speyside Community Action Planning workshop.

The process engaged fisherfolk, other coastal resource users and community-based organisations (CBOs), including the Speyside Fisherfolk Association, Tobago Unified Fisherfolk Association (TUFA), Speyside Eco-Marine Park Rangers (SEMPR), Environment Tobago and Environmental Research in Charlotteville (ERIC), as well as key government agencies including the Tobago Emergency Management Agency (TEMA), Department of Environment, THA and Environmental Management Authority. See Appendix 2 for the list of participants.

The Plan is based on findings from the vulnerability and capacity assessment in Speyside completed between January to October 2020. The assessment involved desk review and community scoping, participatory mapping and geographic information systems (GIS), household surveys and development of an impact and capacity matrix to collect data and better understand local impacts from climate change and other issues affecting the coast. The findings were reviewed, updated and validated as part of the action planning workshop in July 2024. See Appendix 3 for the vulnerability and capacity assessment findings and the summary poster here.

3. Priorities for Action

A range of actions to adapt and build coastal resilience have been identified as part of the Plan (see section 5 and Appendix 4 for further details). In particular, key climate-related impacts from coastal erosion, sargassum influxes, rising temperatures and extreme weather events (leading to increased run-off/siltation, water stress and heat stress) were highlighted by participants, affecting the fisheries and tourism sectors, health and education services and key infrastructure in Speyside. The following priorities for action have therefore been identified for short to medium term (1-6 years):

- Identifying a storage site, providing equipment/tools and training on best practices for regular clean-up of sargassum influxes by local community groups

- Restoring coral reefs and using artificial reefs to enhance marine biodiversity and resilience
- Fully operationalising the North East Tobago Marine Protected Area (NETMPA) to enhance conservation and sustainable management of coral reefs and other coastal ecosystems
- Reinforcing and expanding the seawall and constructing a breakwater for coastal protection
- Diversifying livelihoods for fisherfolk and other residents (e.g. fish processing, hydro/aquaponics, mariculture, collection and use of sargassum to create value-added/commercial products), including provision of training and equipment and tools
- Upgrading fish landing site and facility to enable safer boat hauling, storage for boats/gear and processing facilities (including ice machine and water tanks)
- Upgrading and maintaining drainage infrastructure to reduce flooding
- Increasing use of water storage and rainwater harvesting by local residents and businesses
- Developing and implementing a community early warning system and disaster preparedness plan for extreme weather
- Identifying a new suitable emergency shelter and ensuring facilities climate resilient (e.g. reinforced windows, hurricane straps, rainwater harvesting, air conditioning/cooling)

Prioritisation was based on the level of impact/risk to the community that the action can address, whether it benefits multiple sectors and community needs, and whether it can be implemented in the short to medium term.

The following priorities for action were highlighted as feasible options for support under Tech4CoastalResilience and other current projects, given the available timeframe and budget: small-scale drainage maintenance to reduce flooding (e.g. clearing blocked drains or installing simple check dams/silt traps); diversifying livelihoods for fisherfolk and other residents (e.g. fish processing, hydro/aquaponics, mariculture); increasing use of water storage tanks and rainwater harvesting by residents; and providing light equipment, tools and training on best practices for regular sargassum clean-up. CANARI and the Department of Marine Resources and Fisheries will follow up to refine and implement at least one of these actions.

4. Use of this Plan

This Plan serves as a guide for coastal planning and resilience actions in Speyside. It should be used and further operationalised by key government agencies, including the Coastal Zone Management Unit, Department of Marine Resources and Fisheries and TEMA in THA, Environmental Management Authority and Institute of Marine Affairs, CBOs and residents in Speyside and relevant civil society and private sector organisations to inform efforts to address climate change and other coastal changes. It is also aligned with, and contributes to, the National Adaptation Plan and Integrated Coastal Zone Management Policy Framework for Trinidad and Tobago.

Figure 1: Stakeholders from Speyside engaging in action planning activities *(Source: CANARI 2024)*

5. Summary of Speyside Community Resilience Plan

Note the table below includes only the key climate-related impacts and priorities for action identified and highlighted by participants. The full list of all the identified impacts and actions is in Appendix 4.

**= top priorities

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
Fisheries and marine resources					
<u>Sargassum influxes</u> Impacts • Disruptions to fishing operations as jetty and shoreline access blocked and fishing vessels unable to go out to fish, resulting in reduced income • Damage to engines, nets and other gear, and increased safety at sea risks for fishers • Blockage to shoreline access for recreational fishers and snorkelling/diving • Rotting sargassum, which releases hydrogen sulphide and ammonia gas, can affect health of fisherfolk, dive/tour operators and visitors along coast • Marine ecosystems, including mangroves, are	• ** Identification of storage site and provision of equipment/tools and training on best practices for regular clean-up of sargassum influxes by local community groups • Access to financial assistance/compensation and insurance for addressing damage to boats, engines and gear and for fisherfolk • Awareness raising on health and other issues related to sargassum influxes and Tobago Sargassum Response Plan • Establishment and implementation of regular air quality monitoring and early warning system for sargassum at Speyside to inform response	• Tobago House of Assembly (THA) – Division of Agriculture, Marine Affairs, Marketing and the Environment (DAMME) (co-lead) • THA – Department of Marine Resources and Fisheries (DMRF) (co-lead) • Speyside Fisherfolk Association (co-lead) • Tobago Emergency Management Agency (TEMA) • THA – Coastal Zone Management Unit (CZMU)/ Department of Environment, Climate Change and Energy • Institute of Marine Affairs (IMA)	• Expertise (marine science, disaster response, business development) • Funding • Equipment/tools (e.g. protective gear, machinery, booms for removal/ harvesting of sargassum) • Materials • Suitable storage areas	Short to medium term (1-6 years)	• Reduced loss and damage to fishing vessels, engines and gear from sargassum influxes • Reduced length of time that sargassum is stranded on beach • Increased number of fisherfolk engaged in alternative livelihoods

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
impacted by sargassum influx Vulnerable areas • Speyside Pier • Lucy Vale Bay and adjacent coastline along Lucy Vale Road Vulnerable groups • Fisherfolk • Recreational fishers (e.g. jetty anglers) • Community residents/households relying on fishing as an income or food source • Fishing-related businesses or businesses dependent on fish and marine resources, such as local restaurants, hotels and dive operators • Elderly, infants and others who suffer from respiratory diseases	• Diversification and development of alternative livelihoods (e.g. aquaculture, mariculture, collection and use of sargassum to create value-added/commercial products like liquid fertilizer, biofuels and building materials)	• Environmental Management Authority (EMA) • National Sargassum Task Force • THA - Division of Finance, Trade and Economy • THA - Tourism Division/ Tobago Tourism Agency • Speyside Village Council • All Tobago Fishing Association (ATFA) • Tobago Unified Fisherfolk Association (TUFA) • Fisherfolk • Dive/tour operators • Local community groups • Local entrepreneurs • Finance and insurance providers • Caribbean Fisheries Training and Development Institute (CFTDI) • University of the West Indies (UWI) • Caribbean Agricultural Research & Development Institute (CARDI)			

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
		• Inter-American Institute for Cooperation on Agriculture (IICA) • UN Food and Agriculture Organization (FAO)			
Coral bleaching due to rising sea surface temperatures Impacts • Degradation and die-off of coral reefs • Decline in fish stock in nearshore areas, including parrotfish and other key reef fish that disrupts the food web and affects ecosystem health • Algal overgrowth due to decline in herbivorous species like parrotfish, further stressing reefs • Decline in dive tourism and associated income • These impacts compounded by land-based runoff and unsustainable fishing practices (e.g. heavy use of spearfishing and fish pots) Vulnerable areas	• **Coral reef restoration and use of artificial reefs to enhance reef resilience and support marine biodiversity • **Fully operationalising the North East Tobago Marine Protected Area (NETMPA) to enhance conservation and sustainable management of coral reefs and other coastal ecosystems • **Development of alternative livelihoods for fisherfolk and other residents dependent on reefs and related fisheries (e.g. hydroponics/ aquaponics, aquaculture, mariculture), including training and provision of equipment and tools • Enforcement of rules and regulations, and awareness raising among fisherfolk, on sustainable fishing practices (e.g. catch and mesh size,	• Institute of Marine Affairs (IMA) (co-lead) • DMRF (co-lead) • Speyside Fisherfolk Association (co-lead) • CZMU/ Department of Environment, Climate Change and Energy • EMA • Speyside Village Council • ATFA • TUFA • Fisherfolk • Dive/tour operators • Speyside Eco-Marine Park Rangers (SEMPR) and other local community groups • Environmental Research Institute Charlotteville (ERIC), SpeSeas, CANARI and other NGOs • CFTDI • UWI • FAO	• Expertise (fisheries and marine science, ecosystem restoration, livelihood development, SCUBA diving) • Financing • Equipment (including vessels, SCUBA gear etc) • Materials (including coral spawn/fragments for restoration) • Labour (can be provided by local community groups for restoration) • Training programmes to support livelihood development	Short to medium term (1-6 years)	• Improved cover and health of coral reefs • Increased population of key reef fish in nearshore areas • Increased number of fisherfolk engaged in alternative livelihoods

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Dive sites, including Angel Reef and reefs around Goat Island and Little Tobago Vulnerable groups • Fisherfolk • Recreational fishers • Dive/tour operators • Small businesses e.g. hotels/guesthouses and restaurants relying on local fish supply and dive tourism • Households relying on fishing and dive tourism as income source	gear restrictions, and no-fish/alternative fishing zones) to prevent overexploitation and protect fish nurseries and key species	• United Nations Educational, Scientific and Cultural Organization (UNESCO)			
<u>Extreme weather</u> including heavy rainfall/storms, flooding, extreme heat and drought with related water stress Impacts • Damage and loss of boats, gear and fisheries-related infrastructure (e.g. Speyside jetty and fishing facility) due to storms and storm surge, rough seas and flooding • Safety at sea issues for fishers and divers, disruptions to operations and reduced income due to	• **Upgrade of fish landing site and facility to enable safer and more efficient boat hauling during heavy rainfall/ storms (e.g. constructing a slipway, providing a tractor) • Upgrade and maintenance of fishing facility to incorporate storage for boats, engines and gear and processing facilities (including ice machine and water storage tanks) • **Development of alternative livelihoods for fisherfolk and other	• DMRF (co-lead) • DIQUD (co-lead) • Speyside Fisherfolk Association (co-lead) • CZMU • EMA • Town and Country Planning Division • TEMA • THA - Division of Finance, Trade and Economy • Trinidad and Tobago Meteorological Service (TTMS) • Emergency responders - Fire Services, Speyside	• Expertise (coastal engineering, disaster response, business development) • Financing (significant amounts for fishing facility/ landing site upgrades) • Equipment (e.g. trailer/tractor to haul vessels, weather station, information and communication technology)	Short to medium term (1-6 years)	• Reduced costs from damage and loss of vessels, engines and gear and fishing facility • Reduced number of safety incidents reported by fisherfolk and divers • Increased number of fisherfolk engaged in alternative livelihoods

