



Caribbean Natural Resources Institute

# Implementing climate change action

A toolkit for Caribbean civil society organisations



Second  
edition



CONSERVATION  
INTERNATIONAL



GREEN  
CLIMATE  
FUND





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- The ***Climate ACTT: Action by Civil Society in Trinidad and Tobago to Build Resilience to Climate Change*** project (2015 - 2017), with support from Conservation International and BHP Billiton Trinidad and Tobago.
- The ***CSOs for Disaster Resilience: Empowering Civil Society and Local Communities to Build Resilience to Hurricanes and Climate Extremes in the Eastern Caribbean*** project (2019 - 2022).
- The ***Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance*** project (2020 - 2023), with support from the Green Climate Fund.

It primarily draws on materials and approaches used during the Climate ACTT project.

CANARI gratefully acknowledges case study contributions featured in Section 6, which focuses on climate change and disaster risk reduction projects by civil society organisations (CSOs). These include:

- Five case studies implemented by the CSOs who were involved in the ***Climate ACTT*** project: the Caribbean Youth Environment Network Trinidad and Tobago Chapter; Environmental Research Institute Charlotteville; Environment Tobago; Fondes Amandes Community Reforestation Project; and Turtle Village Trust.
- Five additional case studies contributed by Caribbean Coastal Area Management Foundation; IAMovement; Panos Caribbean; Sustainable Grenadines; and the International Federation of Red Cross and Red Crescent Societies – Caribbean Regional Representation Office.

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# Acronyms

ACTT	Action by civil society in Trinidad and Tobago
CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CBA	Community-based adaptation
CBO	Community-based organisation
CBDRR	Community-based disaster risk reduction
CCA	Climate change adaptation
C-CAM	Caribbean Coastal Area Management Foundation
CCCCC	Caribbean Community Climate Change Centre
CI	Conservation International
CNFO	Caribbean Network of Fisherfolk Organisations
COP	Conference of the Parties
CSO	Civil society organisation
CYEN	Caribbean Youth Environment Network
CYEN-TT	Caribbean Youth Environment Network Trinidad and Tobago Chapter
DRR	Disaster risk reduction
EBA	Ecosystem-based adaptation
Eco-DRR	Ecosystem-based disaster risk reduction
EIA	Environmental impact assessment
ERIC	Environmental Research Institute Charlotteville
ET	Environment Tobago
FACRP	Fondes Amandes Community Reforestation Project
FOH	Fragments of Hope
GHG	Greenhouse gas
GIS	Geographic information system
HFCC-EHC	Holy Faith Convent Couva Eco-Heroes Environment Club
IDB	Inter-American Development Bank
IFRC	International Federation of Red Cross and Red Crescent Societies
IPCC	Intergovernmental Panel on Climate Change
KAP	Knowledge, attitude and practice
MEA	Multilateral Environment Agreement
MEAU	Multilateral Environmental Agreements Unit
NAP	National Adaptation Plan
NDC	Nationally Determined Contributions
NE	North East
PBFMC	Portland Bight Fisheries Management Council
PBPA	Portland Bight Protected Area
SDG	Sustainable Development Goal
THA	Tobago House of Assembly
TVT	Turtle Village Trust
UNFCCC	United Nations Framework Convention on Climate Change
VRA	Vulnerability risk assessment
YCARE	Youth Climate Advocacy and Resilience Building Endeavour



# Introduction

The purpose of this toolkit is to provide civil society organisations (CSOs) with practical information and examples to assist them in designing and implementing effective climate change and disaster resilience projects and programmes in their communities and countries.

The toolkit was originally an output of the ***Climate ACTT: Action by Civil Society in Trinidad and Tobago to Build Resilience to Climate Change*** project (2015 – 2017), which was implemented by the Caribbean Natural Resources Institute (CANARI) in collaboration with Conservation International (CI) and BHP Billiton, Trinidad and Tobago. The project sought to strengthen the capacity of five CSOs in Trinidad and Tobago to internationally accepted levels of best practice in two areas: institutional (organisational) strengthening; and technical capacity to deliver programmes and projects related to climate change adaptation and resilience.

This version of the toolkit has been updated based on experiences from other projects, including:

- The ***CSOs for Disaster Resilience: Empowering Civil Society and Local Communities to Build Resilience to Hurricanes and Climate Extremes in the Eastern Caribbean*** project (2019 - 2022).
- The ***Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance*** project (2020 - 2023), with support from the Green Climate Fund.

The scope and content of the toolkit have been refined to meet current and evolving needs as it relates to climate change adaptation, as well as widened to incorporate consideration for disaster risk reduction and building wider resilience to natural hazards at the community level.

The toolkit comprises six sections:

**Section 1: Understanding climate change** provides an overview of the key concepts used to discuss climate change and its impacts and highlights how the Caribbean region, in particular, is affected. The climate change policy and finance landscape is also presented.

**Section 2: Communicating effectively about climate change** highlights the importance of communicating effectively in any activity related to climate change and provides CSOs with a step-by-step guide to designing a climate change communication plan.

**Section 3: Assessing vulnerability to climate change** provides an overview of vulnerability assessments and highlights their importance in identifying and selecting relevant actions to adapt and build resilience. This section also provides step by step instructions for using a number of different vulnerability assessment tools.

**Section 4: Planning for adaptation and disaster risk reduction** looks at the key principles and processes CSOs should apply in developing a climate change adaptation or disaster risk reduction action plan.

**Section 5: Taking action to adapt and build disaster resilience** provides an overview of different approaches and strategies for adaptation, including community-based adaptation and ecosystem-based adaptation.

**Section 6: Adaptation and disaster risk reduction in action** documents ten case studies of practical climate change adaptation and disaster risk reduction projects in the Caribbean.

CANARI regards this toolkit as a living document that will be refined, adapted and expanded based on our and others' experiences. We welcome comments, suggestions and feedback to ensure that the toolkit meets the needs of CSOs in the Caribbean. Please send these to [info@canari.org](mailto:info@canari.org).

# Understanding climate change

- 1.1. Introduction
- 1.2 What is climate change?
- 1.3 What is the main cause of the climate change we are experiencing now?
- 1.4 What are the global effects of climate change?
- 1.5 How is climate change currently affecting the Caribbean?
- 1.6 Understanding the policy environment to address climate change
- 1.7 Climate finance
- 1.8 Gender and climate change
- 1.9 Useful resources

## Box 1: Key terms and acronyms used in Section 1

<b>Climate</b>	The average, or typical, weather conditions of a given area observed over a long period of time, usually 30 years or more. When scientists talk about climate, they are looking at averages of precipitation, temperature, humidity, wind velocity, phenomena such as fog, frost, and hail storms, and other measures of the weather that occur over a long period in a particular place (NASA, 2005).
<b>Climate change</b>	A change in the climate, which is attributed directly or indirectly to human activity, where the composition of the global atmosphere is altered and this change is in addition to natural climate variability observed over comparable time periods (adapted from IPCC, 2021). This results in a change in the mean and/or the variability of climatic conditions, such as temperature, precipitation, atmospheric pressure or winds, that persists for decades or longer.
<b>Climate change adaptation</b>	The adjustment of human or natural systems, including specific measures to address the actual or potential impacts of climate change, particularly to moderate harm or exploit beneficial opportunities (adapted from IPCC, 2021).
<b>Climate change mitigation</b>	A human intervention to reduce greenhouse gas emissions by limiting activities or mechanisms that release these gases or enhance activities or mechanisms that remove the gases from the Earth's atmosphere (adapted from IPCC, 2021).
<b>COP21</b>	21 <sup>st</sup> Session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) that took place in Paris in December 2015, resulting in the landmark Paris Agreement, which established goals and binding commitments around climate change mitigation and adaptation.
<b>Disaster</b>	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. The effect of the disaster can be immediate and localised but is often widespread and could last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources (UNDRR, 2017).
<b>Global warming</b>	Refers to the increase in global surface temperature due to greenhouse gas emissions, which trap heat in the Earth's atmosphere, relative to a baseline reference period. A common choice for the baseline is 1850 - 1900 - the earliest period of reliable observations with sufficient geographic coverage (adapted from IPCC, 2021).
<b>Greenhouse gases (GHGs)</b>	The atmospheric gases that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds. Carbon dioxide, methane, nitrous oxide, ozone, and water vapour are the primary greenhouse gases in the Earth's atmosphere (NASA, 2005).
<b>Weather</b>	Short-term atmospheric conditions. Weather is measured by temperature, humidity, wind speed, atmospheric pressure, cloudiness and precipitation. In most places, weather can change from minute-to-minute, hour-to-hour, day-to-day, and season-to-season (adapted from NASA, 2005).

## 1.1. Introduction

Climate change poses a significant challenge for the Caribbean region, affecting biodiversity, livelihoods, infrastructure and human settlements, and the economy. Organisations across the region, including CSOs, have started to address these challenges. Understanding the causes and impacts of climate change is critical to taking effective action.

In this section, we outline the:

- processes and factors driving climate change;
- specific impacts of, and vulnerabilities to, climate change in the Caribbean; and
- the policy and financial context for addressing climate change at the national, regional and international levels.



Figure 1: Climate change can cause the loss of recreational beaches and therefore poses a significant threat to our way of life in the Caribbean. Photo: Natalie Boodram/CANARI

## 1.2. What is climate change?

Climate change refers to a change in the components of climate, such as temperature, precipitation, atmospheric pressure or winds that persists for decades or longer. Climate change can arise from either natural causes or human activity.

Major signs that the climate is changing include:

- planet-wide increases in average temperature (see Figure 2 of rising global temperatures over the last 150 years);
- increases in land and ocean temperatures;
- changes in the frequency and strength of extreme weather events (e.g. hurricanes); and
- changes in ocean chemistry.

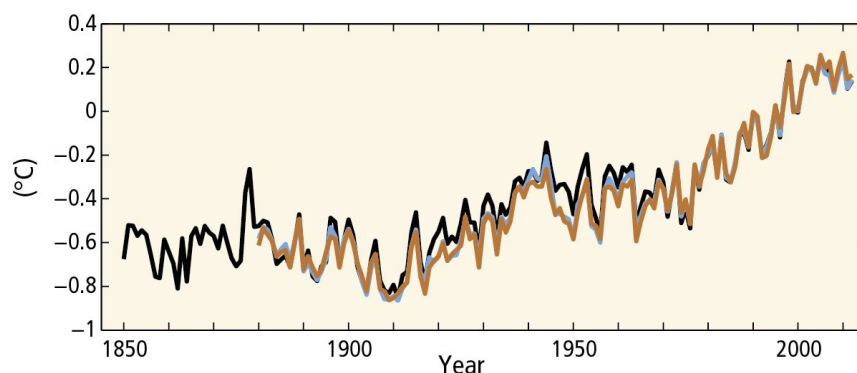


Figure 2: Change in globally averaged land and ocean surface temperature since 1850. Source: IPCC, 2014



## Box 2: Clarifying some common misunderstandings

### Weather and climate

Weather refers to the short-term changes we see in temperature, clouds, precipitation, humidity and wind in a particular city or region. Weather can vary greatly from one day to the next, or even within the same day. In the morning, the weather may be cloudy and cool but by afternoon it may be sunny and warm.

The climate of a town or region is its weather averaged over many years (30 years or more). For example, in a town in the Caribbean, you expect a tropical climate with a rainy season and a dry season. Although some years the rainy season may start later or be drier than expected, on average the heaviest rainfall is from June to November. The climate of a town, region or the entire planet changes very slowly. These changes take place on the scale of tens, hundreds and thousands of years (NASA, 2005).

The main difference between weather and climate is the time scale. Weather is short-term - hours, days, months and weeks. Climate is longer term - years, decades and centuries.

### Global warming and climate change

Global warming and climate change are sometimes used interchangeably, but the two have different meanings. Global warming refers to the increase in average global temperature due to greenhouse gas (GHG) emissions. Climate change is the long-term change or shift in temperature, rainfall, snow, humidity, wind and all the other components of climate and weather. It also includes changes in the frequencies and strength of extreme weather events such as droughts and storms.

### Climate change mitigation and adaptation

Climate change *mitigation addresses the causes of climate change*. Mitigation seeks to reduce the emission of GHGs (e.g. through use of alternative energy sources to produce energy that do not release GHGs) or to capture and store carbon (e.g. through planting trees that absorb carbon dioxide from the atmosphere).

Climate change *adaptation addresses the impacts of climate change*. It encompasses the adjustment of human or natural systems, including specific measures to address the actual or potential impacts of climate change, for example, replanting mangroves to protect against coastal erosion and flooding due to sea level rise and more intense hurricanes and storm surges.

## 1.3. What is the main cause of the climate change we are experiencing now?

Most scientists agree that current climate change is caused by human activities that are increasing the amount of greenhouse gases (GHGs) and trapping more heat in the Earth's atmosphere. These activities include:

- burning fossil fuels that contain a high percentage of carbon (e.g. coal, oil and natural gas) for electricity, transportation and industrial processes, which adds GHGs such as carbon dioxide to the atmosphere;
- clearing forests for agriculture and human settlement; forests are major stores of carbon and their removal leads to less absorption of carbon dioxide (a major GHG) and therefore more carbon dioxide in the atmosphere; and
- cattle grazing, use of fertilizers and animal waste from agriculture, which are major sources of GHGs such as methane and nitrous oxide.

### Box 3: How our climate works?

The energy from the sun is the main source of heat and the main driver of the Earth's climate. Because of the shape of the Earth and its rotation around the sun, the amount of the sun's energy reaching the Earth's surface varies from place to place producing the various climates. For example, unlike North America, the Caribbean has a tropical climate as it is near the equator and receives more of the sun's energy.