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
storms, rough seas and flooding • Water shortages and heat stress during hot, dry spells, impacting fishing operations particularly processing and vending (e.g. increased costs for ice and risk of spoilage) Vulnerable groups • Fisherfolk • Dive/tour operators • Small businesses e.g. hotel/guesthouses and restaurants relying on local fish supply and dive tourism • Households relying on fishing and dive tourism as an income source	residents (e.g. hydroponics/aquaponics, aquaculture, mariculture), including training and provision of equipment and tools • Safety at sea training, access to required equipment (e.g. GPS, VHF radio) and improved early warning systems (e.g. SMS and radio alerts) for fisherfolk and dive operators • Access to insurance for boats, engines, gear and personal insurance for fisherfolk to enhance financial resilience	Community Emergency Response Team (CERT) • Speyside Village Council • ATFA • TUFA • Fisherfolk • Dive/tour operators • Insurance providers • Telecommunication service providers • CFTDI • UWI • FAO	• Materials • Planning approvals/ environmental impact assessments • Training programmes to support livelihoods development		
Settlements and Infrastructure					
Extreme weather with heavy rainfall and strong winds leading to flooding and landslides Impacts • Damage and loss of homes, other property and key infrastructure (roads, schools and other public buildings) due to strong	• **Upgrade and maintenance of drainage infrastructure to enhance its capacity to handle heavy runoff and reduce flooding • **Tree trimming to reduce impact of fallen branches/trees in high-risk areas	• DIQUD (co-lead) • TEMA (co-lead) • Speyside Village Council (co-lead) • THA - Division of Settlements, Public Utilities and Rural Development • THA - Education Division • THA - Tourism Division/ Tobago Tourism Agency	• Expertise (engineering, construction, disaster management, water management) • Financing (significant amount for upgrading	Short to medium term (1-6 years)	• Reduced costs from damage and loss of property and infrastructure from floods and landslides • Reduced closure of schools and other key social services due to floods, landslides and

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
winds, fallen trees, landslides and flooding, which is exacerbated by poor drainage • Road blockages, leading to restricted access and mobility, and disruptions to telecommunications, power and other utilities due to strong winds, fallen trees, floods and landslides • Disruptions to schooling during flooding and landslides or need to use as emergency shelters • Increased risk of mosquito-borne diseases (e.g. dengue, zika) due to stagnant water in vacant homes • Damage to heritage sites and attractions, including trails for sightseeing and birdwatching, and decline in tourism and tourism-related income • Siltation of Speyside dam Vulnerable areas • Lucy Vale and Top Hill areas, which are impacted by landslides	• **Identification of a new suitable emergency shelter and ensuring facilities climate resilient (e.g. reinforced windows, hurricane straps, rainwater harvesting and storage tanks) • **Development and implementation of community early warning system for extreme weather and disaster preparedness plan • Retrofitting and enhancing climate resilience of schools and other public buildings to withstand extreme weather • Updating and enforcing building codes for residential and commercial properties to address extreme weather (e.g. roof design, height, and road setbacks) • Development of home-schooling kits to reduce the impact of school disruptions and ensure continuity in education	• EMA • Town and Country Planning Division • Emergency responders - Fire Services, Speyside CERT • Water and Sewerage Authority (WASA) • TTMS • Local residents and property owners • Local business owners • School principals • Insurance providers • Telecommunication service providers • Habitat for Humanity T&T • T&T Red Cross Society	drainage and retrofitting buildings) • Equipment/ tools (e.g. for tree trimming, digital access) • Materials (including instructional guides, digital resources) • Labour • Planning approvals/ environmental impact assessments		other extreme weather • Operational and climate-resilient emergency shelter for Speyside exists in a safe location

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Speyside High School, which is current emergency shelter, and Community Centre, which is alternative shelter Vulnerable groups • Residents • Business owners • Property owners	• Desilting/cleaning and regular maintenance of Speyside dam				
<u>Coastal erosion</u> from rough seas, storms and storm surge, and sea level rise Impacts • Damage and loss of homes, businesses and key infrastructure (roads and bridges) along coastline • Degradation and loss of beaches and coastal vegetation, which is exacerbated by use of heavy machinery for sargassum removal • Coastal flooding, which is exacerbated by poor drainage and heavy run-off • Disruptions to livelihoods and decline in income, particularly with damage to key infrastructure	• **Reinforcement and expansion of seawall and construction of a breakwater to protect high risk areas • Replanting of mangroves and other coastal vegetation (e.g. sea-grape, coconut trees, vetiver grass) to address erosion and sedimentation and protect shoreline • Updating and enforcing building codes (e.g. related to setbacks, drainage, raised floors etc.) to address erosion and sea level rise • Relocation of critical infrastructure/assets further inland or to higher ground, where feasible	• CZMU/ Department of Environment, Climate Change and Energy (co-lead) • DIQUD (co-lead) • Speyside Village Council (co-lead) • Local residents and property owners • Local business owners • IMA • EMA • Town and Country Planning Division • THA - Tourism Division/ Tobago Tourism Agency • THA - Division of Settlements, Public Utilities and Rural Development • TEMA	• Expertise (coastal engineering, construction, hydrology, ecosystem restoration) • Financing (significant amounts for upgrading drainage, seawall and breakwater) • Equipment • Materials • Seedlings for restoration • Labour (can be provided by local community groups for replanting) • Planning approvals/ environmental	Medium to long term (4-10 years)	• Reduced costs from damage and loss of property and infrastructure from coastal erosion and flooding • Increased extent and health of coastal vegetation

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
Vulnerable areas • Northern part of Tyrrel's Bay • Coastal roads - Lucy Vale road near Speyside Pier, portions of road from Speyside to Charlotteville, road to Indian Bay • Speyside Hill, which was paved and contributes to increased runoff and damage to roads Vulnerable groups • Residents living along coast • Business and property owners (e.g. Speyside Inn, Manta Lodge, restaurants) along coast		• SEMPR and other local community groups • ERIC, SpeSeas, IAMovement, CANARI and other environmental NGOs • Habitat for Humanity T&T • UWI	impact assessments		
Health, Education and Social Services					
<u>Dry spells/drought</u> Impacts • Reduced access to potable water affects residents, schools and other essential services, and businesses, including tourism (e.g. food and hospitality) • Limited water availability leads to sanitation issues,	• **Increased use of water storage tanks and rainwater harvesting for residential and commercial purposes • Desilting and maintenance of dams that provide Speyside's water supply • Upgrade and expansion of water storage capacity	• WASA (co-lead) • Speyside Village Council (co-lead) • DIQUD • THA - Division of Health, Wellness and Social Protection • THA - Division of Settlements, Public Utilities and Rural Development	• Expertise (water management, fire management, construction) • Finance (significant amounts for upgrading water infrastructure/ network) • Equipment • Materials	Short to medium term (1-6 years)	• Reduced incidence of water stress/ shortages reported by residents and businesses • Increased use of water storage tanks and rainwater harvesting to improve water supply

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
increasing the risk of waterborne diseases • Time and effort spent securing alternative water sources create additional burdens for households and businesses • Potential for community conflicts over scarce water resources and disruptions in access to food/essential goods • Increased risk of bush fires and related risks to health, safety and property Vulnerable groups • Residents without pipeborne water supply • Elderly and young children • Tourism-related and agriculture-related businesses • Vendors and other small businesses	and distribution networks for Speyside • Improved fire management, including training and provision of equipment/gear to community groups	• THA - Tourism Division • THA – Division of Food Security, Natural Resources, the Environment and Sustainable Development • Department of Environment, Climate Change and Energy • TEMA • Fire Services • Town and Country Planning Division • Chamber of Commerce • Local residents and property owners • Local businesses • SEMPR and local community groups • ERIC • Habitat for Humanity T&T	• Labour		

APPENDICES

Appendix 1: Speyside Community Action Planning Workshop Agenda

Integrating digital technologies and participatory tools to support coastal community resilience in Trinidad & Tobago (Tech4CoastalResilience)

Speyside Community Action Planning Workshop
July 19, 2024

CONCEPT NOTE & AGENDA

Background

The project, "Integrating digital technologies and participatory tools to support coastal community resilience in Trinidad and Tobago (Tech4CoastalResilience)", is being implemented from 2023-2024 by the Caribbean Natural Resources Institute (CANARI) in partnership with the Fisheries Division, Ministry of Agriculture, Land and Fisheries and the Department of Marine Resources and Fisheries, Tobago House of Assembly. It aims to improve the resilience of vulnerable coastal communities to climate change impacts in Trinidad and Tobago (T&T). It is supported by the "Harnessing Innovative Technologies to Support Resilient Settlements on the Coastal Zones of the Caribbean (HIT RESET Caribbean)" programme. HIT RESET Caribbean is funded by the ACP Innovation Fund implemented by the Organization of African, Caribbean and Pacific States (OACPS) and European Union (EU).

CANARI, the Fisheries Division, Ministry of Agriculture, Land and Fisheries and Department of Marine Resources and Fisheries, Tobago House of Assembly are conducting action planning workshops in ten coastal communities – Blanchisseuse, Carli Bay, Icacos, Mayaro, Matelot and Moruga in Trinidad and Castara, Roxborough, Speyside and Scarborough in Tobago – from June to August 2024 under the project. These workshops will involve validating the findings from the vulnerability and capacity assessments conducted in these communities to better understand local impacts from climate change and other issues affecting the coast, and prioritising actions to build local resilience. This will inform efforts to implement specific coastal resilience actions under the project and in the future.

Workshop goal and objectives

The goal of this workshop is to engage community residents in Speyside and other key stakeholders to review key climate impacts and vulnerabilities and prioritise adaptation strategies.

The specific objectives of the workshop are to:

- review findings from the vulnerability and capacity assessment completed in 2021 in Speyside in terms of key impacts and vulnerabilities related to climate change and other changes, including for the fisheries and tourism sectors and related livelihoods;
- conduct participatory action planning to improve understanding of and identify ways to reduce vulnerability and adapt to climate and other changes; and
- prioritise specific strategies to adapt and build coastal resilience in Speyside.

Workshop venue

The workshop will be held July 19, 2024, from 10am – 3:15pm at Speyside High School, Tobago.

Target group

The workshop will target 20-30 participants, including fisherfolk, hotel and tour operators, other coastal resource users and community-based organisations in Speyside. The project partners and government and civil society organisations involved in fisheries, coastal and marine management, climate change and disaster risk management in Speyside will also be engaged. This includes:

- key government agencies involved in adaptation, disaster risk management and coastal and marine resource management, including Department of Marine Resources and Fisheries, Coastal Zone Management Unit - Division of Infrastructure, Quarries and Urban Development, Institute of Marine Affairs and Tobago Emergency Management Agency;
- civil society organisations, including fisherfolk organisations, environmental non-governmental organisations (NGOs), women's, youth and other community groups; and
- private sector, including fisherfolk and hotel and tour operators.

Approach

The workshop will be facilitated by CANARI in collaboration with the Department of Marine Resources and Fisheries, Tobago House of Assembly. It will be designed to be interactive, engaging the community in practical exercises and discussions to support coastal resilience action planning.

Outputs

A local action plan for building coastal resilience will be developed based on the key findings from the vulnerability and capacity assessment in Speyside and the inputs from community residents and other key stakeholders. Specific strategies to adapt and build coastal resilience in Speyside will also be identified to be further implemented under the project.

Travel and meals

CANARI will cover the costs of the venue and meals for all participants. Local travel to Speyside may also be covered for civil society representatives where needed.