Other factors that influence the climate include:

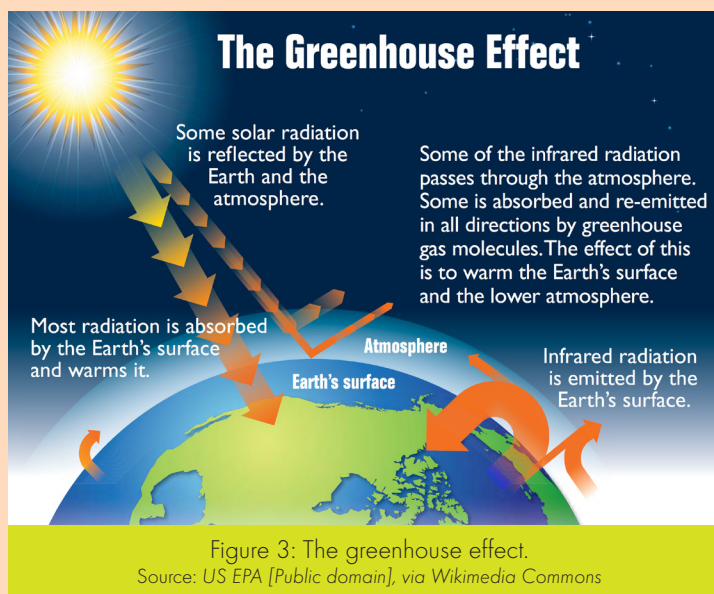
- gases that occur naturally in the atmosphere, such as carbon dioxide and water vapour, are very efficient at trapping heat. Increasing concentrations of these gases can lead to warming, while decreasing concentrations lead to cooling;
- ocean currents that move heat from the equator to the poles and from the surface of the ocean to the depths of the ocean. For example, without the ocean currents that bring warmer waters north, the United Kingdom would be 5°C cooler (National Center for Atmospheric Research [NCAR], 2011).
- volcanic eruptions that release gases, such as sulphur dioxide, and tiny particles into the atmosphere which reflect incoming sunlight out into space and cause cooling;
- snow and ice that have light-coloured surfaces, which reflect incoming sunlight out into space and cause cooling;
- forest fires that release carbon dioxide, which traps heat; and
- cloud cover that both traps heat in the atmosphere because clouds are made of water vapour and reflect light and heat from the atmosphere because they are light in colour.

#### Climate change and the enhanced 'greenhouse effect'

As energy from the sun enters the atmosphere, it is absorbed by the Earth's surface and warms the land and oceans. This energy is then radiated back into the atmosphere as heat.

Several gases in the atmosphere, including carbon dioxide, methane, nitrous oxide, ozone, and water vapour, trap some of this heat. This process is called the 'greenhouse effect' because these gases act like the glass walls of a greenhouse – they let in light but keep heat from escaping. This process occurs naturally and has kept the Earth's temperature about 33°C warmer than it would be otherwise (NASA, 2005). Current life on Earth could not be sustained without the natural greenhouse effect.

However, when the concentration of these greenhouse gases (GHGs) gets too high, conditions on Earth start to change. Since the industrial revolution, humans have released more GHGs into the atmosphere than the Earth can absorb, trapping more heat. This increase in GHGs is believed to be the main cause of the increase in average global temperature and current climate change (IPCC, 2021).



Adapted from National Center for Atmospheric Research - University Corporation for Atmospheric Research. Weather and Climate Basics. [https://eo.ucar.edu/basics/cc\\_1.html](https://eo.ucar.edu/basics/cc_1.html) [accessed 15 February 2017].

## 1.4. What are the global effects of climate change?

The main effects of climate change are:

- changes in rainfall and seasonal patterns, as well as changes in ocean conditions and currents due to rising air and ocean temperatures;
- more extreme and frequent weather-related disasters, such as droughts, floods, heatwaves, hurricanes and storm surges;
- melting ice caps and less snow at the poles and in mountain regions due to rising temperatures;
- rising sea level because of higher ocean temperatures that cause water to expand, and melting polar ice caps that add water to the oceans. Sea level rise causes coastal erosion and saltwater intrusion into fresh water resources; and
- ocean acidification, which is due to our oceans absorbing excess carbon dioxide from the atmosphere and becoming more acidic. Ocean acidification threatens coral reefs and the wide range of marine species that depend on reefs.



Figure 4: Rising ocean temperatures have caused massive coral mortality across the globe. Photo: Charles Sheppard



Figure 5: Small increases in sea levels can have devastating effects on coastal habitats. Photo: Charles Sheppard

## 1.5. How is climate change currently affecting the Caribbean?

The effects of climate change are felt differently across the globe. In the Caribbean region, temperature records have shown increases in air and ocean temperatures over the past century. Rainfall patterns have become unpredictable with more periods of heavy rainfall and flooding. Rising sea levels also threaten coastal areas where the majority of the population and infrastructure in Caribbean islands is located. This section outlines the major actual and potential effects of climate change across the Caribbean.

### 1.5.1. Observed effects of climate change in the Caribbean<sup>1</sup>

The following are the main effects of climate change that have been observed in the Caribbean:

#### *a) Heat stress and rising air temperatures*

An increase in air temperature has been observed in the Caribbean, consistent with the global warming trend. There is an increasing trend in very warm days and nights for the Caribbean as a whole.

#### *b) Warming ocean temperatures*

There has been an overall warming trend in sea surface temperatures (SSTs) in the Caribbean with the most significant increase occurring in recent years. SSTs are an important determinant of Caribbean climate and a significant contributor to the health of the regional marine ecological systems. Increasing SSTs have already resulted in coral bleaching events with potentially devastating consequences on coral reef ecosystems and on the people who depend on them for seafood, tourism and shoreline protection.

#### *c) Changing rainfall patterns*

The number of consecutive dry days is increasing, as well as the amount of rainfall during rainfall events. Sporadic rainfall and dry spells lead to water shortages, affecting domestic water supply and the key economic sectors of agriculture and tourism. More periods of heavy rainfall have been recorded over the last 20 years, leading to flooding and damage to infrastructure (Taylor, et al., 2007).

#### *d) More extreme weather events*

There has been a significant increase in Category 4 and 5 Atlantic hurricanes since 1995 (IPCC, 2021). Extreme storm events often result in loss of lives and damage to key economic sectors such as agriculture and tourism and impacts to important ecosystems (reefs and mangroves) that play an important role in protecting the coastline and supporting livelihoods.

The 2017 hurricane season was among the deadliest and costliest to date with an unprecedented two Category 5 hurricanes, Irma and Maria, decimating islands such as Dominica and Barbuda. The Post-Disaster Needs Assessment for Dominica concluded that Hurricane Maria resulted in total damages of US\$931 million and losses of US\$380 million, which amounts to 226 percent of the 2016 gross domestic product (GDP) (Government of the Commonwealth of Dominica, 2017). The 2019 hurricane season also proved to be record breaking, with the Category 5 Hurricane Dorian causing significant devastation in the Bahamas (ECLAC, 2019). There have also been more droughts since the 1960s, with the 2013 - 2016 event noted as being the most severe, as virtually the entire region experienced a drought.

<sup>1</sup> Unless otherwise cited, information in this section mainly references the Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.



### ***e) Rising sea levels***

There is a general increasing trend in the sea level of the Caribbean region. There has been a regional rate of increase of  $1.8 \pm 0.1$  mm/year between 1950 and 2009, with a higher rate of increase in later years:  $1.7 \pm 1.3$  mm/year between 1993 and 2010 (Climate Studies Group Mona, 2020). Notably, larger sea level increases have been observed for the post-2000 period. Rising sea levels not only erode the coastline but can also lead to the contamination of fresh water by salt water, a process called salt-water intrusion.

### ***f) Sargassum influxes***

Since 2011, increasing amounts of sargassum seaweed have been observed around the Wider Caribbean Region, including in locations where sargassum was absent or extremely rare in the past. The lesser Antilles and their south and east coasts have been particularly impacted by these influxes since the first episode in 2011. Other influx events of lesser magnitude have been observed over the following years, with a particularly intense episode in 2014 - 2015. Impacts have been noted on the economy (particularly tourism, fisheries and marine transport activities), environment (disturbance to marine species and clogging of beaches and turtle nesting sites) and to health (related to respiratory problems and other illness from gases released from rotting sargassum).

## **1.5.2 Future projections for the Caribbean<sup>2</sup>**

The following are the main projections for the Caribbean in terms of the future effects of climate change:

### ***a) Increase in sea surface temperature***

Under a business-as-usual scenario, SSTs are projected to increase by  $1.76 \pm 0.39^{\circ}\text{C}$  per century in the wider Caribbean. By the end of the century, years when projected SSTs are coolest fall within the range of the warmest years in the present.

### ***b) Increase in air surface temperature***

The Caribbean as a whole will gradually warm through to the end of the century, including increases in minimum, maximum and mean temperatures (irrespective of scenario). Temperature increases are also expected across all seasons of the year. Regional Climate Models (RCMs) suggest increases in mean temperature of up to  $4^{\circ}\text{C}$  by end of century. An average annual increase in surface temperature of  $1.2$  to  $2.3^{\circ}\text{C}$  is projected across the Caribbean by 2100 (Mycoo, et al., 2022). The Caribbean has been advocating for measures to ensure a maximum rise of  $1.5^{\circ}\text{C}$  for a chance to stay alive (see Case Study on 1point5tostayalive advocacy campaign on climate justice in Section 6). With a  $2^{\circ}\text{C}$  increase,  $13,000$  km<sup>2</sup> of land would disappear in the region due to rising sea levels as warmer waters expand; this is an area comparable to the whole of Barbados, Saint Vincent and the Grenadines, Anguilla, and Antigua and Barbuda combined (Panos Caribbean, 2015). Projections also show an increase in both warm days and warm nights and a decrease in both cool days and cool nights.

<sup>2</sup> Unless otherwise cited, information in this section mainly references the Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.



### ***c) Changing rainfall patterns***

The Caribbean as a whole will gradually dry through to the end of the century, with drying expected to be less in the far north Caribbean and more in the south and southeast. Global Climate Models (GCMs) suggest for the central and southern Caribbean basin, drying up to 20 per cent for annual rainfall, while Regional Climate Model (RCM)-based projections suggest up to 25-35% less rainfall by the end of the century. GCMs suggest that mid-2020s will see up to 2% less (annual mean) rainfall. By the 2050s, the region may be up to 6% drier, and by the end of century up to 17% drier. Increases in consecutive dry days are projected across the region.

### ***d) Increase in storm intensity***

While projections indicate no change or slight decrease in frequency of hurricanes, it is expected there will be a continued shift towards stronger storms by the end of the century, as measured by maximum wind speed increases of +2 to +11%. Some scenarios indicate an 80% increase in the frequency of Saffir-Simpson Category 4 and 5 Atlantic hurricanes over the next 80 years.

### ***e) Rising sea levels***

Sea level rise (SLR) projections for the Caribbean range from 0.26 to 0.82 m by 2100 relative to 1986 - 2005 levels, with the northern Caribbean tending to have slightly higher projected values than the southern Caribbean. By the end of the century, sea level rise is projected to reach or exceed 1m across the Caribbean. As a result of the projected sea level rise in the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding and coastal erosion.

### ***f) Ocean acidification***

Oceans are becoming more acidic as a result of absorbing some of the excess carbon dioxide in the atmosphere. This presents a threat to coral reefs and shellfish as they cannot form their external skeletons (hard shells) when the water is too acidic (Mycoo, et al., 2022).

## **1.5.3 Potential impacts of climate change on natural resources and the Caribbean's economy and livelihoods**

Climate change is a complex challenge as its impacts and consequences are interlinked and wide-ranging. While many of the impacts will first be experienced within the natural environment, the consequences will also be cultural, economic and social. Climate change will have impacts on the following:

### ***a) Caribbean biodiversity***

- Many species of animals and plants are likely to be affected by climate change. For instance, a 0.5 m increase in sea level is expected to result in the loss of approximately one third of marine turtle nesting sites in the Caribbean (Fish, et al., 2005, cited in Mycoo, et al., 2022).

## Figure 6. Selected Climate Change Effects on the Caribbean

**Caribbean biodiversity is being affected** by climate change. Several species of plants and animals that are either found in the Caribbean or migrate to the region for part of the year are already affected by global warming. The Caribbean Sea has already warmed by 1.5°C in the past century. If it were to become a further 1°C warmer, fish like tuna, parrot fish and dolphin fish, would go in search of cooler waters.



A 0.5 m increase in sea level is expected to result in the loss of just over one third of marine turtle nesting sites in the Caribbean.<sup>3</sup> Sea level rise and increases in water temperature and storminess could also damage reefs and sea grass beds, the foraging habitats of sea turtles. **Photo: Paul Diamond**

**More intense hurricanes.** The region has experienced stronger storms since 1995, including an increase in category 4 and 5 hurricanes. A major hurricane can have very high costs: the 2017 hurricane season was among the deadliest and costliest to date with an unprecedented two Category 5 Hurricanes, Irma and Maria, decimating Dominica and Barbuda. Dominica's total damages and losses from Hurricane Maria have been estimated at US\$1.3 billion – about 226% of the country's 2016 GDP.



More intense hurricanes and rising sea levels will contribute to coastal erosion in many Caribbean countries. **Photo: Jonathan Gomez**

**Rising sea levels** will make parts of the coastal zone disappear. Sea level rise can lead to flooding of low-lying areas and coastal communities; dislocation of coastal communities; loss of land due to erosion; and contamination of groundwater by salt water. 70% of Caribbean people live and work in the coastal zone and it is also where much of the infrastructure, like roads, airports, and seaports, is found.



Severe flooding in Guyana, 2021. **Photo: Guyana Civil Defence Commission**

**Changing rainfall patterns.** The entire region experienced a Pan Caribbean drought between 2013 and 2016. Islands that are already short of water, like Antigua and Barbuda, Barbados, and St. Kitts and Nevis, could be faced with severe drought and water shortages in the future. In recent years, heavy rains have caused catastrophic flooding and landslides in Guyana, Haiti and Jamaica.

<sup>3</sup> Fish et al., 2005, cited in Mimura, N., L. Nurse, R.F. McLean, J. Agard, L. Briguglio, P. Lefale, R. Payet and G. Sem. 2007. Small islands. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge, UK: Cambridge University Press, 687-716. <sup>4</sup> Inter-American Development Bank. 2020. Assessment of the effects and impacts of Hurricane Dorian in the Bahamas. <sup>5</sup> Government of the Commonwealth of Dominica. 2017. Post Post-Disaster Needs Assessment Hurricane Maria September 18, 2017. A Report by the Government of the Commonwealth of



Abaco Islands, Bahamas. In 2019, Category 5 Hurricane Dorian made landfall on Great Abaco Island, Bahamas with sustained winds of 185 mph. Dorian's extreme intensity and slow progress over the islands – only one mile an hour at times – subjected them to the most fierce and prolonged battering by an Atlantic hurricane of any populated place in recorded history. The total cost of damage is estimated at US\$3.4 billion, with hundreds dead or missing and an additional 29,472 persons affected by damages to their homes and assets<sup>4</sup>. **Photo: Adam Del Giudice/ AFP**



Coral reef after bleaching event. **Photo: Owen Day**

**Severe stress on Caribbean coral reefs and mangroves.** Strong hurricanes damage reefs and mangroves already weakened by pollution from the land, over-fishing and disease. Warmer sea temperatures contribute to coral bleaching. Rising sea levels submerge or drown mangroves. Damaged coral reefs and mangroves weaken coastal defences and can have a negative effect on fisheries, beach quality and tourism.



Sargassum washed up on Tobago's coastline. **Photo: Natalie Boodram/ CANARI**

**Sargassum influxes.** Mass influxes of sargassum seaweed linked to ocean eutrophication and climate change have been increasingly affecting the Caribbean since 2011. Impacts have been noted on the economy (particularly tourism and fisheries), environment (disturbance to marine species, clogging of beaches) and to health (gases from rotting sargassum).

### **Productive sectors are affected by climate change.**

In 2017, Hurricane Maria caused an estimated US\$176.9 million in agricultural loss and damage in Dominica.<sup>5</sup> Hurricane Ivan's impact on Grenada in 2004 caused losses in the agricultural sector equivalent to 10% of GDP. The two main crops, nutmeg and cocoa, needed at least 10 years (i.e. their typical gestation period) to recover and contribute to GDP or earn foreign exchange.<sup>6,7</sup> Warmer temperatures could lead to an increase in the pests and plant diseases that thrive in warm weather and could also affect crops yields. If other regions, such as North America and Europe get warmer, the Caribbean may become less attractive as a tourism destination. The beaches and coral reefs that tourists come to see and experience are affected by intense hurricanes and warmer water temperatures. These ecosystems are already weakened by human activity such as construction in the coastal zone and pollution from land, which makes it harder for them to stand up to climate threats.



Beautiful beaches make the Caribbean a key tourism destination. **Photo: Hugh Whyte**

Dominica. <sup>6</sup> The United Nations Development Programme (UNDP) Barbados and the OECS. 2007. Post-disaster Early Recovery in a Caribbean Small Island Developing State. The Case of Hurricane Ivan in Grenada (2004): Best Practices and Lessons Learned. UN House, Hastings, Barbados. <sup>7</sup> Mimura, N., L. Nurse, R.F. McLean, J. Agard, L. Briguglio, P. Lefale, R. Payet and G. Sem. 2007. Small islands. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge, UK: Cambridge University Press, 687-716.



- Sea level rise and increases in water temperature, storms and rainfall could also damage reefs and sea grass beds, which are important foraging habitats for sea turtles and many other marine species.
- Higher temperatures can lead to a change in the length of the growing season for plants and, on a positive note, increase the productivity of plants.

### **b) Coastal and marine ecosystems**

- Increased coral bleaching occurs when ocean water gets too warm. Coral reefs thrive in waters around 25°C. If water temperatures rise above this, corals expel the small organisms that live on them. When this happens, the corals appear white or “bleached”.
- Coastal erosion and saltwater intrusion lead to the degradation of mangroves, wetlands, and seagrass beds that support nurseries for fish and aquatic species.

### **c) Food production**

Food production can benefit from increased crop productivity with higher temperatures. However, production can also be severely disrupted by extreme weather events, such as droughts and flooding, as well as livelihoods based on farming, fishing and other productive sectors that rely on natural resources. Climate change impacts on food production include:

- **Agriculture:** changing rainfall patterns may mean that farmers will no longer plant or reap certain crops at the accustomed time. Too much rain at the wrong time can ruin a crop; too little can also lead to losses. Also, new pests and invasive species due to changing climatic conditions can ruin a crop and reduce productivity.
- **Fisheries:** decline of coastal ecosystems, and the fisheries that depend on them, due to the direct impacts of climate change, including increased coral bleaching, ocean acidification, sea level rise and damage



Figure 7: Coastal erosion of the Boggy Sand Road, Cayman Islands. Photo: CANARI



Figure 8: An example of small scale agriculture in the Caribbean. Photo: CANARI

from more intense hurricanes and storm surges. Non-climate factors, such as overfishing and pollution, also compound these impacts.

#### ***d) Water resources***

Increased water scarcity, due to changing rainfall patterns, could lead to severe droughts and water shortages. In 2015, many Caribbean countries, including Jamaica, Antigua & Barbuda, and Trinidad & Tobago (particularly Tobago) experienced an extended period of low rainfall that led to water shortages (Food and Agricultural Organisation [FAO], 2016).

#### ***e) Tourism***

Tourism is one of the region's most important economic sectors and is highly climate-sensitive because climate change directly affects environmental resources that are amongst its major tourism attractions. Widespread resource degradation, such as beach erosion and coral bleaching, has been found to negatively impact the perception of destination attractiveness.

#### ***f) Public health and well-being***

- Public health is at risk, and can be seriously compromised by lack of access to adequate, safe freshwater and nutrition. Vulnerable groups such as women, children, persons with disabilities, the elderly and indigenous groups are at even greater risk, as they have specific needs and limited access to resources in order to meet these needs.
- Extreme weather events are conducive to the transmission of diseases such as malaria and dengue. In 2014, the mosquito-borne chikungunya devastated the Caribbean work force, followed by the Zika virus from 2015 to 2017, which also had grave socio-economic impacts in Latin America and the Caribbean. Zika resulted in an estimated US\$7 - 18 billion in costs related to diagnosing and treating patients, loss of tourism revenue, the value of lost productivity and the long-term direct and indirect costs of disabilities attributable to the disease (UNDP, 2017). Scientists predict that vector- and water-borne diseases will increase as climate changes in the Caribbean (Mycoo, et al., 2022).



Figure 9: Beach tourism, Barbados. Photo: Nicole Leotaud/  
CANARI

**Table 1: Summary of climate change trends and impacts in the Caribbean**

Climate change trends	Climate change impacts and consequences
<ul style="list-style-type: none"> <li>Higher temperatures on land</li> <li>More warm days, fewer cold nights</li> </ul>	<ul style="list-style-type: none"> <li>Increase in productivity and length of growing season of certain plants and crops</li> <li>Heat stress and heatwaves</li> <li>Increase of some vector- and water-borne diseases</li> <li>Increase in forest fires</li> <li>Damage to forests</li> <li>Food shortages due to heat stress and pest outbreaks</li> </ul>
<ul style="list-style-type: none"> <li>Higher temperatures in the sea</li> </ul>	<ul style="list-style-type: none"> <li>Coral bleaching</li> <li>Damage to coral reefs</li> <li>Damage to mangroves</li> <li>Migration of fish and other marine animals to cooler water</li> <li>More intense hurricanes and storm surges</li> </ul>
<ul style="list-style-type: none"> <li>Greater rainfall variability</li> </ul>	<ul style="list-style-type: none"> <li>Flooding</li> <li>Landslides</li> <li>Soil degradation</li> <li>Increase of some vector- and water-borne diseases</li> <li>Food and water shortages</li> <li>Damage to forests</li> </ul>
<ul style="list-style-type: none"> <li>More frequent and extreme weather events such as droughts, floods and hurricanes</li> </ul>	<ul style="list-style-type: none"> <li>Coastal erosion</li> <li>Food and water shortages</li> <li>Landslides</li> <li>Soil degradation</li> <li>Flooding</li> <li>Storm surge</li> <li>Increase of some vector and water borne diseases</li> <li>Damage to key ecosystems - coral reefs, mangroves, forests</li> <li>Damage to buildings, roads, bridges, airports, ports</li> <li>Impact on livelihoods e.g. farming, fishing, tourism</li> </ul>
<ul style="list-style-type: none"> <li>Sea level rise (due to increased sea temperatures and melting of glaciers)</li> </ul>	<ul style="list-style-type: none"> <li>Coastal erosion</li> <li>Coastal flooding and more intense storm surges</li> <li>Saltwater intrusion</li> <li>Damage to coral reefs</li> <li>Damage to mangroves</li> <li>Damage to coastal infrastructure (buildings, roads, airports, ports)</li> <li>Decline in coastal fisheries</li> </ul>
<ul style="list-style-type: none"> <li>Ocean acidification</li> </ul>	<ul style="list-style-type: none"> <li>Reduced growth of coral reefs and molluscs</li> <li>Decline in coastal fisheries</li> <li>Sargassum influx</li> </ul>



**Table 2: Summary of impacts of climate change trends on different ecosystems of the Caribbean**

**Coastal and marine ecosystems**



Little bay Anguilla. Photo: Anguilla National Trust

**Beaches**

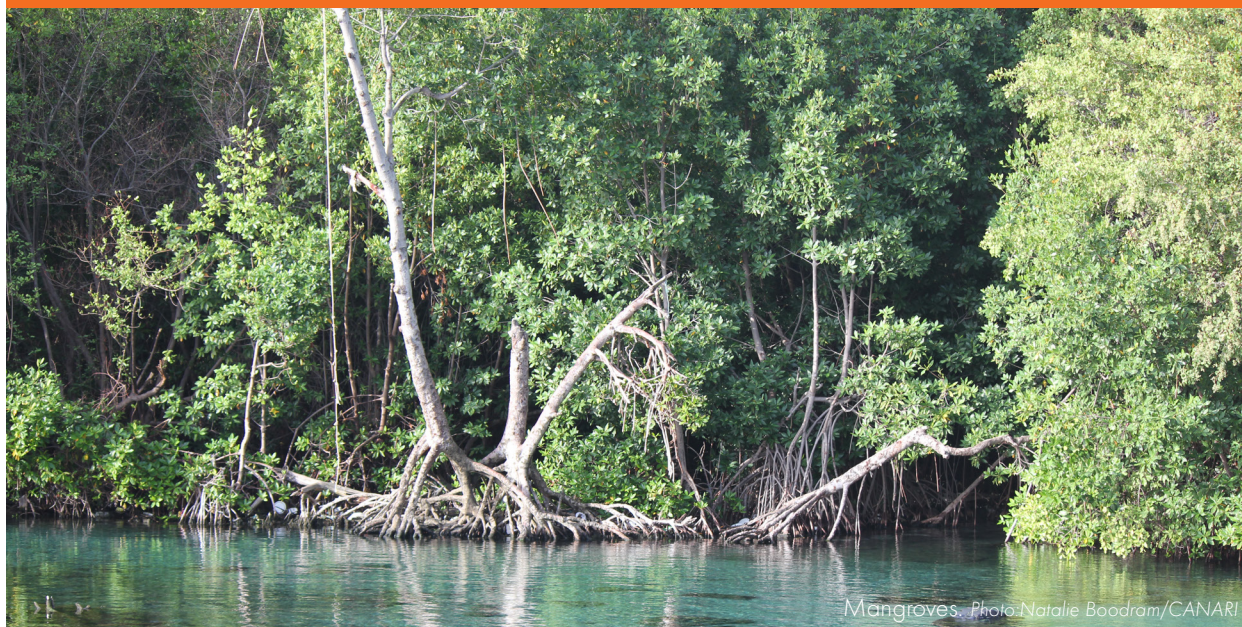
Caribbean beaches are important to the region for many reasons. Apart from their aesthetic and recreational value, they provide habitats for wildlife, like nesting sites for marine turtles. They bring in significant tourism revenue to countries but also support local livelihoods such as fishing and community enterprises. Beaches in the Caribbean are very diverse and undergo natural and cyclical changes due to tidal regimes, changing sea level and extreme weather events like storms and hurricanes. Like other ecosystems, beaches are also impacted by several human activities, such as pollution from land, decreasing water quality; unchecked development for tourism, occurring particularly on sheltered beaches (also preferred by nesting turtles); sand mining on beaches which removes and damages habitat of shorebirds, turtles, and coastal vegetation. All of these activities not only impact on the beach ecosystem but can have further negative impacts on nearshore ecosystems like coral reefs and seagrass beds. Climate change impacts on beaches include the following:

- Increasing temperatures affect wildlife such as turtles, where sex is determined by temperature and higher temperatures will lead to high female to male ratio e.g. in hawksbill and leatherback turtles.
- Rising sea level results in coastal erosion and retreat of settlements inland, and further removal of inland habitats to rebuild infrastructure.
- Rising sea level and coastal erosion also result in costly coastal engineering interventions to protect beaches and mitigate against further erosion.
- More extreme weather events, like hurricanes and storms, can lead to removal of or damage to coastal vegetation.
- Storm surges lead to coastal erosion along beaches, destroying the habitat for nesting turtles and shorebirds and other organisms
- Sargassum seaweed influxes, which have become a challenge in recent times, can clog beaches with massive amounts of seaweed, affect fisheries, tourism and recreational activities and turtle nesting, and increase the risk of invasive alien species being introduced.



**Table 2 (cont.): Summary of impacts of climate change trends on different ecosystems of the Caribbean**

**Coastal and marine ecosystems (cont.)**



Mangroves. Photo: Natalie Boodram/CANARI

**Mangroves**

There are four main mangrove species which occur in the wider Caribbean, namely, red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncularia racemosa*) and buttonwood (*Conocarpus erectus*) (Wilson, 2017). Mangroves provide various ecosystem services, including the removal of waste and pollutants from surface runoff; reducing the sediment load heading into the nearshore systems; regulating water quality; serving as nursery, breeding and foraging grounds for marine life and terrestrial species; shoreline protection; carbon sequestration; and nutrient and energy export to other critical ecosystems such as coral reefs and seagrass beds. They also support livelihoods in fisheries, ecotourism and other community enterprises.

Mangroves in the Caribbean region are most affected by human activities such as the clearing of mangroves for agriculture, pollution from agricultural runoff and other activities such as aquaculture and the removal of mangroves for coastal development and for timber and charcoal. Of climate change impacts, mangroves are most affected by:

- Rising sea level, which can lead to saltwater intrusion causing mortality of mangroves at the coast and the retreat of mangroves further inland. This reduces the mangroves' ability to act as buffers between coastal and terrestrial aquatic systems (Wilson, 2017).
- Increasing air temperature can lead to changes in species composition, affecting the composition of species which inhabit the mangroves and affecting the ecosystem as a whole (Alongi, 2008).
- Increasing intensity of storms and hurricanes and other weather extremes, which can affect the mangroves' ability to re-establish and reduce its ability to filter and regulate surface runoff. An example of this was seen in Puerto Rico after Hurricane Irma, where massive uprooting and damage to mangroves occurred, resulting in a 53% mortality of mangrove trees (Branoff, et al., 2018).