Provisional Agenda

July 19, 2024	
9:30 am	Registration of participants
10:00 am	Opening remarks, welcome and introductions Overview of the project and workshop objectives
10:30am	Presentation and Q&A – VCA findings for Speyside community Group discussion – Validating the VCA findings
12:00 pm	**Lunch**
12:45 pm	Introduction to participatory scenario planning Interactive exercise – Participatory Scenario Planning for Speyside
2:35 pm	Group discussion – Prioritising strategies to adapt and build Speyside's resilience
3:10 pm	Wrap up and next steps for project Closing remarks
3:15 pm	**End of workshop**

For more information, please contact CANARI via Candice Ramkissoon, Senior Technical Officer at candice@canari.org or Aditi Thanoo, Technical Officer at aditi@canari.org or call 638-6062

Appendix 2: Speyside Community Action Planning Workshop Participant List

July 19, 2024 | Speyside High School – AV Room | 10am-3:15pm

NO.	FULL NAME	ORGANISATION	TITLE	EMAIL
1	Susan Suchit	Speyside Eco-Marine Park Rangers (SEMPR)	Vice President	susansuchit@gmail.com
2	Bertrand Bikharry	Environment Tobago	Director	bertrand@environmenttobago.net / bertrnd@bhikarry.net
3	Shanice Mark	Environmental Research Institute Charlotteville (ERIC)	Assist. Programme Manager	ericecologist@eric-tobago.org
4	Jaime Hamilton	Trinidad & Tobago Red Cross Society (TTRCS)		hamiltonajaime@gmail.com
5	Ashlyn Lemessee	TTRCS		ajlemessee@gmai.com
6	Shermain Stephens	TTRCS	Member	Ssstephens90@gmail.com
7	Dayreon Mitchell	Tobago Emergency Management Agency (TEMA)	GIS Specialist	dayreon.mitchell@gov.tt
8	Shaunte Greene	TEMA	Planning Assistant	shaunte.greene03@gmail.com
9	Tamara Perez	TEMA		Tamarazedel3@gmail.com
10	Kelorn Robinson	TEMA	Logistics	kelornrobinson@gmail.com
11	Wayne Gary	Tobago Heritage Society / Waynes World Tours	Tour Guide	waynegary23@gmail.com
12	Delvin Smart	SEMPR	Member	mindelvinsmart@gmail.com
13	Jenise Kirk	Department of Marine Resources and Fisheries, THA	Fisheries Services	fso.dmrf@gmail.com / dmrf2010@gmail.com

14	Oshum Mills	Environmental Management Authority (EMA)	Technical Admin Assistant	oshunmills@gmail.com
15	Ricardo Mc Pherson	EMA	Admin Support	
16	Christine Scipio	SEMPR		purple.min.design@outlook.com
17	Tanoe Augustine	SEMPR		purple.min.design@outlook.com
18	Aria Murray	SEMPR		purple.min.design@outlook.com
19	Crystal Lawrence	Department of Environment, THA	Environmental Officer II	Og.lawrence.c.m@gmail.com
20	Simon Benjamin	Speyside Fisherfolk Association	Member	Slimy26@gmail.com
21	Allison Thomas	Tobago United Fisherfolk Association (TUFA)	Secretary	tufafisherfolkassociaton@gmail.com
22	Dexter Taylor	TUFA	President	tufafisherfolkassociaton@gmail.com
23	Ian Daly	TUFA	Committee Member	Iandaly6229@gmail.com
24	Welldon Mapp	ERIC	Dive Master	Welldonmapp27@gmail.com
25	Candice Ramkissoon	Caribbean Natural Resources Institute (CANARI)	Senior Technical Officer/ Facilitator	candice@canari.org
26	Aditi Thanoo	CANARI	Technical Officer/ Facilitator	aditi@canari.org

Appendix 3. Speyside Vulnerability and Capacity Assessment

Overview of community

An overview of the Speyside community is provided below, including the geography, demographics, socio-economic activities, and previous assessments in the area of relevance to climate change.

Speyside, Tobago
Geography The community of Speyside is located on the north eastern part of Tobago. It has a tropical climate, influenced by the north east trade winds. The dominant relief feature of the area is the Tobago Main Ridge highland area which slopes off steeply to the north east. Vegetation includes lower montane rainforest, lowland rainforest, littoral coastal woodland, wetlands, deciduous seasonal forest and secondary forest. The community lies along Tyrrel's Bay on the Atlantic Ocean coast. There are a number of offshore islands, including Little Tobago and Goat Island, and several coral reefs within the coastal region of Speyside, which support a thriving diving industry. These coral reefs and other coastal ecosystems are encompassed within the proposed Northeast Tobago Marine Protected Area (NETMPA).[1] There is one main road that traverses the village, the Windward Main Road, which is subject to a number of land slippages (Bachan, 2007). There is also a coastal seawall which is constructed along Tyrrel's Bay and Speyside Bay. The wall plays a critical function against coastal erosion, acting as a retaining wall for the Windward Main Road and protecting human settlements on the coast (Bachan, 2007).
Demographics Speyside has a population of approximately 1,100 (Jobe 2016). Number of males, females, elderly and youth were not readily available based on the last census in 2011. **Socio-economic activities** • The main livelihood activities include: fishing, tourism, farming and engagement in public sector programmes. The tourism industry is centered around the natural and cultural heritage of Speyside, with many natural attractions (e.g. Little Tobago Island, Goat Island, coral reefs for snorkeling/diving, beaches) and historical sites (e.g. Water Wheel, Bird of Paradise Inn, Mr. Lau Estate, Belmont Point Cannon). • Fishing is a major source of employment and livelihood. Approximately 40-60 fishers and 30 vessels operate in Speyside. Types of fishing include palange, fish pot, a la vive, banking, trolling and seine (Ottley, 2019), and the sector is quite dependent on the coral reefs and related fisheries. • There is one main fish landing site/jetty and a basic fish processing facility (Ottley, 2019). However, there is no gas station, ice-making facility or cold storage in the community. **Past assessments** • In a recent vulnerability assessment for T&T, Speyside's coastal area, and its fisheries and tourism sectors that are especially dependent on coral reefs, were noted as climate vulnerable and threatened by sea level rise, storms and surge, and sargassum influxes as well as increased sedimentation and nutrient loading (Clarke *et al.,* 2019).

[1] The proposed North-East Tobago Marine PA covers an estimated 59 280 ha, extending on Tobago along the entire coastal strip from Roxborough on the north-east coast, to Parlatuvier on the north-west coast and extending seawards for 11 km.

- A vulnerability assessment was also conducted in this community in 2007 (Bachan, 2007). From consultations, the community was identified as extremely vulnerable to environmental degradation, high wind, rain and hurricanes, social and health issues, unemployment, and youth issues.
- A knowledge, attitudes and practices (KAP) survey was conducted in coastal communities of Trinidad and Tobago, including Speyside, on tsunamis (Kanhai *et al.,* 2016).
- A strengths, weaknesses, opportunities and threats (SWOT) analysis was conducted to inform the application of the ecosystem approach to fisheries (EAF) in Tobago, including Speyside (Jobe, 2016).

Methodology

The vulnerability and capacity assessment (VCA) in Speyside was conducted from 2020-2021 by CANARI and a field team of four persons trained as part of the two-day VCA training workshop held in December 2019 in Trinidad[2].

Participatory geographic information systems (P-GIS) and impact and capacity matrix tools were applied in Speyside in a half-day workshop on July 30, 2020. Production of maps based on information gathered in the workshops was supported by a GIS expert who digitised and input maps into a GIS. The field team then conducted 77 surveys over four weeks. Surveys targeted fisherfolk, including fishers, fish processors and vendors, and selected households and individuals that are representative of various demographics, livelihood activities and sectors and vulnerable groups identified in the P-GIS and impact and capacity matrix exercises.

The field team included fisheries officers/data collectors operating in the community from the Department of Marine Resources and Fisheries, Tobago House of Assembly (THA), the CC4FISH National Project Coordinator for T&T, and community representatives. The field team collectively encompassed a mix of competencies, including in climate change, fisheries and socio-economic/community development, to ensure a holistic approach and effective implementation.

Figure 1. Participatory mapping in Speyside, Tobago. Photos 1-3 show participatory mapping process and resulting map highlighting relevant climate and other hazards, as well as vulnerable areas in Speyside, Tobago to the impacts of identified hazards.

Source: CANARI (2021).

[2] https://canari.org/wp-content/uploads/2018/02/CC4FISH-TT-VCA-Training-Workshop-Report-Jan2020.pdf

Key climate change impacts and vulnerabilities for Speyside

The specific findings from the applications of the three VCA tools in Speyside are detailed below.

Participatory mapping and GIS findings

Fisherfolk and other community stakeholders identified and mapped a range of climate-related hazards that they had experienced, or which will pose a significant risk to the community of Speyside, with a focus on fisheries-related assets and vulnerable areas and groups during the P-GIS exercise.

The key hazards included:

- Coastal erosion and flooding, which especially affects beaches, fisheries and tourism-related assets (e.g. fish landing site, jetty) and livelihoods, and residential areas leading to property damage and economic loss. It was noted that the local primary school, Speyside Anglican School, is one of the areas prone to flooding due to its location near a main drain and this is problematic as the school also serves as an emergency shelter.
- Coastal erosion also impacts coastal and marine ecosystems relevant to the fisheries sector, including coral reefs due to increased sedimentation.
- Sargassum influxes impact beaches, coral reefs and other marine ecosystems, and disrupt fisheries and tourism operations due to damage to boats, blockage of access to infrastructure (e.g. jetty), and the pungent smell (e.g. release of hydrogen sulphide and ammonia gas) and unsightliness.

The other non-climate hazards identified by stakeholders included:

- The loss of agricultural land due to housing development. This development means land that would have previously been used for alternative livelihood opportunities (e.g. agriculture) is now no longer available to do so.
- Greywater runoff leading to pollution of the coastal and marine environment.

The local knowledge captured through the P-GIS exercise was digitised and placed within a GIS for integration with scientific knowledge and other data. Figure 2 shows the GIS map developed through digitisation of the annotated satellite imagery maps created during exercise.

Figure 2. Participatory map of Speyside developed through discussions with community stakeholders on key climate-related hazards, impacts and vulnerabilities.

Source: CANARI (2021).

Local knowledge data provided by stakeholders in Speyside, Tobago during the 'Workshop for the Vulnerability and Capacity Assessment of Speyside' (July 30, 2020). Map created by CANARI (2021) using EPSG:32620; Google Earth (13/03/2015), Trinidad and Tobago. 11°17'45.59"N, 60°31'53.88"W, Eye alt 1.44km. CNES 2021, Airbus 2021. https://earth.google.com [01/10/2020].

Points of interest

#	**Description**
1	"Washing machine" out in front Little Tobago where Caribbean Sea and Atlantic Ocean meet and waters are turbulent
2	Goat Island has a reef important for scuba diving (Angel Reef in front and Japanese Gardens to the west of the island)
3	Grey water
4	Grey water drainage which adds to the stench of the sargassum. Septic water also flows into this drain.
5	During an influx of sargassum, vessels are pulled ashore or remain in the water

Impact and capacity matrix findings

Community stakeholders ranked the climate and other related hazards that they had identified and their impacts, including on the fisheries sector and vulnerable areas and groups, during the impact and capacity matrix exercise. Additionally, current or potential coping and adaptation strategies were identified for these impacts.

For Speyside, stakeholders highlighted storms and storm surge and sargassum influxes as the hazards with the most significant impacts on their livelihoods and infrastructure and as priorities to address. The identification of storms and storm surge as a top hazard in Speyside is not surprising, given their location on the windward coast of Tobago where they are exposed to the southern margins of the Atlantic Hurricane belt. Most recently, the community suffered impacts from Tropical Storm Karen in September 2019. Impacts included damage to or loss of fishing boats, gear and the jetty and safety at sea issues for fishers. Tourism operations, such as hotels and restaurants and attractions such as coral reefs and other diving sites, were also noted as being highly vulnerable to the impacts of storms and storm surge. Sargassum influxes adversely impacted both the fisheries and tourism sectors as well. Impacts included damage to boat engines and gear for fishers and dive/tour operators and loss of income due to disruptions to fishing and tourism operations.

Other hazards and their impacts were also discussed, including from the COVID-19 pandemic where stakeholders noted loss of livelihoods and income due to business closures or reduced opening hours and restrictions related to public gathering, mobility and access to beaches and key tourist attractions.

Coping and adaptation strategies were discussed for the two priority hazards identified by stakeholders. This included development of infrastructure such as a slipway or provision of equipment such as a tractor in order to haul boats to safety; improved communications and early warning systems; and development of a community preparedness and recovery plan to address these hazards. In terms of sargassum influxes, stakeholders also suggested provision of equipment/tools for clean-up of sargassum influxes on an regular basis (e.g. daily) by the local community to avoid it piling up and requiring more expensive, heavy equipment to clear the sargassum. They further suggested research and development to effectively collect, store and use sargassum locally and commercially.

Table 1 shows detailed matrix including other notable hazards impacting the community such as pollution and the current COVID-19 pandemic.

Table 1. Impact and capacity matrix for Speyside, Tobago

Key:	3 – High Impact	2 – Medium Impact	1 – Low impact	0 – No impact

Key assets	**Ranking of hazards**							
	storms and storm surge*	sargassum*	coastal erosion	pollution (greywater)	pollution (marine and other litter)	Sahara dust	COVID-19	ocean currents
Fishing boats	3	3	1	1	1	1	1	1
Fishing gear	3	3	1	1	1	1	1	1
Fishers	3	3	2	2	2	2	2	3
Spearfishers	3	3	2 (poor visibility)	2	2	1	2	3
Dive & tour operators	3	3	1	2	2	2	3	3
Jetty	3	2	3	1	1	1	1	1
Other landing sites	3	3	3	1	2	1	1	1
Fishing facility	3	1	2	1	1	1	1	1
Hotels & restaurants	3	3	2	2	2	2	3	1
Fishing grounds	3	2	2 (poor visibility)	2	2	2	1	1
Coral reefs	3	3	3	3	2	2	1	1
Seagrass	2	3	2	2	2	1	1	1
Total	**35**	**32**	**24**	**20**	**20**	**17**	**18**	**18**
Potential coping/adaptation strategies?	Build slipway or provide tractor to community for hauling boats; Improve communications and early warning system (e.g. SMS and radio); Develop and implement community preparedness and recovery plan; Identify new, safe emergency shelter (besides school that is vulnerable)	Provide equipment/ tools for beach clean-up on a regular basis (before sargassum piles up) by local community groups; Research and development to collect, store and use sargassum locally and commercially						

Source: CANARI (2021).

Survey findings

A total of 77 surveys were administered in Speyside, with 38 percent of respondents being female and 58 percent male. 21 percent of survey respondents did not indicate their age. Of those who indicated age, 23 percent were aged 20-39, 30 percent were aged 40-59, and 26 percent were over 59. Responses disaggregated by age/gender showed no significant difference in responses between groups.

The majority of survey respondents in Speyside noted 'other' as their main source of income (33 percent), followed by the public sector (31 percent) fisheries sector (17 percent) and agriculture and tourism sectors (10 percent each). In terms of secondary sources of income, 51 percent of respondents noted 'other', while 18 percent indicated fisheries, 9 percent indicated tourism, 8 percent indicated agriculture and 6 percent indicated the public sector. These other sources of income included self-employment, pension and the National Insurance Scheme (NIS). 13 percent of respondents were not employed.

Table 2. Sources of Income for Speyside survey respondents

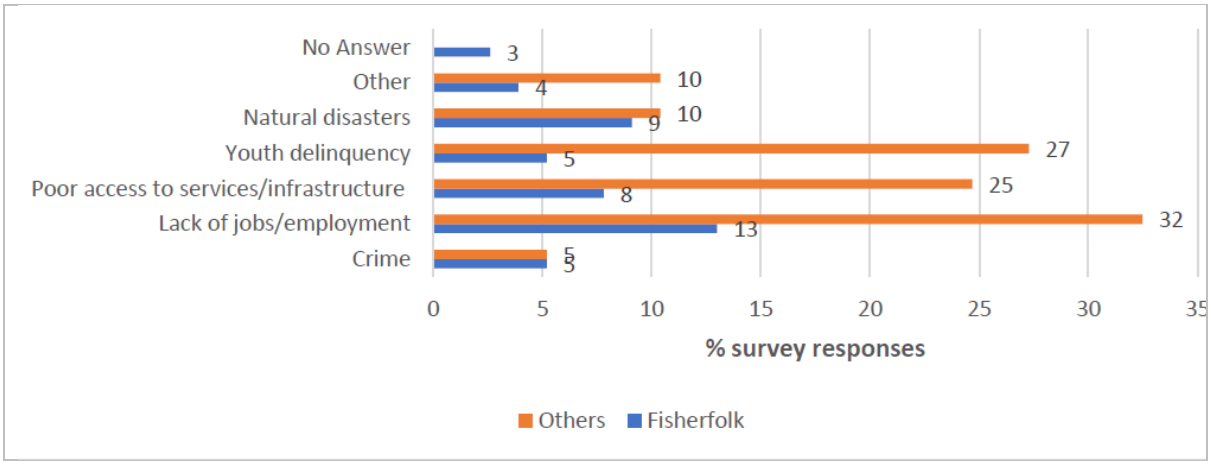
Source of income	agriculture	fisheries	public sector	tourism	other	no answer
Main source	10%	17%	31%	10%	33%	0%
Secondary source	8%	18%	6%	9%	51%	9%

Source: CANARI (2021)

The majority of survey respondents in Speyside working within the fisheries sector are male and ranging from 20-59 years. Survey respondents, who were female, largely indicated income sources from self-employment and pensions or worked in the public sector.

Lack of jobs/employment was the main problem identified by Speyside respondents (45 percent), followed by poor access to services and infrastructure (32 percent) and youth delinquency (32 percent). Respondents also highlighted natural hazards (19 percent) and crime (10 percent) as issues. Generally, fisherfolk and respondents involved in other sectors highlighted similar problems. However, fisherfolk identified natural hazards as a main problem, which was only second to lack of jobs/employment (Figure 3).

Figure 3. Main problems affecting Speyside respondents' households and livelihoods.

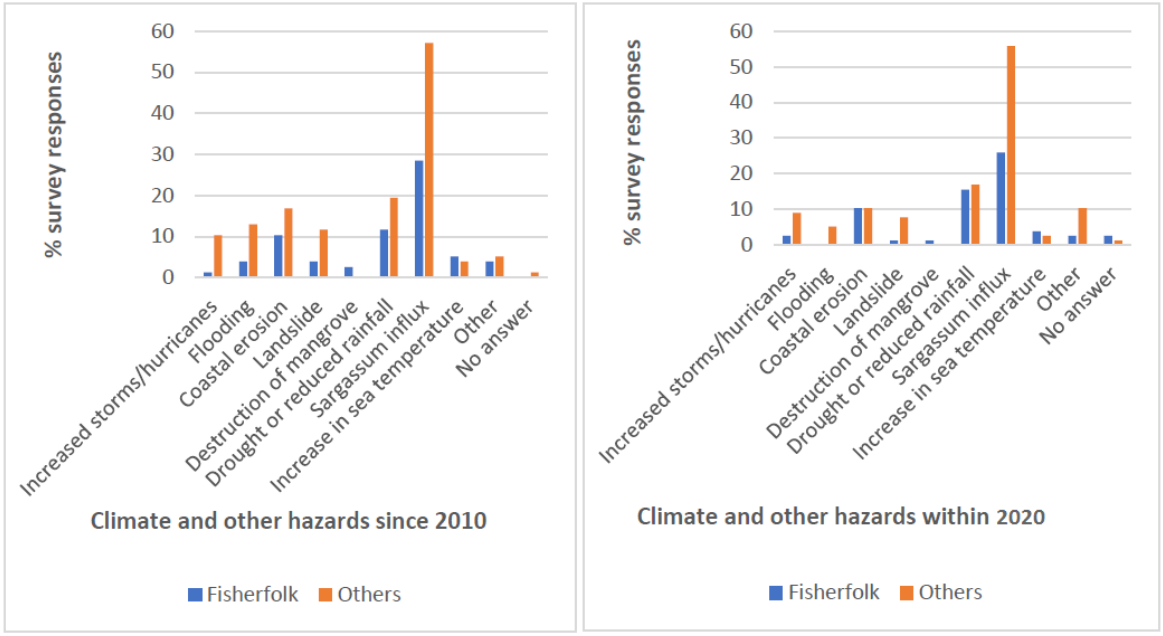


Source: CANARI (2021).

Climate and other hazards affecting the Speyside community

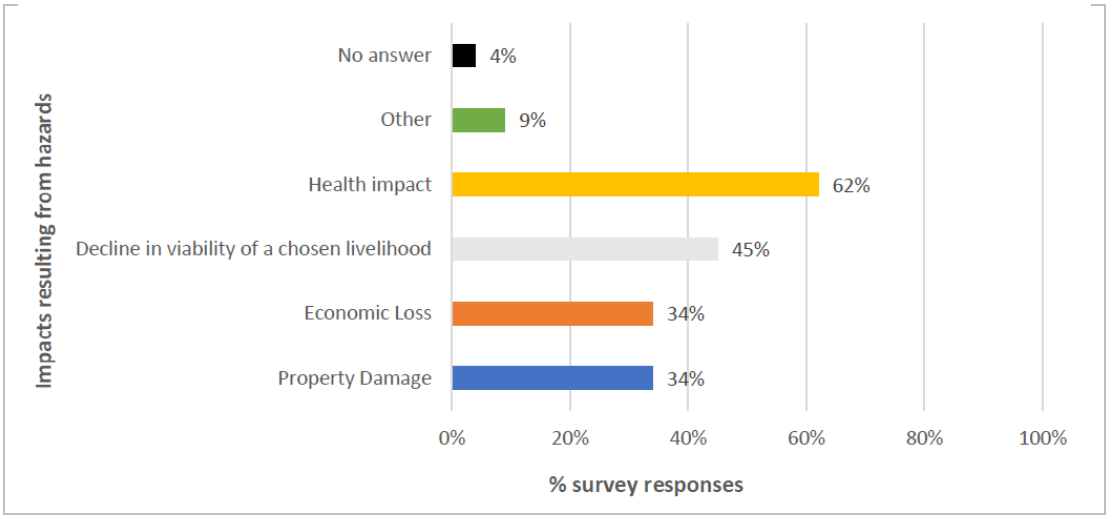
Sargassum influxes were noted as the main hazard affecting Speyside survey respondents within the last 12 months (82 percent) and since 2010 (86 percent). Drought and reduced rainfall and coastal erosion were also identified as key hazards. The highlighting of drought/reduced rainfall as a key hazard is notable as it was not highlighted in the P-GIS and impact and capacity matrix exercises that targeted a smaller subset of stakeholders. Additionally, only fisherfolk identified destruction of mangroves as a hazard to their households and livelihoods. This is likely due to mangrove ecosystems playing an important role as fish nurseries and supporting the fisheries sector (Figure 49). Respondents indicated that they experienced health impacts (62 percent), decline in viability of livelihoods (45 percent), economic loss (34 percent) and property damage (34 percent) from the identified hazards (Figure 5).