**Table 2 (cont.): Summary of impacts of climate change trends on different ecosystems of the Caribbean**

**Coastal and marine ecosystems (cont.)**



**Coral reefs**

Coral reefs are one of the most important and productive ecosystems in the Caribbean region. There are 65 species of corals found across the region with an estimated coverage of 26,000 km<sup>2</sup>. More common corals found here belong to the genera *Millepora*, *Porites*, *Monastrea*, *Acropora*, *Agaricia*, *Meandrina*, *Diploria*, *Dendrogyra*, *Colpophyllia* and *Mycetophyllia*. Coral reefs have significant ecological functions but are also especially important in the region for supporting the tourism and fisheries sectors (Birdlife International, 2010). Coral reefs are estimated to provide shoreline protection at a value up to US\$2.2 billion annually and to generate up to US\$2.1 billion in annual dive tourism revenue (Burke & Maidens, 2004). They also provide food, medicines, recreational activities and ecosystem services like formation of sandy beaches. Coral reefs in the Caribbean are classified as threatened however (Birdlife International, 2010). They face many challenges due to coastal development for tourism, industry or housing; overexploitation and damage due to unsustainable fishing practices; and pollution from marine and land-based sources such as sewage, agricultural runoff, sediment and chemicals from skin care products and other pharmaceuticals. Other activities detrimental to reefs, include vessel discharge, oil spills and dredging in nearshore environments. Coral disease is also another major threat faced by Caribbean reef ecosystems, like the most recent Stony Coral Tissue Loss Disease, which has been spreading since 2014 (UNEP-CEP, 2020).

These impacts on coral reefs are further exacerbated by climate change (UNEP-CEP, 2020), including:

- Increasing sea surface temperatures that can cause bleaching and mortality of coral, leading to decreased productivity of the ecosystem and decreased/changed populations of reef-associated marine life, due to migration and lower levels of fish reproduction. In 2005, the Caribbean experienced a substantive bleaching event, where sea surface temperatures were increased for a 7-month period. The islands of the Lesser Antilles experienced even higher temperatures leading to extensive coral bleaching and mortality.
- Rising sea level is expected to increase coastal erosion and sedimentation of reefs impairing their ability to photosynthesise, feed and carry out other important physiological processes.
- Increasing intensity of storms and hurricanes can cause physical damage to reefs from wave action which can result in death of coral polyps.
- Increasing intensity and frequency of extreme rainfall events can bring greater volumes of sediment and land-based sources of pollution to the nearshore marine environment, causing smothering of coral reefs.
- Ocean acidification lowers the calcium carbonate needed for reef building and for the health of shellfish.
- Sargassum influx events are also a growing concern for coral reef ecosystems, where mats of the sargassum seaweed come into shore and are deposited on the seabed when they die, smothering coral and other nearshore ecosystems.



**Table 2 *(cont.)*: Summary of impacts of climate change trends on different ecosystems of the Caribbean**

**Coastal and marine ecosystems *(cont.)***



Seagrass. Photo: Benjamin L. Jones

**Seagrass beds**

In the Caribbean, seagrass beds can be found in nearshore areas, growing as large meadows in sheltered coastal areas or in lagoons between coral reefs and beaches. Although seagrass is recognised as a highly valuable and productive marine ecosystem, it is also one of the most vulnerable to human activity and climate change. There are eight types of seagrasses found in the Caribbean, one of which is invasive, *Halophila stipulacea*. Those native to the region are: shoal grass (*Halodule wrightii*), turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), clover grass (*Halophila baillonii*), widgeon grass (*Ruppia maritima*), paddle grass (*Halophila decipiens*) and star grass (also known as Engelmann's seagrass) (*Halophila engelmannii*).

Seagrasses in the Caribbean are negatively impacted by human activity such as damage caused by boats, fishing gear, mooring and anchors; shading from coastal infrastructure and boats; trampling by humans; coastal pollution; and other nearshore disturbances which can smother seagrasses and affect ecosystem health. The exact impacts of climate change on seagrass are still poorly understood, however it is expected that increased sea surface temperatures can “burn” seagrasses, as seen in one study in Turks and Caicos of a shallow water seagrass community. It is also expected that the nursery and spawning function of seagrass beds can be affected by increased sea surface temperatures (UNEP-CEP, 2020). Climate change impacts, such as more intense rainfall and extreme weather events which cause greater surface runoff, can amplify the effects of existing threats to seagrass such as sedimentation. Recent sargassum influx events have also proven to be a climate change-related threat. As sargassum mats move closer to shore, they can smother nearshore ecosystems like seagrass beds as they die off and sink to the seabed (UNEP-CEP, 2020).

**Table 2 *(cont.)*: Summary of impacts of climate change trends on different ecosystems of the Caribbean**

**Land-based ecosystems**



**Forests**

The Caribbean is home to several forest types that can be broadly categorised into four groups: tropical and subtropical moist forests; tropical and subtropical coniferous forests; tropical and subtropical dry forests (Ekos Communications. Inc. , 2009); and shrublands and dry scrub (Birdlife International , 2010). Forests in the Caribbean are affected by anthropogenic pressures such as reduced land area, growth in population and development, and fires. These pressures on Caribbean forests are further exacerbated by the effects of climate change. Some forest types are already recognised as threatened like the tropical dry forests. Generally, climate change impacts on Caribbean forests are noted as follows (Nelson, et al., 2018):

- Increased drought conditions can affect the growth of forests and limiting reproductive effort.
- More intense hurricanes damage forests, modifying the ecosystem structure which can take years to recover.
- Increased variability in rainfall patterns affects the growth and survival of forest types, like tropical dry forests, which are more sensitive to shifts in rainfall patterns.
- Increased daily temperatures and decreased levels of rainfall can lead to more fires, which forests may take long to recover from.
- More frequent fires may also allow the proliferation of invasive species which tend to be more drought and fire resilient than native species trees. In some cases, it may even affect species composition of the forest.



**Table 2 *(cont.)*: Summary of impacts of climate change trends on different ecosystems of the Caribbean**

**Land-based ecosystems *(cont.)***



River, Grenada. Photo: Natalie Boodram/CANARI

**Freshwater systems**

The region is also home to rich freshwater ecosystems, such as wetlands, lakes, rivers and streams. These land-based aquatic systems are important habitats for plants and wildlife, including migratory birds and other animals. Freshwater ecosystems also provide vital ecosystem services like food, water and energy sources, and are particularly important in smaller islands of the Caribbean, where sources for freshwater are limited. These ecosystems are important for providing and regulating water, particularly on islands with only one source and/or flatter islands. These systems supply water for economic activity, with some sectors having a greater demand like agriculture and tourism. In Barbados for example, the agriculture and domestic sectors are the two largest water users (FAO, 2015). However, these demands are increasing, which in turn puts greater strain on freshwater ecosystems to supply water. Aside from development and increased urbanisation, there are several other human-related threats to freshwater ecosystems, including: habitat destruction and fragmentation for development and agriculture; overexploitation and abstraction of water which decreases water flow and impacts on habitat structure, connectivity and availability of food for organisms in the water body; pollution; and deforestation that increases the volume of water and sediment run off from surrounding lands.

Human activities like these have even greater impact on freshwater ecosystems when coupled with the impacts of climate change. Climate change affects land-based aquatic ecosystems as follows (Birdlife International, 2010):

- Increasing drying or drought conditions can change freshwater habitats, biodiversity and water retention in aquifers.
- Rising sea level and saltwater intrusion can cause the thinning of freshwater layers and lead to mortality in freshwater species and changes in species composition.
- Increasing intensity of storms and hurricanes can damage riverine habitats and organisms (which are forced to move elsewhere or killed).
- Rising air temperature can lead to heat stress and causes an increasing demand for and abstraction of freshwater.
- Increasing intensity of rainfall events, together with deforestation along river and other freshwater systems, can lead to sedimentation and flooding of rivers.

## Box 4: Vulnerability to climate change in the Caribbean islands

Small island developing states in the Caribbean have been identified as amongst the most vulnerable to the impacts of climate change for several reasons:

- **Caribbean islands are routinely exposed to climate hazards.** About 70% of Caribbean people live and work in coastal areas, where infrastructure such as roads and air and sea ports are also located, exposing them to coastal erosion and flooding due to sea level rise and storm surge. Many of the Caribbean islands, such as Grenada, Dominica, and The Bahamas, are also located along the path of tropical storms. Storms affect the Caribbean each year, causing loss of lives and millions of dollars in damages to the countries. Some of our island states are also prone to dry conditions that are exacerbated during extended periods of low rainfall leading to droughts. Islands like Aruba, Bonaire, and Antigua have dry conditions that are expected to increase as the climate continues to change.
- **Caribbean islands are highly affected by climate hazards and related disasters.** Our past has shown that extreme climatic events, such as heatwaves, drought and hurricanes, can cause disasters and disproportionately affect the population and economies of Caribbean islands. In small islands with economies based on one or two sectors, such as agriculture and tourism, a single climatic event can result in loss of life and damage to infrastructure and livelihoods affecting the entire island. In 2019,



Figure 10: Damage in the city of Moron, Haiti, following Hurricane Matthew. Photo: Avi Hakim, CDC (Flickr) [CC BY 2.0 (<http://creativecommons.org/licenses/by/2.0>)], via Wikimedia Commons



## Box 4 *(cont.)*: Vulnerability to climate change in the Caribbean islands

Hurricane Dorian, one of the strongest Atlantic Hurricanes on record, hit the Bahamas. In 2017, category 5 Hurricane Maria devastated Dominica, resulting in damages and losses estimated at around US\$1.37 billion, equating to 226% of Dominica's 2016 GDP (Government of the Commonwealth of Dominica, 2017). Antigua and Barbuda was also hit by both Hurricanes Irma and Maria in 2017 with catastrophic effects – total damages were estimated at US\$ 136.1 million and losses at US\$ 18.9 million. The impact of Hurricane Irma on Barbuda was particularly severe with 81% of Barbuda's buildings reported to have been destroyed or severely damaged, and the island was deemed uninhabitable. Additionally, the 2009 - 2010 drought caused a 20% reduction in vegetable production and 200% rise in vegetable prices in Saint Vincent and the Grenadines (FAO, 2016).

- **The costs of adaptation are a disproportionate burden on developing economies.** Most of the islands of the Caribbean are classified as medium developed countries, with Haiti classified as among the least developed countries in the world. Adapting to climate change is costly. The infrastructure needed to adapt to climate change, such as sea walls, changes to building structures and roads, is expensive to put in place and most Caribbean governments cannot afford these costs.

The net effect is that the Caribbean is highly vulnerable to climate change and related natural disasters. With limited finances and technical resources to address the impacts of climate change, Caribbean governments and civil society have been advocating for additional support for adaptation from developed countries.

The potential for more extreme events in the face of climate change poses a critical challenge for the future.



Figure 11: Damage in Dominica following Hurricane Maria in 2017. Photo: Andrew MacCalla Direct Relief



Figure 12: After Hurricane Tomas hit St. Lucia in 2010, severe flooding and mudslides were experienced throughout the island. Photo: Natalie Boodram/CANARI



## 1.6 Understanding the policy environment to address climate change

For effective advocacy around climate change, CSOs need a sound understanding not only of climate change and its impacts but also of the policy response in terms of mitigating and adapting to climate change at the global, regional and national levels.

Policy response to climate change focuses on two measures:

- **Adaptation to address the impacts of climate change.** Adaptation helps human and environmental systems to adjust or change to be able to function in changing climates. These measures can include changing crops to drought-resistant varieties in the Caribbean as it becomes drier and warmer.
- **Mitigation to address the causes of climate change.** Mitigation seeks to reduce the emissions of GHGs (e.g. use of alternative energy sources for electricity and transportation that do not produce carbon dioxide) and enhance activities that absorb and store carbon dioxide from the environment (e.g. planting and protecting forests that absorb carbon dioxide from the atmosphere).

This section presents the current status of key policies, agreements and organisations driving these measures and shaping the climate change policy environment at various levels.

### 1.6.1 Global level

#### *a) The United Nations Framework Convention on Climate Change (UNFCCC)*

The UNFCCC is one of three conventions resulting from the 1992 Rio Declaration on Environment and Development. The ultimate objective of the UNFCCC is to stabilise greenhouse gas concentrations at a level that would prevent dangerous human-induced interference with the climate system. It also states that “such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner” (UNFCCC, 1992).

The UNFCCC took effect in 1994 and 197 countries have ratified the text, becoming Parties to the Convention. Since the first meeting of the Conference of the Parties (COP) to the UNFCCC held in Berlin, Germany in 1995, world leaders have met on a regular basis to try and provide adequate responses to the challenges posed by climate change.

One of the most notable outcomes of these COP meetings was the Kyoto Protocol, adopted in 1997. When it entered into force almost 10 years later in 2005, the Kyoto Protocol set binding emission reduction targets for a total of 37 industrialised or developed countries, as well as the European Community, based on the fact that these countries have been and continue to be the highest emitters of greenhouse gases. The first commitment period set

out by the Kyoto Protocol spanned four years, 2008 - 2012, while the second commitment period started in 2013 and ran until 2020.

The 21st COP meeting (COP 21) of the UNFCCC was held in December 2015 in Paris, France. The main outcome of the meeting, the **Paris Agreement**, was considered a major achievement in light of the provisions agreed by the Parties to the Convention to increase efforts to combat climate change as well as to adapt to its effects. The Paris Agreement entered into force on 4 November 2016.

The Paris Agreement states that all parties to the Convention will work to ensure that global temperature rise can be maintained to well below 2°C above average pre-industrial levels, while countries will strive for a maximum of 1.5°C. In the lead-up to the COP 21 Paris meeting, Caribbean countries advocated for a cap of 1.5°C, and many stakeholders embarked on a “1point5toStayAlive” campaign (see Case Study 6.8 in Section 6). Indeed, a 2°C increase would lead to rising sea levels as warmer waters expand and could submerge as much as 13,000 km<sup>2</sup> of land in the Caribbean region, an area comparable to the islands of Anguilla, Antigua and Barbuda, Barbados and Saint Vincent and the Grenadines combined<sup>8</sup>.

The Paris Agreement includes provisions for enhanced support to assist developing countries including:

- international cooperation and support;
- capacity-building, including through innovation and technology; and
- financial support and resources, especially to meet the costs of adaptation.

The Paris Agreement also contains provisions inviting CSOs to scale up their efforts and support actions to reduce emissions and/or to build resilience and decrease vulnerability to the adverse effects of climate change<sup>9</sup>.

### ***b) The Intergovernmental Panel on Climate Change (IPCC)<sup>10</sup>***

The IPCC is an organisation set up by the United Nations Environment Programme and the World Meteorological Organization in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. Since 1990, the IPCC has produced five assessment reports on climate change with contributions from over 1,000 scientists worldwide. The most recent assessment reports from 2021 - 2022 focus on state-of-the-art climate science and model projections, impacts and vulnerability to climate change, and strategies for adaptation and mitigation.

<sup>8</sup> <http://1point5.info/whatsup>

<sup>9</sup> For more information, see <http://bigpicture.unfccc.int/#content-the-paris-agreemen>

<sup>10</sup> For more information, see <https://www.ipcc.ch/index.htm>

## 1.6.2 Regional level

### ***a) Caribbean Community Climate Change Centre (CCCCC or 5Cs)<sup>11</sup>:***

The CCCCC coordinates the Caribbean Community's (CARICOM) response to climate change. It is also the repository and clearing house for regional climate change information and data and provides climate change related policy advice and guidelines to the CARICOM Member States through the CARICOM Secretariat.

### ***b) Regional Framework and Implementation Plan for Achieving Development Resilient to Climate Change:***

The CCCCC has prepared a Regional Framework and Implementation Plan for Achieving Development Resilient to Climate Change (CCCCC, 2009). The Regional Framework, which was approved in 2009, defines a strategic and coordinated approach to address climate change and build resilience within CARICOM. The framework focuses on:

1. Mainstreaming climate change adaptation strategies into the sustainable development agendas of CARICOM states.
2. Promoting the implementation of specific adaptation measures to address key vulnerabilities in the region.
3. Promoting actions to reduce GHG emissions through fossil fuel reduction and conservation, and switching to renewable and clean energy sources.
4. Encouraging action to reduce the vulnerability of natural and human systems in CARICOM countries to the impacts of climate change.
5. Promoting social, economic, and environmental benefits through the sustainable management of standing forests in CARICOM countries.

An implementation plan was developed for the period 2011 – 2021, and is currently being updated, to secure buy-in and funding from CARICOM governments, civil society and key donors to take action and establish a monitoring and evaluation system to track progress in building resilience to climate change (CCCCC, 2011).

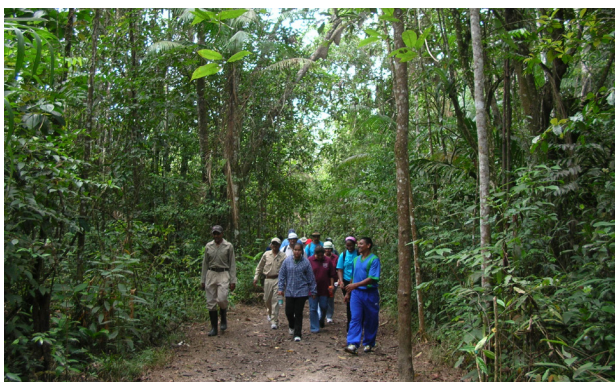


Figure 13: The Aripo Savannas Scientific Reserve, Trinidad. Photo: CANARI

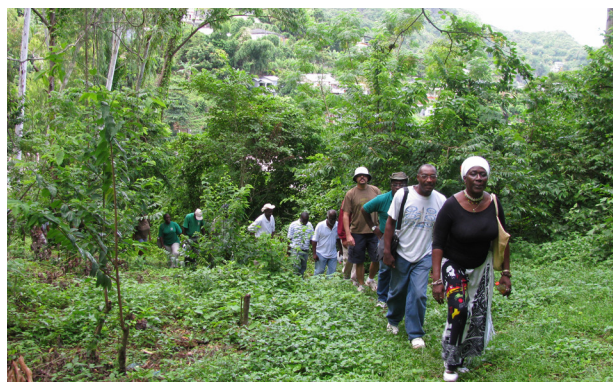


Figure 14: The Fondes Amandes Community Reforestation Project, Trinidad. Photo: CANARI

11 For more information on CCCCC, see <http://www.caribbeanclimate.bz/>

### 1.6.3 National level

#### a) National Climate Change Policy

At the national level, many Caribbean countries have established comprehensive policy and legislative frameworks to address adaptation and mitigation of climate change. These policies seek to integrate climate change issues into planning for sustainable and resilient development, ensure a coordinated approach across government agencies, and foster partnerships with businesses and civil society. Climate change policy aims to identify nationally-appropriate mitigation actions to reduce GHG emissions and achieve specific targets as part of their commitments under the Paris Agreement, and to promote actions to reduce vulnerability and adapt to the impacts of climate change. See example in Box 5 below.

#### Box 5: Grenada Climate Change Policy

The National Climate Change Policy of Grenada, Carriacou and Petite Martinique (2017 - 2021) was published in November 2017. This policy builds on the National Climate Change Strategy and Action Plan 2007 - 2011 (NCCSAP). The revised policy reflected lessons from the implementation of the NCCSAP and gaps in climate change adaptation and mitigation efforts. The development of the policy was managed by a National Climate Change Committee.

The policy sets the context for climate change action, at the global, regional and national levels. Grenada is party to the UNFCCC Paris Agreement, which it sees as important to achieving targets set under the Sustainable Development Goals (SDGs). Grenada, as one of the member states of the Caribbean Community (CARICOM), is also signatory to the CARICOM Declaration for Climate Action which came into being in 2015. Like other CARICOM states, Grenada is also guided by the Regional Framework for Achieving Development Resilient to Climate Change and the accompanying implementation plan developed by the CCCCC.

At the national policy level, the National Climate Change Policy also aligns to the national development goals identified in the then draft National Strategic Development Plan 2030 and the Growth and Poverty Reduction Strategy. The policy also addresses gaps in the NCCSAP. These gaps were related to climate change data for use in decision-making; training in an integrated approach for climate change adaptation, in all sectors and at all levels, that is, ministries, private sector, civil society sector and in communities; enforcement of relevant laws, and public education and awareness initiatives on conservation and climate change to support enforcement efforts; resources for supporting partnerships between national, regional and international bodies; and measures to adequately address rise in temperature, changing rainfall patterns, rise in sea level, natural hazards, and low carbon infrastructure.

The vision, as stated in the policy, is “An empowered Grenadian population capable of managing the risks from climate change with emphasis on pursuing a low carbon development pathway and building resilience at the individual, community and national levels.” The policy comprises:

- Eight objectives for the policy period of 2017 - 2020
- Thirteen interconnected strategies for achieving the objectives of policy and the Nationally Determined Contribution
- Twenty outcomes to be realised between 2017 and 2020 with timelines identified

The policy corresponds to actions identified in the Nationally Determined Contributions and the National Adaptation Plan developed for the same timeframe (2017 - 2021). Also included in the policy is a monitoring and evaluation framework and strategies for sourcing financial and technical support.



## ***b) Nationally Determined Contributions***

As part of their commitment to Article 4 of the Paris Agreement, countries develop Nationally Determined Contributions (NDCs<sup>12</sup>) to highlight what climate actions they will take from 2020 towards the long-term goals of the agreement to keep warming under 2°C globally. The NDCs include actions taken to decrease national GHG emissions, and activities for adaptation to climate change impacts. Each country is required to develop and communicate intended NDCs as well as national mitigation interventions for attaining the NDCs.

The NDCs, new or revised, are submitted to the UNFCCC Secretariat every five years, with 2020 being the most recent round of submissions, and subsequent submissions in 2025, 2030 and so on. These documents are shared publicly through the NDC registry which is managed by the secretariat. Each country signing on to the Paris Agreement can submit NDCs through national focal points for climate change. Currently, 190 countries have submitted NDCs to the UNFCCC, including Caribbean countries.

### **Box 6: Nationally Determined Contribution of Jamaica**

An update of the Nationally Determined Contribution (NDC) of Jamaica was submitted to the United Nations Framework Convention of Climate Change (UNFCCC) in June 2020. The updated NDC recommitted to the Paris Agreement, with increased ambitions in terms of scope and reductions of Jamaica's GHG emissions. The scope of the NDC was expanded to include the forestry sector and changes in land use, acknowledging the significance of the forestry stocks to the island. Jamaica also intends to increase reductions in their energy sector through decreased use of carbon or fossil-based sources of energy.

The country has also committed to more ambitious targets for reduction of emissions in the energy and forestry and land use sectors, shifting from 1.1 to 1.5 MtCO<sub>2</sub>e (metric tonnes of carbon dioxide equivalent) stated in the 2015 NDC, to 1.8 to 2.0 MtCO<sub>2</sub>e. The updated NDC and revised commitments are supported by the country's existing policy framework, plans and strategies, building on those made in the last NDC.

The updated NDC is based on a reference and target year of 2030 and sets business-as-usual indicators for the priority sectors of energy and forestry and land use change. It also highlights strategies, plans and actions being undertaken, not covered in the commitments, but which will contribute to reduced emissions, in agriculture and waste management. For example, one of the key strategies identified was the Climate Change Policy Framework for Jamaica (2015) which has priority areas focused on developing energy and water efficient agricultural systems and diversified food production. For waste management, an example highlighted was the ban of single-use plastic. An initiative which started in 2019 targets the manufacturing, importing and distributing of straws and plastic bags.

Along with the priority sectors and timeline, the NDC also outlines the specific percentage target reduction of business-as-usual emissions, sources of data and gases covered in the NDC. It also highlights the assumptions and methodological approaches for achieving the targets and states how the NDC is fair and ambitious given the current national context of the island. The NDC further details the planning process, including the institutional framework and mechanisms for stakeholder engagement and gender considerations. Country context is also provided, with details on the geography, climate and economy of the island as well as national priority areas such as sustainable development and poverty eradication.

The 2020 NDC is more ambitious than the previous one and, despite the growth of the economy, the increase in emissions is expected to be small for the key sectors targeted.

<sup>12</sup> More information on NDCs and country NDC documents can be found at <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs#eq-6>

### ***c) National Adaptation Plans***

Under the UNFCCC, countries are encouraged to develop and implement National Adaptation Plans (NAPs) under the Cancun Adaptation Framework<sup>13</sup> through a participatory and multi-stakeholder process. NAPs help countries identify medium-term and long-term adaptation needs and priorities for action and implement strategies to address the impacts of climate change. Several Caribbean governments, including in Antigua and Barbuda, Barbados, Belize, Grenada, Guyana, Jamaica, Saint Lucia and Saint Vincent and the Grenadines, have developed NAPs for the entire country and specific sectors, such as agriculture and water.

Countries are also ensuring that NAPs are developed or updated to include gender considerations and includes gender-responsive actions<sup>14</sup>. Women, youth and other vulnerable groups are impacted differently by climate change and will adapt differently. Recognising these differences, NAPs need to ensure the inclusion of women and other groups in decision-making processes and their equal access to resources and opportunities. Countries like Grenada, Guyana and Saint Lucia have included gender considerations in their NAPs.

### ***d) Nationally Appropriate Mitigation Action<sup>15</sup>***

Countries can also develop nationally appropriate mitigation actions (NAMAs). These are all the various actions undertaken by developing nations to lower GHG emissions and mitigate climate change, with a wide focus on several sectors or specific activities for transformation of the economic sector. The UNFCCC Secretariat manages an online registry of NAMAs to support developing countries in accessing opportunities for financial, technical, and capacity development resources for these actions. Although NAMAs are voluntary, several Caribbean countries have developed actions. Examples of these include:

- Nationally Appropriate Mitigation Action (NAMA): Mainstreaming Solar PV in Grenada
- Nationally Appropriate Mitigation on the Greening of Towns in the Co-operative Republic of Guyana
- Nationally Appropriate Mitigation Action (NAMA) for Jamaica: A Water Sector Focus

<sup>13</sup> For more information, see: <http://unfccc.int/adaptation/items/5852.php>

<sup>14</sup> For more information on gender-responsive NAPs, see: <https://napglobalnetwork.org/wp-content/uploads/2017/07/napgn-en-2017-a-framework-for-gender-responsive-nap-processes.pdf>

<sup>15</sup> More information on the NAMA registry can be found here: <https://unfccc.int/topics/mitigation/workstreams/nationally-appropriate-mitigation-actions/nama-registry>

## 1.7 Climate finance

### 1.7.1. Global overview

Climate finance refers to funding mobilised for climate change mitigation and adaptation actions, which is made available through public, private and other financing sources at the international, national and local levels. The different types of climate finance include grants, concessional loans, private equity and guarantees (Bird, et al., 2017).

Currently, substantial financing is required for mitigation efforts to reduce GHG emissions and to adapt to the impacts of climate change. Under the UNFCCC, developed countries with more funding available for climate action are called upon to financially assist developing countries which have fewer financial resources and a greater vulnerability to climate change impacts, such as Caribbean islands. Developed countries have a leading role in creating innovative and diverse financing mechanisms, and the importance of understanding the financing needs of developing countries to ensure that funding streams are aligned with the objectives of the UNFCCC and country priorities as highlighted in the Paris Agreement (UNFCCC, 2021).

A global target of US\$100 billion per year in climate financing for developing countries from 2020 to 2025 was agreed by the parties to the Paris Agreement (OECD, 2021). Despite the increasing resources available for climate action, climate financing mobilised for developing countries has fallen short of this target (OECD, 2021). Developing countries, including those in the Caribbean, are calling for more global support to implement their NAPs and more ambitious NDCs. They have also identified the need for funds to address loss and damage from climate change (Bird, et al., 2017), particularly for those countries which have already begun to experience its severe impacts like here in the Caribbean. CSOs in the region have further noted barriers to their access to climate finance to support adaptation and mitigation – both in terms of the amount of funding and the quality and way in which it is delivered – and called for a targeted focus on improving funding at the local level (Crawford, et al., 2021).

### 1.7.2. Multilateral funding

Funding for climate change actions is often sourced internationally or regionally within the Caribbean and other developing countries. Multilateral funding is a partnership or agreement between three or more entities, like governments. Multilateral funds accessed in the Caribbean region and elsewhere include the Global Environment Facility, the Green Climate Fund, the Adaptation Fund, the Climate Investment Funds and multilateral development banks such as the World Bank and the Inter-American Development Bank (Bird, et al., 2017). The Green Climate Fund and Adaptation Fund are new funding mechanisms under the UNFCCC, with the Green Climate Fund representing the largest global climate fund with over US\$10 billion available as of 2021 (Green Climate Fund, 2021).