Figure 4. Climate and other hazards affecting households or livelihoods in Speyside since 2010 and within 2020.



Source: CANARI (2021).

Figure 5. Resulting impacts from climate and related hazards affecting Speyside respondents.

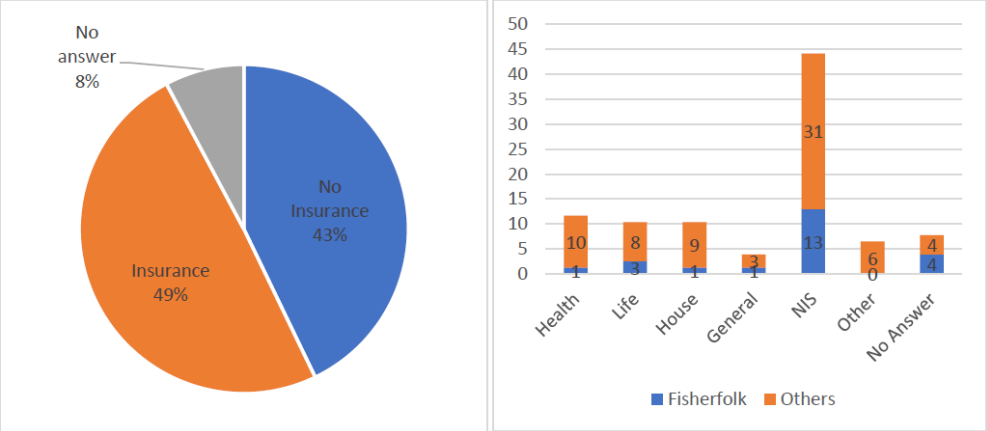


Source: CANARI (2021).

Recovery methods and coping and adaptation strategies

Of those surveyed, 38 percent of respondents had taken 24+ months to recover from identified hazards and their impacts, 25 percent indicated they recovered in less than six months, and 25 percent indicated they were still recovering. There was no response from 12% of respondents. 49 percent had insurance to support recovery, while 43 percent did not. Of those that had insurance, 44 percent had NIS, 11 percent possess health and life insurance and 10 percent possess house insurance. Most respondents indicating insurance were not fisherfolk. About 13 percent of fisherfolk had NIS as insurance (Figure 6).

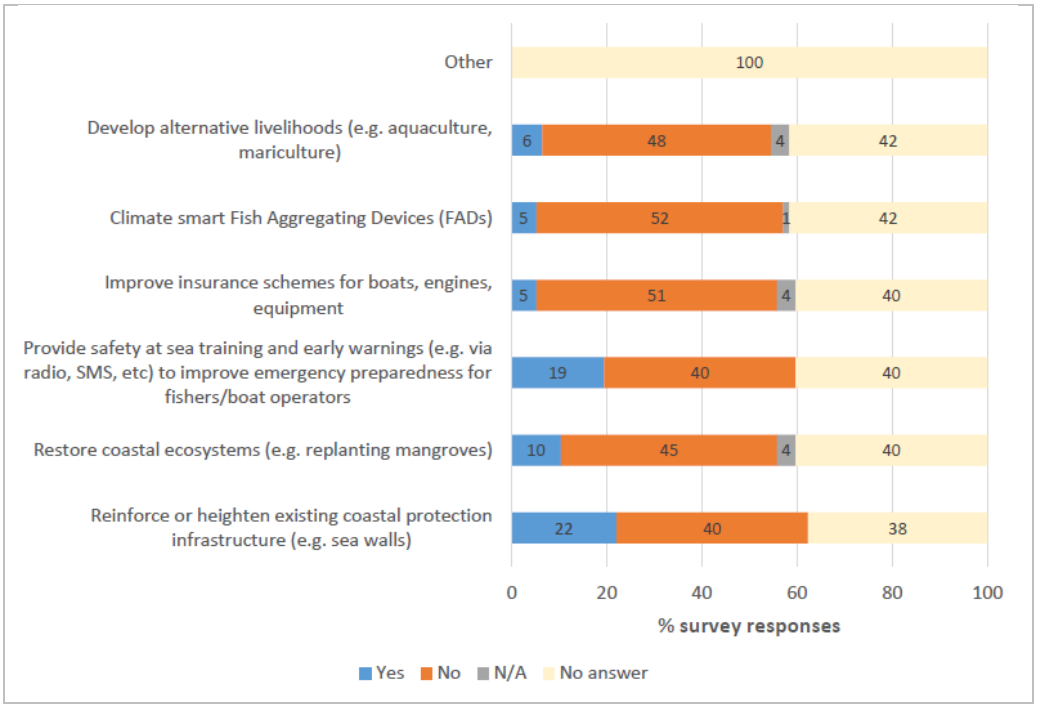
Figure 6. Insurance status and type for Speyside respondents.



Source: CANARI (2021).

While about half of Speyside respondents noted adaptation measures that have been implemented, other respondents indicated that no measures had been implemented. In terms of the coastal and marine zone, adaptation measures identified by respondents included reinforcement of coastal protection infrastructure (22 percent), safety at sea measures (19 percent), restoration of coastal ecosystems (10 percent) and development of alternative livelihoods (6 percent). See Figure 7.

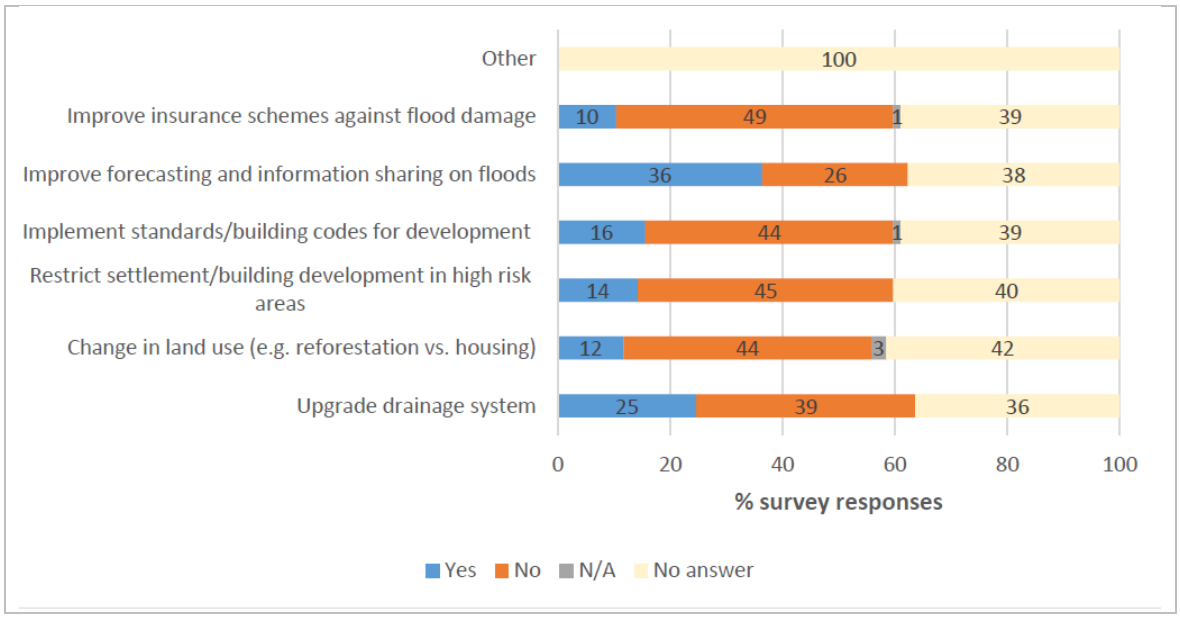
Figure 7. Coastal and marine zone adaptation measures for Speyside.



Source: CANARI (2021).

In terms of flood protection, identified adaptation measures included improved forecasting and information sharing on floods (36 percent of respondents), drainage system upgrades (25 percent of respondents), implementation of building codes (16 percent of respondents) and restriction of building development in high risk areas (14 percent of respondents; Figure 8).

Figure 8. Flood protection and adaptation measures for Speyside.

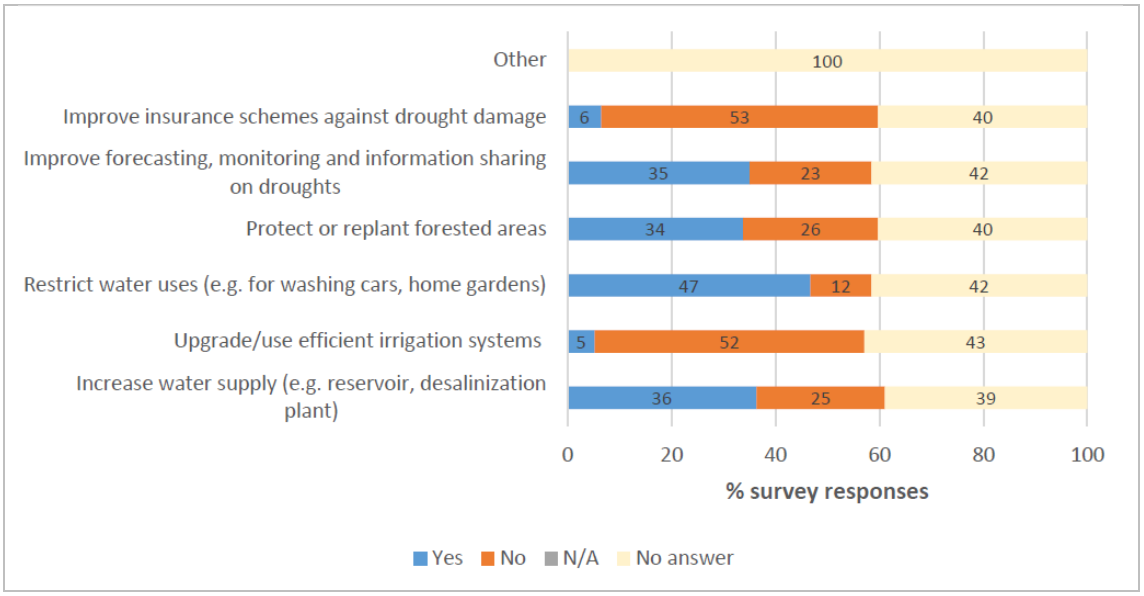


Source: CANARI (2021).

For drought/low flow protection, adaptation measures identified by respondents included implementation of restrictions in water use (47 percent), increased water supply (36 percent),

improved forecasting and information sharing on droughts (35 percent) and protection or replanting of forested areas (34 percent) (Figure 9). Notably, stronger implementation of adaptation measures for drought or reduced rainfall were indicated by respondents than for the coastal and marine zone or floods.