Funding is also available through regional mechanisms and governments. One regional initiative of note is the Caribbean Catastrophic Risk Insurance Facility (CCRIF). This facility was set up in 2007 with assistance from the World Bank and others. It currently has 16 members and now receives funding from contributions of developing countries (Bird, et al., 2017).

### 1.7.3. Bilateral funding

Bilateral funding involves a partnership or agreement between two entities, in most instances two governments. In the Caribbean, several of these partnerships have led to the progress in climate change action and achievement of NDCs. Sources of bilateral funding for the Caribbean region include, for example:

- Canada-Caribbean Resilience Facility
- Germany's International Climate Initiative
- Japan-Caribbean Climate Change Partnership
- United States Agency for International Development (USAID) Climate Change Adaptation Program

While funding is often provided as grants or concessional loans, other types of mechanisms also exist such as debt for climate swaps and foreign direct investment. Debt for climate swap arrangements can be used to redirect climate financing to reduce debt of countries, particularly where large debt detracts from their ability to effectively fund climate action<sup>16</sup>. Foreign direct investment is where investments are made by persons or companies from one country into the economy of another (Chen & Scott, 2021). The Caribbean region has had significant investment from transnational corporations, but this channel of funding has decreased over the years<sup>17</sup>.

### 1.7.4. National funding

National financing for climate change can be delivered in several ways. For the Caribbean region, one of the most direct ways is the establishment of national climate funds or discretionary funds under national climate change policies, strategies and plans. Fees, taxes and levies are used to finance these national funds, such as corporate taxes or levies on tourist arrivals and departures and visitor accommodation like the climate resilience levy in Saint Vincent and the Grenadines.

Countries, such as Antigua and Barbuda<sup>18</sup> and Guyana, have established national climate funds for supporting climate actions (Bird, et al., 2017; Government of Antigua and

<sup>16</sup> The Economic Commission for Latin America and the Caribbean (ECLAC) has proposed a strategy for establishing a Caribbean Resilience Fund (CRF) through which "debt-for-climate-adaptation swaps" can be facilitated. More information on this can be found here: <https://www.cepal.org/sites/default/files/news/files/nydbetreliefcaribbeannovember2017.pdf>

<sup>17</sup> De Groot, O. and Pérez Ludeña, M. 2014. Foreign direct investment in the Caribbean Region- Trends, determinants and policies. Studies and Perspectives. ECLAC. [https://repositorio.cepal.org/bitstream/handle/11362/36620/1/S2014046\\_en.pdf](https://repositorio.cepal.org/bitstream/handle/11362/36620/1/S2014046_en.pdf)

<sup>18</sup> National climate funding is available in Antigua and Barbuda through the establishment of the Sustainable Island Resource Framework Fund (SIRF Fund). <https://environment.gov.ag/sirf>

Barbuda, 2021). Funding is also made available through budgetary allocations from the national government.

Other ways that funds can be sourced for climate action at the national level include:

- Green bonds - Bonds can be used to finance programmes, projects, and activities around climate change adaptation and mitigation, for example, green infrastructure, sustainable land use and planning, and renewable energy.
- Social impact investing - Resources can be pooled from the public, private and non-profit sectors to implement climate actions. Other innovative platforms for crowd funding initiatives can also be used. One example of this is the Jamaican Social Stock Exchange (JSSE) which is pioneering the establishment of the Jamaica Social Investment Exchange (JSIX) with the intention of supporting the country's sustainable development<sup>19</sup>.
- Public-private sector partnerships - Typically, these are long-term agreements between a private party and a government entity for providing a public asset or service, in which the private party bears significant risk and management responsibility (World Bank, 2020). These efforts have been increasing in the region and can be harnessed further to increase funds available for climate change work. Opportunities for these arrangements can be created around clean energy and green and climate resilient infrastructure.

### **Box 7: Antigua and Barbuda's national fund for environmental and climate change action**

Antigua and Barbuda have established a national funding facility, the Sustainable Island Resource Framework (SIRF) Fund, as the main mechanism for financing environmental and climate adaptation and mitigation actions. The fund was set up as a Special Fund through the Finance Administration Act of 2006.

The Fund leverages various national and international funding, with use guided by the country's Environmental Protection and Management Act of 2019. Nationally, funds are to be collected from visitor fees at parks, taxes, levies, duties, carbon credits, fines for pollutions and other regulatory fees. However, the mechanisms are not yet fully in place to collect these fees. Bilateral and multilateral funders are currently the main funding sources for the SIRF Fund, including the Adaptation Fund, Green Climate Fund and the Global Environment Facility.

The Department of Environment has the role of overseeing the SIRF Fund in its 'start up' phase until it can operate as a self-sufficient entity, with oversight from the Fund's General Board. The Department works in collaboration with other key government agencies, the private sector and civil society. Specifically, it is mandated to allocate at least 15% of the monies in the Fund annually to non-governmental organisations to support their environmental and climate action in Antigua and Barbuda (Government of Antigua and Barbuda, 2019).

<sup>19</sup> Learn more about JSSE here: <https://www.jamstockex.com/what-is-the-jamaica-social-stock-exchange/>

Although these various funding opportunities exist, the Caribbean region has still been unable to acquire the level of funding needed to effectively respond to climate change (Oliver, et al., 2018). One way countries are addressing this is through the formation of partnerships with regional or international organisations with the capacity to act as intermediaries and provide technical assistance to countries to access multilateral funds and execute climate actions. In the Caribbean, regional organisations such as the CCCCC, the Organisation of Eastern Caribbean States (OECS) and the Caribbean Development Bank (CDB) and international organisations like UN agencies often fulfil the role of intermediaries through strategic partnerships. CSOs can also serve as intermediaries for multilateral, bilateral and national funds (CANARI, 2016).

## 1.8 Gender and climate change

Gender equality is an important concern that intersects many issues and their solutions. Gender equality has received increased attention and focus, particularly in work being done to meet targets and commitments set out in the Sustainable Development Goals (Goal 5 - gender equality) and the Paris Agreement. Caribbean Governments are progressing towards not just the mainstreaming of climate change in national institutional frameworks, but gender equality as well, recognising that policies, plans, programmes and projects need to be more gender responsive.

To do so, it is important to understand the key concepts related to gender (see Box 8). The Building Resilience with Nature and Gender in the Eastern Caribbean Toolkit<sup>20</sup> is a useful resource for learning more about key gender concepts and how to apply them.

### *Gender mainstreaming in climate change*

Gender mainstreaming in climate change takes into account the specific needs of women, men, boys and girls and other factors that intersect with gender, such as race, age, class, wealth, religion and disabilities, in policy design, implementation and monitoring and evaluation. Gender mainstreaming generally seeks to achieve or address gender equality; include gender sensitive and responsive actions and



Figure 15: Female fish vendor in Barbados. Photo: CANARI

<sup>20</sup> Reference: Bonnin Roncerel, A, Perch, L., McCue, J. and Zermoglio, F. 2020. Building Resilience with Nature and Gender in the Eastern Caribbean - A toolkit to Mainstream Ecosystem-based Adaptation Gender Equality and Social Inclusion. Organisation of Eastern Caribbean States.

## Box 8: Key gender concepts

### What is gender and gender equality?

**Gender** refers to the characteristics of women, men, girls and boys that have been created and accepted by society, including norms, behaviours and roles associated with being a woman, man, girl or boy, as well as relationships with each other (World Health Organization).

**Gender equality** is defined as “equal rights, responsibilities and opportunities” of men, women, boys and girls, that is, that men, women, boys or girls, will not face discrimination based on their gender and that their different needs are considered. It should be clear that gender equality is not exclusive to women’s rights and issues but sees both men’s and women’s rights as human rights.

### Why is gender important to consider in climate change?

Examining climate change from a gender lens “will allow us to understand the obstacles that women and men face from climate hazards, their differential exposures, sensitivity and susceptibility in the face of increased and intensified risk and identification of tangible adaptation measures that better foster women’s integration into decision-making structures (where they are not always included) towards climate-resilient development” (Bonnin Roncerel, et al., 2020). For example, climate change impacts on livelihoods, and the natural resources upon which they depend, are not experienced in the same way by men and women in the Caribbean.

According to the Intergovernmental Panel on Climate Change (IPCC), gender inequalities need to be identified and addressed in developing adaptation and mitigation interventions to ensure improved results and outcomes.<sup>21</sup> The UNFCCC also recognises this importance and requires policy and action to be gender responsive, as outlined in the Paris Agreement. In order to incorporate gender considerations in the climate change policy and actions, it is essential to gather data and conduct gender analysis.

### What is gender analysis and why is it important?

Gender analysis involves the gathering of data on socio-economic and political factors influencing climate change gender differences, how genders are affected by climate change impacts and the role women and men play in the development of interventions. Gender analysis can be used to ensure that policy development and implementation are not gender neutral or gender blind, as men and women are affected differently, particularly as gender intersects with other vulnerable groups/characteristics such as age, poverty levels, disabilities, etc. (United Nations Development Programme, 2016). Undertaking gender analysis and assessments is the initial and crucial step to gender mainstreaming, where gender disparities can be identified to guide development of comprehensive and inclusive solutions and inform decision-making processes.

considerations at all levels of implementation; and recognise gender roles and relationships among genders in creating solutions.

Gender analysis is an important step to guide this process (See Box 8). This involves identification of the differences in access to resources, information, opportunities and decision-making processes between and among genders. It can include policy and institutional analyses and technical analyses.

Another key aspect is gender-responsive budgeting to mobilise funds to take action, which has three main aspects: gender equality in public service employment, gender-specific costs and monitoring of expenditures by gender. The Grenada Gender Equality Policy

<sup>21</sup> [https://napglobalnetwork.org/wp-content/uploads/2019/12/napgn-en-2019-toolkit-for-a-gender\\_responsive-process-to-formulate-and-implement-naps.pdf](https://napglobalnetwork.org/wp-content/uploads/2019/12/napgn-en-2019-toolkit-for-a-gender_responsive-process-to-formulate-and-implement-naps.pdf)

and Action Plan (GEPAP) 2014 - 2024 is one example where gender-sensitive budgeting is provided for at the policy level.

To meet UNFCCC requirements for gender-responsive policy and action for climate change, countries are seeking to develop climate policies, NDCs and NAPs which integrate gender concerns, as well as ensure linkages to national gender policies or plans.

## 1.9 Useful resources

Caribbean Community Climate Change Centre [CCCCC]. (2011). *Background on climate change* [online]. Belmopan, Belize: CCCCC. Available at <http://www.caribbeanclimate.bz/featured-articles/climate-change.html>

International Institute for Sustainable Development. (2021). *NAP Global Network*. [Online] Available at: <https://napglobalnetwork.org/>

Mycoo, M., Wairiu, M., Campbell, D., Duvat, V., Golbuu, Y., Maharaj, S., Nalau, J. Nunn, P., Pinnegar, J., Warrick, O., et al. (2022). Small Islands. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. [Parry, M., Canziani, O., Palutikof, J., van der Linden, P. and Hanson, C. (eds.)] Cambridge, UK: Cambridge University Press. Available at <https://www.ipcc.ch/report/ar6/wg2/>

NAP Global Network & UNFCCC. (2019). *The Toolkit for a Gender-Responsive Process to Formulate and Implement National Adaptation Plans (NAPs)*. Daze, A. and Church, C. (lead authors). Winnipeg: International Institute for Sustainable Development. Available at: [https://napglobalnetwork.org/wp-content/uploads/2019/12/napgn-en-2019-toolkit-for-a-gender\\_responsive-process-to-formulate-and-implement-naps.pdf](https://napglobalnetwork.org/wp-content/uploads/2019/12/napgn-en-2019-toolkit-for-a-gender_responsive-process-to-formulate-and-implement-naps.pdf)

Roncerel, A.B., Perch, L., McCue, J. and Zermoglio, F. (2020). *Building Resilience with Nature and Gender in the Eastern Caribbean - A toolkit to Mainstream Ecosystem-based Adaptation, Gender Equality and Social Inclusion*. Organisation of Eastern Caribbean States.

UNFCCC. (2021). *Introduction to Climate Finance*. [Online] Available at: <https://unfccc.int/topics/climate-finance/the-big-picture/introduction-to-climate-finance>

World Resources Institute and UN Climate Change. (2021). *NDC Partnership*. [Online] Available at: <https://ndcpartnership.org/>

# Communicating effectively about climate change

- 2.1. Introduction
- 2.2. Planning your communications
- 2.3. Steps involved in developing your communication plan
- 2.4. Useful resources



## Box 9: Key terms used in Section 2

<b>Advocacy</b>	Advocacy communications seek to influence people, typically policy and decision makers, to take a particular action. Advocacy campaigns generally focus on achieving change on a specific issue or policy of local, regional, national or international importance.
<b>Communication Product</b>	The format in which you present your messages, e.g. a flyer, a slide presentation, a video, etc.
<b>COP21</b>	21 <sup>st</sup> Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), which took place in Paris in December 2015, resulting in the landmark Paris Agreement, which established goals and binding commitments around climate change mitigation and adaptation <sup>22</sup> .
<b>Dissemination channel (or pathway)</b>	How you get your communication product to the target audience. For example, a flyer could be handed over in person with some accompanying discussion, sent by email or mail, put in the window of a local shop or posted on social media.
<b>Key messages</b>	The most important ideas you want your target audience to understand, remember and act on.
<b>Knowledge, Attitude and Practice (KAP)</b>	All communications should seek to increase the knowledge of the target audience and/or effect some change in their attitudes and practices (sometimes also referred to as 'behaviours').
<b>Public awareness and education</b>	Communication for public awareness and education provides people with information about a subject so that they can better understand it, and usually encourages them to change specific practices or behaviour.
<b>Results, outcomes and outputs</b>	<b>Result</b> is the over-arching term used to describe what you hope to achieve, whether in the short-term or long-term. <b>Outputs are the tangible results</b> of your project (short-term), i.e. the <b>products, goods and services that it directly produces</b> . <b>Outcomes are observable positive or negative attitudinal, behavioural, institutional and societal changes to which your project has contributed</b> ; these may only be seen in the medium or long term.
<b>Target audience</b>	The individuals, groups, organisations and institutions you want to influence through your communications.

<sup>22</sup> see: [http://unfccc.int/files/essential\\_background/convention/application/pdf/english\\_paris\\_agreement.pdf](http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf) for the full text of the Agreement.



## 2.1. Introduction

As Section 1 highlights, the Caribbean region is extremely vulnerable to climate change. Its impacts are affecting, and will continue to affect, our livelihoods, coastal settlements, infrastructure, ecosystems and economic stability. Communicating effectively about the causes and impacts of climate change, and what can be done to mitigate and adapt to it, is therefore critical. But you will only be effective in communicating about this if you are clear in your own mind about:

- what climate change is and what is causing it;
- how climate change is affecting your target audiences; and
- what actions each target audience could take to mitigate or adapt to climate change.

You may also need to clarify common misunderstandings, such as the distinctions between natural and man-made climate change, climate change and global warming, and climate change mitigation and adaptation (see Box 2 in Section 1). The list of key terms in Section 1 provides clear definitions that can also assist you with this and which you can use in your communications.

## 2.2 Planning your communications

The starting point for all effective communication is the development of a **communication plan**. This applies whether you are planning for an entire project or just a single communication product, such as a flyer or a video. Your communication plan outlines:

- **your overall communication objectives:** the change(s) in knowledge, attitudes and practice (KAP) that you want your communications to effect;
- **your target audience(s):** the individuals, groups or organisations you want to influence through your communications;
- the **desired outcomes** for each target audience;
- what you know about **each target audience's existing knowledge, attitudes, practices, interests, agendas** and what **opportunities or challenges** these present for engaging them;
- what you know about each **target audience's communication preferences**;



Figure 16: As part of the Climate ACTT project, representatives of the five beneficiary CSOs participated in a training workshop designed to strengthen the organisations' capacity for effective communication about climate change. In this photo, CANARI's former Executive Director mentors each CSO in producing a draft outline for a communication plan on climate change.  
Photo: CANARI

- **your key messages**, which articulate the most important things you want your target audience to understand, remember and act on;
- the **communication products** you think will be most effective in getting the messages across to the target audience;
- the **dissemination channels** (also referred to as **pathways**) that are most appropriate to the desired objective and target audience; and
- the **indicators/means of evaluation** that you will use to judge and measure the effectiveness of your communications, i.e. whether and to what extent the desired results have been achieved.

Steps 1 to 8 in Section 2.3 outline in more detail how you develop each aspect of the plan.



### Tip

You will also need to develop a **detailed breakdown of the activities and timeline** needed to accomplish the communication plan, including who will be responsible for what, and the proposed start and end dates. This may be developed as part of the plan or be included in the overall breakdown of project activities and timeline.

## 2.3 Steps involved in developing your communication plan

### Step 1: Develop your overall communication objectives

Reflect on what are the changes in knowledge, attitudes and practice/behaviour that you would like your climate change communication project or product to bring about, then draft them as objectives.

Make sure these objectives link well with, and contribute to, the wider objectives of the project.

Your overall objectives are likely to be expressed at quite a high level. For example, the overall objectives of CANARI's Communication Plan for the Climate ACTT project were:

- to raise awareness of how the project partners (CANARI, CI and BHP Billiton) are contributing to climate change action in T&T through the project;



Figure 17: Members of the Environmental Research Institute Charlotteville (ERIC) work on communicating climate change impacts they have observed in Tobago. Photo: CANARI

- to raise awareness on how beneficiary CSOs are contributing to climate change action in T&T through the project;
- to raise awareness on how beneficiary CSOs are strengthening their organisations to achieve best practice; and
- to catalyse and support development of partnerships and to leverage additional support for the work of CSOs on climate change to contribute to greater scale and depth of impact and sustainability of results.

## **Step 2: Identify your target audiences**

Effective communication must be tailored to the particular target audience you are seeking to influence. Sometimes we make the mistake of saying we want to influence ‘the general public’ or ‘the government’ but if we think in terms of such broad categories, our communications are unlikely to have the desired effect.

Instead, it is useful to start by listing the various sectors or types of target audience and then to identify key departments and individuals within each sector that you want to influence. Your target audience might, for example, belong to one or more of the following sectors or groupings:

- government
- private sector
- civil society organisations
- trade unions
- academia
- media
- women
- youth
- school children
- teachers
- resource users
- international agencies
- donors

Once you have identified the most relevant target sectors, you should focus on who are the individuals, or groups of individuals, that it would be most effective to target. These will usually be individuals or groups with power, authority and/or credibility. For instance, if you have identified the government sector as a target, you might consider focusing on one or more of the following:

- ministers

- other Members of Parliament
- permanent secretaries
- other government technocrats
- local councillors
- local government staff

You can then get even more specific and identify specific individuals (or positions/roles), such as:

- Mayor of Port of Spain;
- permanent secretary in the Ministry of Community Development; and
- chair of the Tunapuna/Piarco Regional Corporation.



### Tips

- Sometimes you may have more impact by targeting a potential champion within an organisation, even if they do not have a high level of formal power and authority. These are usually persons who are already sympathetic to the desired outcomes and who are respected by their peers and maybe also target audiences in other sectors.
- Don't forget that people within your organisation are also potential target audiences and champions.
- It is important to target audiences whose views differ from yours or who are active opponents of your position, particularly if they are powerful.

### Step 3: Identify the desired outcomes for each target audience

The desired outcomes are the specific results you want to achieve for each target audience, usually by the end of the project (although sometimes they may also include outcomes you hope will be achieved over the longer term).

As can be seen from the example of the Climate ACTT project provided in Table 3, the desired outcomes for government agencies with roles and responsibilities related to climate change were that they would:

- a) be aware of best practices being implemented by the beneficiary CSOs;
- b) support the beneficiary CSOs in their work on climate change;
- c) involve the beneficiary CSOs as partners in development, implementation and evaluation of climate change policies and actions in Trinidad and Tobago; and
- d) respond positively to the beneficiary CSOs' recommendations for change in policy and practice.

**Table 3: Extract from CANARI's Communication Plan for the Climate ACTT project**

Desired Outcomes for each target audience	Target audiences' interests/opportunities for and challenges in engaging them	Communication preferences	Key messages	Products	Dissemination channels	Indicator/Means of Evaluation
<p><b>Government agencies with roles and responsibilities related to climate change</b> will:</p> <ul style="list-style-type: none"> <li>• be aware of best practices being implemented by the beneficiary CSOs;</li> <li>• support the beneficiary CSOs in their work on climate change;</li> <li>• involve the beneficiary CSOs as partners in development, implementation and evaluation of climate change policies and actions in T&amp;T;</li> <li>• respond positively to the beneficiary CSOs' recommendations for change in policy and practice.</li> </ul>	<p><b>Government agencies:</b></p> <p><b>Interests/agendas:</b></p> <ul style="list-style-type: none"> <li>• have mandates to deliver policies and programmes related to climate change;</li> <li>• are interested in how the project and the work of the CSOs can help them to deliver their mandate.</li> </ul> <p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>• have access to resources and skills (technical, communications etc.) that could complement those of the beneficiary CSOs;</li> <li>• have access to or control of resources and permissions required by the CSOs to implement work on climate change;</li> <li>• are responsible for developing policies and implementing programmes with potential opportunities for engagement of the beneficiary CSOs.</li> </ul> <p><b>Challenges:</b></p> <ul style="list-style-type: none"> <li>• may have negative perceptions of CSOs as too weak to partner with;</li> <li>• tend to engage CSOs via consultations seeking limited input, rather than as partners playing a meaningful role in climate change action in T&amp;T.</li> </ul>	<ul style="list-style-type: none"> <li>• Email</li> <li>• Face-to-face meetings</li> <li>• Field visits to actual or potential project sites</li> <li>• Short summaries of information with clear arguments for a particular course of action (Note: Ministers, Parliamentarians and Permanent Secretaries need information to be presented in a short, easily digestible form, i.e. in jargon-free language that a non-specialist can understand. More detailed technical information can be made available to senior technocrats and advisors if necessary/useful)</li> <li>• Short Powerpoint presentations</li> <li>• Audiovisual products, especially short videos</li> <li>• Newspapers and radio</li> </ul>	<ul style="list-style-type: none"> <li>• The five beneficiary CSOs are already playing an important role in responding to climate change and can do even more.</li> <li>• The Climate ACTT project is helping the five beneficiary CSOs to further strengthen their organisations and implement strategic, locally-relevant adaptation strategies that will benefit T&amp;T.</li> <li>• The five beneficiary CSOs need support from government to be able to implement their practical projects and achieve greater scale and depth of impact and sustainability of results in their work on climate change.</li> <li>• The five beneficiary CSOs are well placed to contribute to the development of national climate change policy and action.</li> </ul>	<ul style="list-style-type: none"> <li>• Policy and project briefs</li> <li>• Project webpage updates</li> <li>• Power Point presentations</li> <li>• Media releases</li> <li>• Videos</li> </ul>	<ul style="list-style-type: none"> <li>• Project launch (held 27.10.2015)</li> <li>• Direct emails to agencies</li> <li>• Telephone calls</li> <li>• Face-to-face meetings</li> <li>• Facebook pages of CANARI and beneficiary CSOs</li> <li>• CANARI's YouTube channel</li> <li>• Websites of CANARI, CI, BHP Billiton and beneficiary CSOs</li> <li>• Field visits to CSO projects and participation in project events (launch, workshops)</li> </ul>	<p><b>Activity indicators:</b></p> <ul style="list-style-type: none"> <li>• # of government agencies targeted</li> <li>• Project webpage updated at least monthly</li> <li>• # of Facebook posts</li> <li>• # of YouTube videos</li> <li>• # of media releases</li> <li>• # of presentations given to government agencies</li> <li>• # of other communication products targeting government agencies</li> <li>• # of field visits/ project events/ meetings with government agencies</li> </ul> <p><b>Short-term results indicators:</b></p> <ul style="list-style-type: none"> <li>• # of government agencies responding/ engaged in the project</li> <li>• # of web hits</li> <li>• # of Facebook likes and shares and comments</li> <li>• # of YouTube views</li> <li>• # of references to Climate ACTT project in communications of government agencies</li> <li>• # of invitations from government agencies to beneficiary CSOs/ CANARI to partner or engage in a government-led process</li> </ul>



Note too that some of these outcomes, such as d) and to some extent c), are unlikely to be fully achieved within shorter duration projects, but they are outcomes to which the project can legitimately expect to contribute.

The more specific and measurable you make your desired outcomes, the easier it will be to evaluate whether they have been achieved (see also Step 8: Develop the indicators and means of evaluation).

#### **Step 4: Document what you know about the current knowledge, attitudes, practices, interests and agendas of your target audience**

Once you have identified who you want to target with your messages about climate change, it is useful to reflect on what you already know about each audience and what else it would be useful to find out. For example, it is useful to know:

- what they already know about climate change;
- what their attitude is to climate change;
- whether their practices contribute to exacerbating, mitigating and/or building resilience to climate change;
- what their interests are;
- what they believe in;
- what is on their agenda; and
- what may enable or hinder communicating and engaging with them.

This exercise can be wide-ranging, provided it is relevant to determining what and how you will communicate with the target audience. For example, you will note in Table 3 that there is little focus on what the government agencies know or understand about climate change as it is assumed that knowledge is high since responding to climate change is part of their mandate. On the other hand, since many of the desired outcomes relate to the agencies' potential to partner with CSOs, it was useful to document their attitudes to the CSO sector and practices in engaging with it.

If there are gaps in your understanding and knowledge of your audience, think of ways in which you could find out more, perhaps from others who have more experience of working with that target audience – or even by interviewing them, focus groups or asking them to complete a questionnaire.

#### **Step 5: Document what you know about the communication preferences of your target audience**

If you don't know how your target audiences prefer to receive information, there is a high risk that you will waste money and time creating a product that doesn't stimulate the changes in KAP that you desire. There is little published data in various Caribbean islands

about target audience preferences, so take the opportunity to discuss these when you are meeting with actual or potential target audiences.

Our experience indicates that there has been a significant shift over the last few years in the preferences of almost all target audiences. There is less interest in hard copy, printed documents, such as policy briefs and technical reports. Instead, people prefer to access information electronically on websites, Facebook, YouTube, blogs etc. and the widespread use of smartphones means that almost everyone now has access to electronic media. Many people also express a preference for information to be provided in a series of shorter, more digestible ‘bites’ rather than one lengthy document, article or video, noting that they tend to set aside anything that they can’t read or watch immediately and then may never get back to it. If you have determined that a longer document is necessary, make sure you have an executive summary or list of key messages on the first page.

### Step 6: Develop your key messages

It can be challenging to communicate about climate change and its impacts because of the complexity and scientific nature of some of the issues. This makes it all the more important that you clearly understand the issues and concepts before trying to communicate them to others and that you tailor your messages to the target audience’s current level of knowledge and particular interests.

A good message:

- is specific;
- communicates clearly to your audience;
- is linked to something the audience cares about; and
- is credible and can be backed up by facts or evidence.

Messages about climate change often try to convey a sense of urgency and emphasise the benefits of making the changes that are being recommended for the particular target audience. You can find two good examples of messages about the impacts of climate change, along with clear calls to action, in the following songs by Caribbean artistes:

- *Voices for Climate Change*, a collaborative effort by Jamaican artistes after training from Panos Caribbean on climate change, available at <https://www.youtube.com/watch?v=M-5NGTSzTJs>; and



Figure 18: Representatives of Environment Tobago (ET) work on mapping climate change impacts in Tobago. Photo: CANARI

- *1point5tostayalive* a collaborative effort by artistes from across the Caribbean, produced in the run up to COP 21, available at <https://soundcloud.com/panos-caribbean/1pont5-to-stay-alive>, (see also Case Study in Section 6).



### **Tip: Think about the messenger as well as the message**

Just having a good message may not be enough; it is also important to use the right messenger. A popular musician or sports person may be more effective in getting a message across to young people than a scientist or politician. On the other hand, a decision-maker or politician may be more receptive to a message conveyed by a technical expert. Leaders of faith-based organisations are already trusted by their respective congregations and can link climate change messages to the values they espouse.

Adapted from CANARI, 2009.