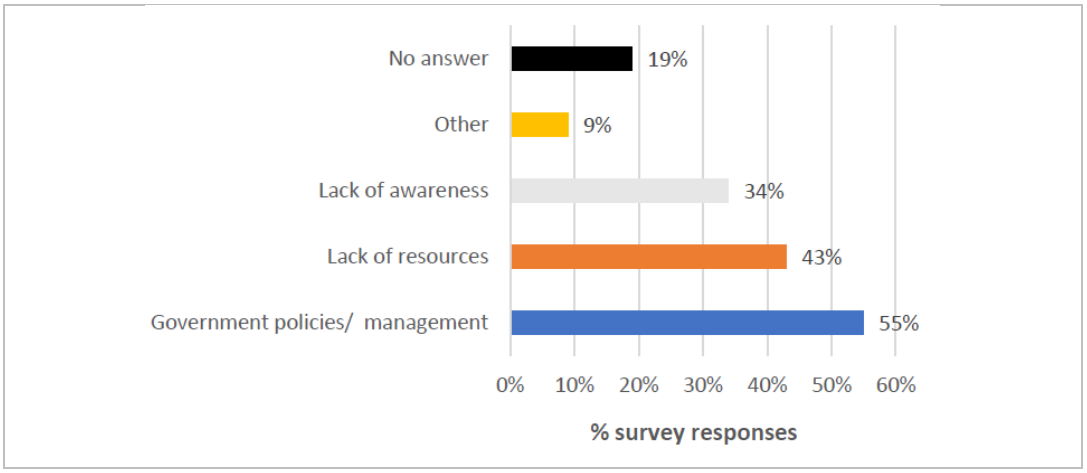
Figure 9. Drought protection and adaptation measures for Speyside.



Source: CANARI (2021).

In terms of main barriers to implementing adaptation measures in Speyside, 55 percent of respondents indicated weak government policies/management, 43 percent indicated lack of resources and 34 percent indicated lack of awareness as barriers (Figure 10).

Figure 10. Main barriers to putting in place measures to address the impacts identified in Speyside.



Source: CANARI (2021).

Summary of findings

A summary of the key climate change impacts, vulnerabilities and adaptation priorities for Speyside is outlined in Table 3.

Table 3. Key climate change impacts, vulnerabilities and adaptation priorities identified by Speyside stakeholders

Climate-related hazards	Key impacts	Vulnerable groups and areas	Priorities for adaptation
Coastal and marine biodiversity and ecosystems			
• Storms and storm surge • Rough seas • Sargassum influx • Coastal erosion and flooding	• Coastal erosion and flooding impacting beaches and leading to degradation/ loss of coastal vegetation. • Increased sedimentation and damage to coral reefs and other nearshore marine ecosystems. • Marine ecosystems impacted by influx of sargassum including coral reefs.	• The coastline of Speyside including beaches and coastal vegetation and related biodiversity. • Coral reef ecosystems which may be inundated with sargassum influxes or impacted by sedimentation as a result of coastal erosion. • Dive/tour operators dependent on health of coral reefs and related biodiversity for their operations.	• Improved conservation and sustainable management of coastal and marine ecosystems (e.g. via NETMPA). • Provision of equipment/ tools for clean-up of sargassum influxes on a regular basis (before piles up) by local community groups. • Research and development to effectively collect, store and use sargassum locally and commercially.
Livelihoods and socio-economic practices			
• Storms and storm surge • Rough seas • Coastal erosion and flooding • Inland flooding along rivers • Sargassum influx • Drought/ reduced rainfall	• Damage and loss of fishing boats, gear and fisheries-related infrastructure (e.g. jetty and fishing facility) due to coastal erosion and flooding from rough seas, storms and storm surge and from sargassum influxes. • Disruption to fishing operations and reduced income due to storms, rough seas and sargassum influxes. • Damage and loss of community	• Fisherfolk in Speyside and those dependent on the fisheries sector for their livelihoods (e.g. fishers, boat owners, vendors), including their family members dependent on their income. • Businesses owners and employees that have property and/or work in coastal and low-lying areas prone to coastal erosion and flooding. • Property owners and households, including	• Building slipway or providing a tractor to community for hauling boats. • Improving communications and early warning system (e.g. via SMS and radio) for extreme weather. • Identifying new, safe emergency shelter (besides Speyside

Climate-related hazards	Key impacts	Vulnerable groups and areas	Priorities for adaptation
	infrastructure and disruptions to businesses and schools in low-lying areas as a result of coastal and flash flooding due to storms and storm surge.	those with children that attend the Speyside Anglican School, impacted by coastal and flash flooding. • Dive/tour operators and others reliant on tourism-based livelihoods impacted by disruptions from storms, rough seas, sargassum influxes and drought.	Anglican School that is vulnerable). • Developing and implementing community preparedness and recovery plan. • Provision of equipment/ tools for clean-up of sargassum influxes on a regular basis (before piles up) by local community groups. • Research and development to effectively collect, store and use sargassum locally and commercially.
Settlements and infrastructure			
• Storms and storm surge • Rough seas • Coastal erosion and flooding • Sargassum influx	• Property damage (e.g. businesses and residential homes) or damage/loss of coastal infrastructure (e.g. jetty, fishing facility, roads) due to coastal erosion and flooding from rough seas, storms and storm surge. • Damage or blockage of access to jetty and other coastal infrastructure due to sargassum influxes.	• Jetty and fishing facility. • Community infrastructure (e.g. roads, schools and other buildings) near coast or low-lying areas. • Residential buildings, and their property owners and residents, near to coast or low-lying areas. • Tourism-related businesses (e.g. bars, restaurants, guesthouses/ hotels) and their assets near to coast or low-lying areas.	• Improving communications and early warning system (e.g. SMS and radio) for extreme weather. • Developing and implementing community preparedness and recovery plan. • Provision of equipment/ tools for clean-up of sargassum influxes on a regular basis (before piles up) by local

Climate-related hazards	Key impacts	Vulnerable groups and areas	Priorities for adaptation
			community groups.

Source: CANARI (2021).

Stakeholder Validation

A validation exercise was conducted in Speyside as part of the action planning workshop on July 4, 2024, to determine if there were any significant changes to the key climate change impacts and vulnerabilities identified in the VCA in 2020-2021.

Below is a summary of updates shared by community residents:

Climate and disaster resilience issues

- More extreme weather events were noted, including high winds, rough seas and increased frequency of secondary hazards such as landslides (notably in Lucy Vale and Top Hill).
- While sargassum is currently not a regular issue, large influxes remain a concern, necessitating means for proper removal, storage and utilisation to prevent beach degradation. THA has a Sargassum Response Plan in place, but not clear how being actioned. Notably, fishers are adapting to sargassum's presence, with some observed benefits to certain fish populations. Additional adaptation strategies were noted e.g. use of booms.
- Poor drainage systems, which lack the capacity to deal with heavy runoff, and heavy machinery use for sargassum removal, which impacts the beach profile, are accelerating coastal erosion. Coastal erosion has impacted roads e.g., the road to Indian Bay. Remedial work (e.g., gabion baskets) has been done in small sections, but further intervention is needed. Revegetation (e.g. using coconut trees, vetiver grass) being considered to mitigate erosion.
- Infrastructure concerns, including deteriorating roadways, due to increased runoff. The paving of Speyside Hill was noted as contributing to runoff issues and coastal degradation.
- In terms of local disaster risk reduction and management capacity, a Community Emergency Response Team (CERT) was noted as existent and functioning in the community. Speyside CERT technicians are trained as emergency medical technicians (EMTs) and have vehicles and a designated building. The Speyside High School is temporarily being used as an emergency shelter, but location of a new/more suitable shelter is still being determined. The community centre was being considered but is located close to the sea.

Coastal and marine management issues

- Concerns were raised about coral reef degradation due to overfishing, particularly the use of fish pots and spear fishing. This has significantly impacted parrotfish populations, for example at Angel Reef dive site near Blue Waters Inn in Speyside. These practices threaten reef health and have broader implications for tourism.
- The need for stronger reef and fisheries protection measures was emphasised, including enforcement of regulations along with enhanced community awareness. The importance of designating the area as a protected area was noted and it is understood that supporting documentation is currently being developed for NETMPA.
- Other biodiversity concerns were mentioned, such as degradation of the mangroves behind Speyside School, declining bird populations that are important for eco-tourism, and impacts to reef biodiversity from diving activities. Locals have reported fewer sightings of lobsters and manta rays.
- In general, a disconnection among different resource uses/users was noted.

Water management issues

- Increased water stress was being experienced in the community. While there are ongoing rainwater harvesting efforts e.g. through NGOs such as Habitat for Humanity T&T and Environmental Research Institute Charlotteville (ERIC), previous initiatives were less impactful. Water storage interventions, mainly increasing tanks, are also underway, but there is a need for greater community awareness on water usage and reducing demand.
- The Speyside dam is frequently clogged with silt, reducing water capacity. There is a custom of burning trees in the dry season, which contributes to increased hillside runoff and erosion and exacerbates the siltation problem. More regular cleaning of the dam is needed, although the financial constraints in addressing this were noted.

Socio-economic issues

- Population decline in Speyside has led to an increase in vacant homes, which may contribute to higher risk from dengue and other vector-borne diseases. Additionally, loose galvanize on these buildings poses a hazard during strong winds.
- Alternative livelihoods needed, especially for young people given declining interest in fishing.
- No significant agricultural practices are being undertaken in the area. There is interest in building local capacities and expanding opportunities e.g. via training in aquaponics and fish processing.
- The eco-tourism sector is growing but requires additional training and education. Training is available for tour guiding, but broader support is needed for sustainable employment.
- Key community infrastructure, which locals are dependent on for livelihoods or safety, need to be addressed more quickly and efficiently e.g. the status of construction of a slipway for fisherfolk use is unclear. The community centre, which is being considered for use as the new shelter, is undergoing refurbishment but not yet completed.

Based on the above, community residents re-emphasized the need for adaptation priorities previously identified, particularly:

- Speeding up the building of a slipway or providing a tractor/equipment for hauling in boats for safe storage
- Confirming a new, safe emergency shelter for the community
- Developing and implementing a community disaster preparedness and recovery plan
- Providing equipment and resources for clean-up of sargassum influxes on a regular basis by local community groups

They also recommended additional actions to adapt and build resilience:

- Diversifying livelihood options for fishers – This includes upgrading the fishing facility to incorporate storage and processing facilities and providing training in fish processing
- Improving drainage infrastructure in the community capable of handling runoff to help reduce erosion/degradation
- Tree trimming at high-risk locations to reduce impacts to households and other community buildings from severe weather
- Improving community water access and storage by further increasing water tanks and rainwater harvesting, particularly for residential use
- Investing in indoor cooling systems (e.g. fans, air conditioning) to help address risks of heat stress in schools and other key community buildings due to rising temperatures/extreme heat.

Appendix 4. Speyside Community Resilience Plan

Bold = priority impacts and actions; ** = top priorities

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
Fisheries and marine resources					
<u>Sargassum influxes</u> **Impacts** • **Disruptions to fishing operations as jetty and shoreline access blocked and fishing vessels unable to go out to fish, resulting in reduced income** • **Damage to engines, nets and other gear, and increased safety at sea risks for fishers** • **Blockage to shoreline access for recreational fishers and snorkelling/diving** • **Rotting sargassum, which releases hydrogen sulphide and ammonia gas, can affect health of fisherfolk, dive/tour operators and visitors along coast** • **Marine ecosystems, including mangroves, are**	• **** Identification of storage site and provision of equipment/tools and training on best practices for regular clean-up of sargassum influxes by local community groups** • **Access to financial assistance/compensation and insurance for addressing damage to boats, engines and gear and for fisherfolk** • **Awareness raising on health and other issues related to sargassum influxes and Tobago Sargassum Response Plan** • **Establishment and implementation of regular air quality monitoring and early warning system for sargassum at Speyside to inform response**	• **Tobago House of Assembly (THA) – Division of Agriculture, Marine Affairs, Marketing and the Environment (DAMME) (co-lead)** • **THA – Department of Marine Resources and Fisheries (DMRF) (co-lead)** • **Speyside Fisherfolk Association (co-lead)** • **Tobago Emergency Management Agency (TEMA)** • **THA – Coastal Zone Management Unit (CZMU)/ Department of Environment, Climate Change and Energy** • **Institute of Marine Affairs (IMA)**	• **Expertise (marine science, disaster response, business development)** • **Funding** • **Equipment/tools (e.g. protective gear, machinery, booms for removal/ harvesting of sargassum)** • **Materials** • **Suitable storage areas**	**Short to medium term (1-6 years)**	• **Reduced loss and damage to fishing vessels, engines and gear from sargassum influxes** • **Reduced length of time that sargassum is stranded on beach** • **Increased number of fisherfolk engaged in alternative livelihoods**

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
impacted by sargassum influx Vulnerable areas • Speyside Pier • Lucy Vale Bay and adjacent coastline along Lucy Vale Road Vulnerable groups • Fisherfolk • Recreational fishers (e.g. jetty anglers) • Community residents/households relying on fishing as an income or food source • Fishing-related businesses or businesses dependent on fish and marine resources, such as local restaurants, hotels and dive operators • Elderly, infants and others who suffer from respiratory diseases	• Diversification and development of alternative livelihoods (e.g. aquaculture, mariculture, collection and use of sargassum to create value-added/commercial products like liquid fertilizer, biofuels and building materials)	• Environmental Management Authority (EMA) • National Sargassum Task Force • THA - Division of Finance, Trade and Economy • THA - Tourism Division/ Tobago Tourism Agency • Speyside Village Council • All Tobago Fishing Association (ATFA) • Tobago Unified Fisherfolk Association (TUFA) • Fisherfolk • Dive/tour operators • Local community groups • Local entrepreneurs • Finance and insurance providers • Caribbean Fisheries Training and Development Institute (CFTDI) • University of the West Indies (UWI) • Caribbean Agricultural Research &			

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
		Development Institute (CARDI) • Inter-American Institute for Cooperation on Agriculture (IICA) • UN Food and Agriculture Organization (FAO)			
<u>Coral bleaching</u> due to rising sea surface temperatures Impacts • Degradation and die-off of coral reefs • Decline in fish stock in nearshore areas, including parrotfish and other key reef fish that disrupts the food web and affects ecosystem health • Algal overgrowth due to decline in herbivorous species like parrotfish, further stressing reefs • Decline in dive tourism and associated income • These impacts compounded by land-based runoff and unsustainable fishing practices (e.g. heavy use of spearfishing and fish pots)	• **Coral reef restoration and use of artificial reefs to enhance reef resilience and support marine biodiversity • **Fully operationalising the North East Tobago Marine Protected Area (NETMPA) to enhance conservation and sustainable management of coral reefs and other coastal ecosystems • **Development of alternative livelihoods for fisherfolk and other residents dependent on reefs and related fisheries (e.g. hydroponics/ aquaponics, aquaculture, mariculture), including training and provision of equipment and tools • Enforcement of rules and regulations, and awareness	• Institute of Marine Affairs (IMA) (co-lead) • DMRF (co-lead) • Speyside Fisherfolk Association (co-lead) • CZMU/ Department of Environment, Climate Change and Energy • EMA • Speyside Village Council • ATFA • TUFA • Fisherfolk • Dive/tour operators • Speyside Eco-Marine Park Rangers (SEMPR) and other local community groups • Environmental Research Institute Charlotteville (ERIC), SpeSeas, CANARI and other NGOs • CFTDI	• Expertise (fisheries and marine science, ecosystem restoration, livelihood development, SCUBA diving) • Financing • Equipment (including vessels, SCUBA gear etc) • Materials (including coral spawn/fragments for restoration) • Labour (can be provided by local community groups for restoration) • Training programmes to support livelihood development	Short to medium term (1-6 years)	• Improved cover and health of coral reefs • Increased population of key reef fish in nearshore areas • Increased number of fisherfolk engaged in alternative livelihoods

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
Vulnerable areas • Dive sites, including Angel Reef and reefs around Goat Island and Little Tobago Vulnerable groups • Fisherfolk • Recreational fishers • Dive/tour operators • Small businesses e.g. hotels/guesthouses and restaurants relying on local fish supply and dive tourism • Households relying on fishing and dive tourism as income source	raising among fisherfolk, on sustainable fishing practices (e.g. catch and mesh size, gear restrictions, and no-fish/alternative fishing zones) to prevent overexploitation and protect fish nurseries and key species	• UWI • FAO • United Nations Educational, Scientific and Cultural Organization (UNESCO)			
Extreme weather including heavy rainfall/storms, flooding, extreme heat and drought with related water stress Impacts • Damage and loss of boats, gear and fisheries-related infrastructure (e.g. Speyside jetty and fishing facility) due to storms and storm surge, rough seas and flooding	• **Upgrade of fish landing site and facility to enable safer and more efficient boat hauling during heavy rainfall/ storms (e.g. constructing a slipway, providing a tractor) • Upgrade and maintenance of fishing facility to incorporate storage for boats, engines and gear and	• DMRF (co-lead) • DIQUD (co-lead) • Speyside Fisherfolk Association (co-lead) • CZMU • EMA • Town and Country Planning Division • TEMA • THA - Division of Finance, Trade and Economy	• Expertise (coastal engineering, disaster response, business development) • Financing (significant amounts for fishing facility/ landing site upgrades) • Equipment (e.g. trailer/tractor to	Short to medium term (1-6 years)	• Reduced costs from damage and loss of vessels, engines and gear and fishing facility • Reduced number of safety incidents reported by fisherfolk and divers • Increased number of fisherfolk engaged in

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• **Safety at sea issues for fishers and divers, disruptions to operations and reduced income due to storms, rough seas and flooding** • **Water shortages and heat stress during hot, dry spells, impacting fishing operations particularly processing and vending (e.g. increased costs for ice and risk of spoilage)** **Vulnerable groups** • **Fisherfolk** • **Dive/tour operators** • **Small businesses e.g. hotel/guesthouses and restaurants relying on local fish supply and dive tourism** • **Households relying on fishing and dive tourism as an income source**	**processing facilities (including ice machine and water storage tanks)** • ****Development of alternative livelihoods for fisherfolk and other residents (e.g. hydroponics/aquaponics, aquaculture, mariculture), including training and provision of equipment and tools** • **Safety at sea training, access to required equipment (e.g. GPS, VHF radio) and improved early warning systems (e.g. SMS and radio alerts) for fisherfolk and dive operators** • **Access to insurance for boats, engines, gear and personal insurance for fisherfolk to enhance financial resilience**	• **Trinidad and Tobago Meteorological Service (TTMS)** • **Emergency responders - Fire Services, Speyside Community Emergency Response Team (CERT)** • **Speyside Village Council** • **ATFA** • **TUFA** • **Fisherfolk** • **Dive/tour operators** • **Insurance providers** • **Telecommunication service providers** • **CFTDI** • **UWI** • **FAO**	**haul vessels, weather station, information and communication technology)** • **Materials** • **Planning approvals/ environmental impact assessments** • **Training programmes to support livelihoods development**		**alternative livelihoods**
Coastal erosion from rough seas, storms and storm surge, and sea level rise Impacts	• **Upgrade and maintenance of fish landing site, including a floating jetty to allow access despite erosion/ changing depth of water	• CZMU/ Department of Environment, Climate Change and Energy (co-lead) • DIQUD (co-lead) • DMRF (co-lead)	• Expertise (coastal engineering, construction, hydrology, ecosystem restoration)	Medium to long term (4-10 years)	• Reduced maintenance and repair costs for fish landing site/jetty • Increased extent and health of coastal vegetation

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Damage and loss of fish landing site and fishing facility • Erosion and loss of beaches, which is exacerbated by use of heavy machinery for sargassum removal • Degradation and loss of mangroves and other coastal vegetation, and increased sedimentation of coral reefs and fish nurseries/habitat • Coastal flooding, which is exacerbated by poor drainage and heavy run-off Vulnerable areas • Speyside fish landing site and fishing facility Vulnerable groups • Fisherfolk • Recreational fishers • Households relying on fishing as an income and food source • Divers and visitors using beaches and other coastal areas	• Reinforcement and expansion of seawall and construction of a breakwater in high risk areas • Replanting of mangroves and other coastal vegetation (e.g. sea-grape, coconut trees, vetiver grass) to address erosion and sedimentation and protect shoreline	• Speyside Fisherfolk Association (co-lead) • SEMPR and local community groups • EMA • IMA • Town and Country Planning Division • Speyside Village Council • ATFA • TUFA • Fisherfolk • ERIC, SpeSeas, IAMovement, CANARI and other NGOs • UWI	• Financing (significant amounts for upgrading landing site and seawall/ breakwater) • Equipment • Materials • Seedlings for restoration • Labour (can be provided by local community groups for replanting) • Planning approvals/ environmental impact assessments		

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Small businesses in Speyside e.g. hotel/guesthouses and restaurants dependent on local fish supply and dive tourism					
Settlements and Infrastructure					
<u>Extreme weather</u> with heavy rainfall and strong winds leading to flooding and landslides **Impacts** • **Damage and loss of homes, other property and key infrastructure (roads, schools and other public buildings) due to strong winds, fallen trees, landslides and flooding, which is exacerbated by poor drainage** • **Road blockages, leading to restricted access and mobility, and disruptions to telecommunications, power and other utilities due to strong winds, fallen trees, floods and landslides** • **Disruptions to schooling during flooding and**	• ****Upgrade and maintenance of drainage infrastructure to enhance its capacity to handle heavy runoff and reduce flooding** • ****Tree trimming to reduce impact of fallen branches/trees in high-risk areas** • ****Identification of a new suitable emergency shelter and ensuring facilities climate resilient (e.g. reinforced windows, hurricane straps, rainwater harvesting and storage tanks)** • ****Development and implementation of community early warning system for extreme weather and disaster preparedness plan**	• **DIQUD (co-lead)** • **TEMA (co-lead)** • **Speyside Village Council (co-lead)** • **THA - Division of Settlements, Public Utilities and Rural Development** • **THA - Education Division** • **THA - Tourism Division/ Tobago Tourism Agency** • **EMA** • **Town and Country Planning Division** • **Emergency responders - Fire Services, Speyside CERT** • **Water and Sewerage Authority (WASA)** • **TTMS** • **Local residents and property owners** • **Local business owners**	• **Expertise (engineering, construction, disaster management, water management)** • **Financing (significant amount for upgrading drainage and retrofitting buildings)** • **Equipment/ tools (e.g. for tree trimming, digital access)** • **Materials (including instructional guides, digital resources)** • **Labour**	**Short to medium term (1-6 years)**	• **Reduced costs from damage and loss of property and infrastructure from floods and landslides** • **Reduced closure of schools and other key social services due to floods, landslides and other extreme weather** • **Operational and climate-resilient emergency shelter for Speyside exists in a safe location**

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
landslides or need to use as emergency shelters • Increased risk of mosquito-borne diseases (e.g. dengue, zika) due to stagnant water in vacant homes • Damage to heritage sites and attractions, including trails for sightseeing and birdwatching, and decline in tourism and tourism-related income • Siltation of Speyside dam Vulnerable areas • Lucy Vale and Top Hill areas, which are impacted by landslides • Speyside High School, which is current emergency shelter, and Community Centre, which is alternative shelter Vulnerable groups • Residents • Business owners • Property owners	• Retrofitting and enhancing climate resilience of schools and other public buildings to withstand extreme weather • Updating and enforcing building codes for residential and commercial properties to address extreme weather (e.g. roof design, height, and road setbacks) • Development of home-schooling kits to reduce the impact of school disruptions and ensure continuity in education • Desilting/cleaning and regular maintenance of Speyside dam	• School principals • Insurance providers • Telecommunication service providers • Habitat for Humanity T&T • T&T Red Cross Society	• Planning approvals/ environmental impact assessments		
Coastal erosion from rough seas, storms and storm surge, and sea level rise	• **Reinforcement and expansion of seawall and construction of a	• CZMU/ Department of Environment, Climate	• Expertise (coastal engineering, construction,	Medium to long	• Reduced costs from damage and loss of property

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
Impacts • Damage and loss of homes, businesses and key infrastructure (roads and bridges) along coastline • Degradation and loss of beaches and coastal vegetation, which is exacerbated by use of heavy machinery for sargassum removal • Coastal flooding, which is exacerbated by poor drainage and heavy run-off • Disruptions to livelihoods and decline in income, particularly with damage to key infrastructure Vulnerable areas • Northern part of Tyrrel's Bay • Coastal roads - Lucy Vale road near Speyside Pier, portions of road from Speyside to Charlotteville, road to Indian Bay • Speyside Hill, which was paved and contributes to increased runoff and damage to roads	breakwater to protect high risk areas • Replanting of mangroves and other coastal vegetation (e.g. sea-grape, coconut trees, vetiver grass) to address erosion and sedimentation and protect shoreline • Updating and enforcing building codes (e.g. related to setbacks, drainage, raised floors etc.) to address erosion and sea level rise • Relocation of critical infrastructure/assets further inland or to higher ground, where feasible	Change and Energy (co-lead) • DIQUD (co-lead) • Speyside Village Council (co-lead) • Local residents and property owners • Local business owners • IMA • EMA • Town and Country Planning Division • THA - Tourism Division/ Tobago Tourism Agency • THA - Division of Settlements, Public Utilities and Rural Development • TEMA • SEMPR and other local community groups • ERIC, SpeSeas, IAMovement, CANARI and other environmental NGOs • Habitat for Humanity T&T • UWI	hydrology, ecosystem restoration) • Financing (significant amounts for upgrading drainage, seawall and breakwater) • Equipment • Materials • Seedlings for restoration • Labour (can be provided by local community groups for replanting) • Planning approvals/ environmental impact assessments	term (4-10 years)	and infrastructure from coastal erosion and flooding • Increased extent and health of coastal vegetation

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
Vulnerable groups • **Residents living along coast** • **Business and property owners (e.g. Speyside Inn, Manta Lodge, restaurants) along coast**					
<u>Sargassum influxes</u> Impacts • Rotting sargassum, which releases hydrogen sulphide and ammonia gas, can affect health of residents and staff/customers at businesses and government buildings • Disruptions in operations and closure of businesses and schools during heavy influxes, affecting tourism and other livelihoods • Damage to paint on buildings, appliances, equipment etc. from hydrogen sulphide gas Vulnerable groups • Fisherfolk • Beachgoers	• ** Identification of storage site and provision of equipment/tools and training on best practices for regular clean-up of sargassum by local community groups • Awareness raising and education on public health issues related to climate change, sargassum influxes and management responses • Establishment and implementation of regular air quality monitoring and early warning system for sargassum in Speyside to inform response • Improvements in ventilation systems in schools and other key government buildings located near coast to	• CZMU/ Department of Environment (co-lead) • TEMA (co-lead) • Speyside Village Council (co-lead) • DMRF • DIQUD • EMA • IMA • National Sargassum Taskforce • THA - Division of Health, Wellness and Social Protection • THA - Division of Education • Occupational Safety and Health Agency (OSHA) • THA - Division of Settlements, Public Utilities and Rural Development • THA - Tourism Division/ Tobago Tourism Agency	• Expertise (marine science, disaster response, business development) • Financing • Equipment (booms, harvesters, vessels, machinery, etc.) • Materials • Labour (can be provided by local community groups for clean ups)	Short to medium term (1-6 years)	• Reduced length of time sargassum stranded on beach • Reduced incidence of health-related impacts reported due to rotting sargassum • Increased number of uses/products and livelihoods linked to sargassum

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Elderly, infants and school-aged children who suffer from respiratory diseases • Households and property owners near coast • Vendors and tourism-related small businesses along coast	address air quality and health concerns • Development of alternative livelihoods from collection and use of sargassum to create value-added/commercial products (e.g. liquid fertilizer, biofuels and building materials)	• Fisherfolk • SEMPR and local community groups • School principals • UWI • FAO • CARDI • IICA			
Health, Education and Social Services					
<u>Dry spells/drought</u> **Impacts** • **Reduced access to potable water affects residents, schools and other essential services, and businesses, including tourism (e.g. food and hospitality)** • **Limited water availability leads to sanitation issues, increasing the risk of waterborne diseases** • **Time and effort spent securing alternative water sources create additional burdens for households and businesses** • **Potential for community conflicts over scarce water resources and disruptions**	• ****Increased use of water storage tanks and rainwater harvesting for residential and commercial purposes** • **Desilting and maintenance of dams that provide Speyside's water supply** • **Upgrade and expansion of water storage capacity and distribution networks for Speyside** • **Improved fire management, including training and provision of equipment/gear to community groups**	• **WASA (co-lead)** • **Speyside Village Council (co-lead)** • **DIQUD** • **THA - Division of Health, Wellness and Social Protection** • **THA - Division of Settlements, Public Utilities and Rural Development** • **THA - Tourism Division** • **THA – Division of Food Security, Natural Resources, the Environment and Sustainable Development** • **Department of Environment, Climate Change and Energy**	• **Expertise (water management, fire management, construction)** • **Finance (significant amounts for upgrading water infrastructure/ network)** • **Equipment** • **Materials** • **Labour**	**Short to medium term (1-6 years)**	• **Reduced incidence of water stress/ shortages reported by residents and businesses** • **Increased use of water storage tanks and rainwater harvesting to improve water supply**

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
in access to food/essential goods • **Increased risk of bush fires and related risks to health, safety and property** **Vulnerable groups** • **Residents without pipeborne water supply** • **Elderly and young children** • **Tourism-related and agriculture-related businesses** • **Vendors and other small businesses**		• **TEMA** • **Fire Services** • **Town and Country Planning Division** • **Chamber of Commerce** • **Local residents and property owners** • **Local businesses** • **SEMPR and local community groups** • **ERIC** • **Habitat for Humanity T&T**			
<u>Extreme heat and heatwaves</u> with rising air temperatures Impacts • Heat stress and related illnesses among residents, staff/customers of businesses and public offices, and visitors • Mental and physical stress linked to prolonged exposure to extreme heat, especially in households and businesses with inadequate cooling infrastructure	• **Investment in indoor cooling systems (e.g. air conditioning, fans) and other climate resilience measures for schools and other key community buildings • Awareness raising on health and other related impacts from extreme heat/heat stress and development and roll-out of early warning system on extreme heat for residents and businesses (e.g. SMS and radio alerts)	• THA - Division of Health, Wellness and Social Protection/ Tobago Regional Health Authority (co-lead) • DIQUD (co-lead) • Speyside Village Council (co-lead) • TEMA • THA - Division of Education • THA - Division of Settlements, Public Utilities and Rural Development	• Expertise (engineering, climate adaptation, disaster response, public health, ecosystem restoration) • Finance • Equipment • Materials • Seedlings for urban greening/ restoration • Labour (can be provided by local community groups	Short to medium term (1-6 years)	• Reduced incidence of heat-related illnesses (e.g. heat exhaustion, dehydration) reported by local residents and workers • Increased use and maintenance of cooling systems in homes and local businesses • Increased extent of green spaces and tree cover in/around Speyside community

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Increased risk of vector-borne diseases (e.g. dengue, yellow fever, zika) due to rising temperatures Vulnerable groups • Residents, particularly elderly, infants and school-aged children sensitive to heat • Vendors along beaches and roadside • Farmers and fisherfolk • Construction and other outdoor workers	• Urban greening and use of other nature-based solutions (e.g. reforestation) to help cool the area and address heat stress	• Department of Environment, Climate Change and Energy • EMA • Town and Country Planning Division • TTMS • Chamber of Commerce • Speyside Fisherfolk Association and fisherfolk • Farmers and their organisations • Local businesses • School principals • SEMPR and local community groups • ERIC • Tobago Reforestation and Watershed Rehabilitation Programme (TRWRP) • Habitat for Humanity T&T • UWI • Telecommunication service providers	for urban greening/ restoration)		
<u>Extreme rainfall</u> leading to flooding and landslides Impacts	• Development of home-schooling kits to reduce the impact of school disruptions and ensure continuity in education	• THA - Division of Education (co-lead) • THA - Division of Health, Wellness and Social Protection/ Tobago	• Expertise (climate adaptation, business and livelihood development, digitisation)	Short to medium term (1-6 years)	• Reduced incidence of disruptions to schooling and other key social services due to

Community impacts & risks	Actions to adapt/build resilience	Roles and responsibilities (Lead/supporting actors)	Required resources	Time frame	Indicators of Success
• Disruptions to schooling (e.g. school closures when floods or need to be used as emergency shelters) and other social services (e.g. healthcare) • Increase in unemployment due to disruptions to key economic sectors, including tourism, agriculture and public sector, contributing to crime, poverty, inequality and other issues **Vulnerable areas** • Speyside High School • Speyside Community Centre • Speyside Health Centre **Vulnerable groups** • Residents, especially elderly and young children • Households at or below the poverty line • Local small businesses • Hotel/guesthouse and tour operators	• Improved access to pharmacy resources and resident doctors in/around the community and North East Tobago • Digitisation to support online learning, skills building and training, and other social services delivery • Diversification and development of alternative livelihoods (e.g. apiculture, vertical farming/hydroponics, mariculture, agro-tourism)	Regional Health Authority (co-lead) • Speyside Village Council (co-lead) • Office of the Chief Secretary, THA • THA - Division of Settlements, Public Utilities and Rural Development • THA – Division of Food Security, Natural Resources, the Environment and Sustainable Development • THA - Tourism Division • THA - Division of Finance, Trade and Economy • TEMA • Chamber of Commerce • Local business owners • Local community groups • CFTDI • UWI	• Funding • Equipment/tools, including digital infrastructure • Curriculum materials and instructional guides • Training programmes for alternative livelihoods		floods, landslides and other extreme weather • Increased number of residents engaged in alternative livelihoods and income-generating opportunities