## **Step 7: Select the most effective products to convey the messages**

The **communication product** is the format in which you present the climate change message that you want to share with your target audience. Some common examples of communication products are:

- news releases
- brochures and flyers
- posters
- fact sheets
- videos
- PowerPoint presentations
- technical reports
- policy briefs
- case studies
- blogs
- songs
- skits

The selection of the communication product for each target audience will be based on:

- their communication preferences (see Step 5 above);
- how much money you have available for communications; and
- how quickly you want to get the message out.

You might select a policy brief as the best way to present technical information to policy makers and advocate for policy change to policy makers, with the option of producing a printed version or just a soft copy. On the other hand, a video might be more effective for audiences like school children or resource users like fisherfolk and farmers, particularly if you develop it through a participatory process with the intended target audience. If you have an urgent message, a news release or television/radio interview might be the best option.

### Step 8: Select the dissemination channel

The communication **channel** (or **pathway**) determines how you disseminate the communication product. For example, if you have a policy brief in both soft and printed versions, you could:

- send it via email;
- send it in the post;
- hand it over in person (ideally with time for a discussion of the key points);
- summarise on slides the brief's key messages, then make a face-to-face presentation before handing over the printed version;
- post it on your website, Facebook etc.; and
- ask partners and colleagues to post it on their social media platforms.

Popular dissemination channels include:

- face-to-face meetings;
- radio, television and print media;
- email, websites, and social media platforms; and
- public events such as lectures, workshops, festivals and exhibitions.

For maximum impact, it is best to convey your messages in more than one product and to use several dissemination channels. For example, a youth group focusing on climate change advocacy, and seeking to influence the position of the government in international climate change negotiations, might develop:

- a song or spoken word piece about key climate change issues, which they perform at a special concert, distribute on DVD, and get airplay on radio and television. The Caribbean 1point5tostayalive campaign in the run up to the UNFCCC COP 21 in 2015 provides a good example of multiple products and pathways being used to reinforce the messages (see Case Study in Section 6);
- briefing notes in the form of both an e-policy brief and slides, which they then disseminate via email, social media (e.g. Facebook, Twitter) and at face-to-face meetings with the relevant minister, permanent secretary and other technical staff;

- a series of newspaper articles advocating for the decisions and policies they want to see in place, which could then be further disseminated via their website and social media.

### **Box 10: Example of how dissemination via multiple channels can maximise impact**

In 2012, CANARI was contracted by the Africa Caribbean Pacific (ACP) Fish II Programme to help develop the capacity of fisherfolk leaders and organisations from 12 Caribbean countries to participate in fisheries policy and other discussions on mainstreaming of an ecosystem approach to fisheries (EAF) and climate change into small-scale fisheries at the national and regional levels.

As part of the project communication and visibility activities, project participants used a participatory process to produce a video on the need to address climate change. In the video, Caribbean fisherfolk from Barbados, Belize, Jamaica and Saint Lucia talk about the impacts of climate change they have been experiencing first hand, and the effects these are having on their activity and livelihoods. They also suggest that governments should seek fisherfolk input, as well as that of other relevant stakeholders, to implement adaptation strategies for better resilience to climate change impacts.

To maximise the impact of the video, it was placed on CANARI's YouTube page and on the Caribbean Network of Fisherfolk Organisations' (CNFO) website. It was also presented at a workshop in Guyana in March 2013 as part of the project "Implementing the Caribbean Community Common Fisheries Policy: positioning and engaging fisherfolk organisations", co-hosted by the Caribbean Regional Fisheries Mechanism, the Technical Centre for Agriculture and Rural Cooperation and CNFO.

Due to this widespread dissemination, the video was also seen by the organisers of an international conference in Dublin on the theme of *Hunger, Nutrition and Climate Justice: Making the connections for a more sustainable world* held in April 2013, co-hosted by the Irish Government and the Mary Robinson Foundation – Climate Justice. As a result, CNFO was invited to write and present a case study on empowering its members to act on climate change adaptation, reaching new audiences and achieving not only the intended results (increased awareness of climate change impacts on fisheries and potential adaptation actions in the Caribbean) but also wider international impact.



## Step 8: Develop the indicators and means of evaluation

Whether your communication plan focuses on public education and awareness or advocacy, it is important to evaluate the effectiveness of your approach in order to learn from the experience and apply the lessons learnt to future communication activities. However, you can only evaluate your results if you have determined at the planning stage what are appropriate indicators of success.

### *a) Develop simple indicators*

Developing specific and measurable objectives and desired outcomes (see Steps 1 and 3 above) will help in developing your indicators. To evaluate the overall effectiveness of your communication plan, you should consider three types of indicators:

i. **Activity indicators**, which might include:

- the number of people targeted by a particular outreach activity (e.g. distribution of a news release);
- the people invited to a workshop or other public outreach event;
- the number of topics covered by a particular outreach activity;
- the number of outreach events held; and/or
- the budget spent on outreach activities.

ii. **Short-term result indicators** (i.e. what you hope to have achieved by the end of the project or campaign), which might include:

- the number of people who have heard about climate change or a particular climate change issue;
- the number of copies of outreach material distributed;
- the number of actual people participating in an activity (with comparison to the number of those targeted/invited);
- the number of articles or news items published or aired in a month or week;
- the geographic reach of the activity or product;
- the number of people targeted by a particular activity who can subsequently recall the information; and/or
- the number of people targeted by a particular activity who can subsequently repeat and pass on the messages.

iii. **Medium-term to long-term result indicators** (which may extend well beyond the project or campaign), which might include:

- the number of people who have made lifestyle or other changes as a result of your communications (e.g. doing their part to respond to climate change, deciding to further study or work in a field related to climate change);

- the number of people who have become ‘champions’ or change agents’ as a result of your campaign; and/or
- any changes in policy or legislation that reflect the ideas put forward in your campaign.

### ***b) Qualitative versus quantitative evaluation***

The easiest things to measure are usually quantitative but the most important indicators of your effectiveness are often qualitative, since they measure the shifts in opinions, attitudes and behaviour amongst your target audiences. That is why you will sometimes hear people say, “Not everything that counts can be counted, and not everything that can be counted counts!”

Quantitative evaluation measures tangible results of activities, such as:

- how many people were targeted;
- how many workshops were held;
- how many people are aware of climate change impacts on their livelihoods; and
- the quantity of communications material produced (number of posters, booklets, etc.).

Quantitative evaluation is usually carried out using records such as workshop registration sheets, workshop reports, and questions in surveys and interviews.

Qualitative evaluation seeks to identify and measure the changes in knowledge, attitudes, practices/behaviour, policies, institutions and relationships. Qualitative evaluation approaches include:

- open-ended questions in a survey or interview;
- focus group discussions;
- video feedback from target audiences;
- written documents, such as official publications, reports and studies; and
- direct observation through field work and research into target audience activities, behaviours, and actions through conversations or focus groups with local organisations and community members.

### ***c) Documenting your process and learning from it***

It is important to document your communication activities and their results, not only to support your evaluation, but also to learn how future communication



Figure 19: Two members of Turtle Village Trust (TVT) present their organisation's "body map" – a visual representation of their organisation's anatomy. Photo: CANARI

activities can be improved. You should identify both the major achievements and the challenges. For achievements, it is useful to document why they were successful; similarly, for the challenges, it is useful to document how they were overcome or what could be done differently in future to avoid them. Putting this in writing ensures that the lessons learned can be institutionalised, rather than just remaining in the memories of the few people involved in the communications campaign.

## 2.4 Useful resources

Caribbean Natural Resources Institute [CANARI]. (2020). *An advocacy toolkit for Caribbean civil society organisations*. Port of Spain, Trinidad and Tobago: CANARI.

CANARI. (2021). *Organisational strengthening: A toolkit for Caribbean civil society organisations*. Port-of-Spain: CANARI.

Caribbean Disaster Emergency Management Agency [CDEMA]. (2011). *Climate Smart Community Disaster Management Module and Facilitator's Handbook*. St. Michael, Barbados: CDEMA. Available at [http://www.cdema.org/cris/climate\\_change\\_adaptation\\_mitigation/CSCDM\\_FINAL\\_Facilitators\\_Handbook\\_web\\_version.pdf](http://www.cdema.org/cris/climate_change_adaptation_mitigation/CSCDM_FINAL_Facilitators_Handbook_web_version.pdf)

Caribbean Natural Resources Institute [CANARI]. (2009). *Communicating climate change: A toolbox for local organisations in the Caribbean*. Port of Spain, Trinidad and Tobago: CANARI. Available at <http://www.canari.org/communicating-climate-change-a-toolbox-for-local-organisations-in-the-caribbean-2>



# Assessing vulnerability to climate change

- 3.1. Introduction
- 3.2 Understanding vulnerability and resilience
- 3.3 Steps common to all vulnerability assessment tools
- 3.4 Rapid community mapping
- 3.5 Impact and capacity matrix
- 3.6 Surveys
- 3.7 Semi-structured interviews and focus groups
- 3.8 Participatory photo journaling
- 3.9 Participatory video (PV)
- 3.10 Participatory three-dimensional modelling (P3DM)
- 3.11 Livelihood vulnerability analysis
- 3.12 Value chain analysis
- 3.13 Useful resources

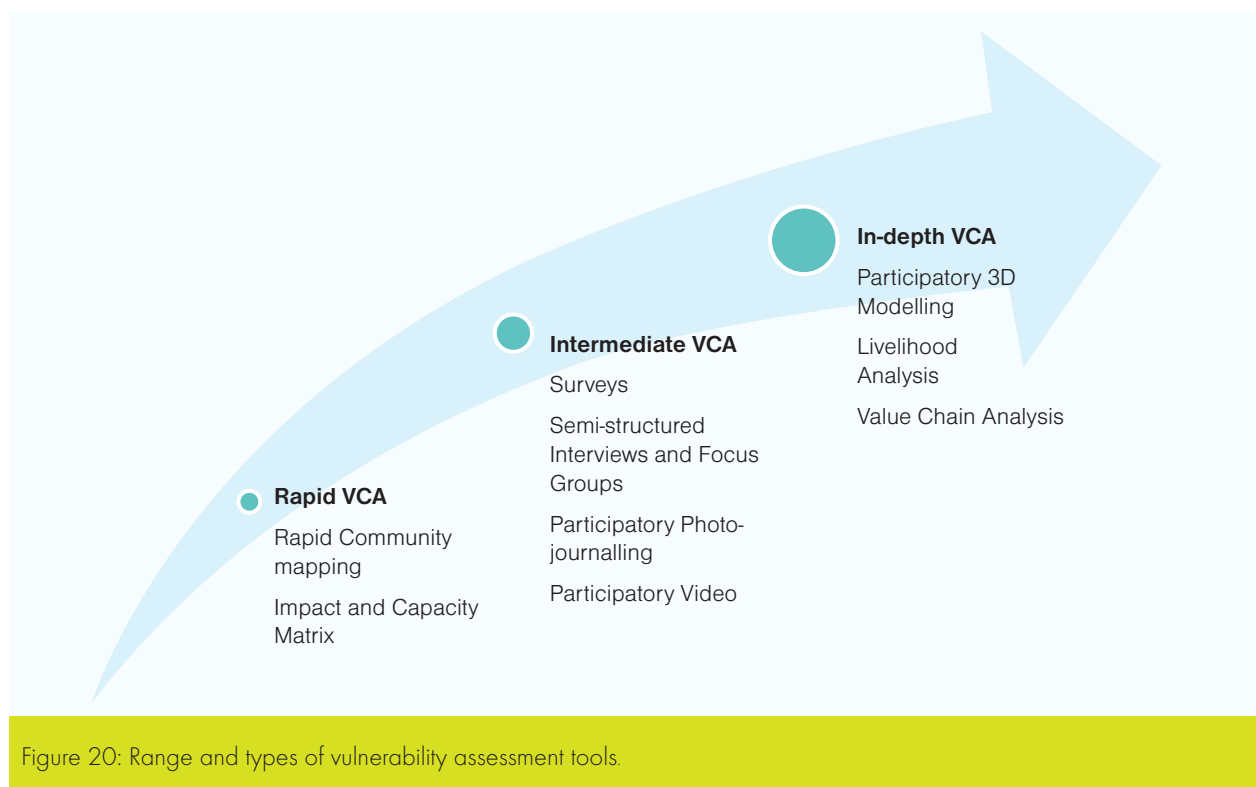


## Box 11: Key terms used in Section 3

<b>Adaptive capacity</b>	The ability of systems, institutions, humans and other organisms to adjust to climate change – including climate variability and extremes – to moderate potential damages, to take advantage of opportunities, or to respond to the consequences. It is context specific as it is strongly influenced by culture, education, health, institutions and socio-economic factors (adapted from IPCC, 2021).
<b>Climate change adaptation</b>	The adjustment of human or natural systems, including specific measures to address the actual or potential impacts of climate change, particularly to moderate harm or exploit beneficial opportunities (adapted from IPCC, 2021).
<b>Climate vulnerability</b>	The characteristics and circumstances of a community, organisation or natural system that make it susceptible to the damaging effects of a climate hazard.
<b>Exposure</b>	The nature and degree to which a system is exposed to significant climatic hazards or variations. It is denoted by 'the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected' (adapted from IPCC, 2021).
<b>Livelihoods</b>	The capabilities, assets and activities required for a means of living. This includes the concept of human well-being and quality of life including, but not limited to, the ability to earn a living in terms of having an adequate salary or generating enough money to cover at least basic needs (DFID, 1999).
<b>Resilience</b>	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (UNDRR, 2017).
<b>Sensitivity</b>	The degree to which a system is affected, either adversely or beneficially, by climate-related changes. More specifically, it is the degree to which biophysical, social and economic conditions are likely to be influenced by stressors or hazards due to climate change including beneficial and harmful effects. The effect may be direct (e.g. a change in fisheries productivity in response to a change in the mean, range, or variability of sea temperature) or indirect (e.g. damages caused by an increase in the frequency of coastal flooding due to sea level rise) (adapted from IPCC, 2007, 2014).
<b>Value chain</b>	A series of steps in an enterprise. It shows the steps from sourcing the raw materials for the products and/or services to sale to the final consumer (Arline, 2016). It is used to improve the enterprise by adding value to the product or service.
<b>Vulnerability</b>	The conditions which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards. These conditions are determined by physical, social, economic and environmental factors or processes (UNIDRR, 2017).

### 3.1. Introduction

Caribbean islands have been identified among the countries most vulnerable to the impacts of climate change. However, the level and type of vulnerability varies from community to community and sector to sector. It is therefore important to conduct a systematic, participatory vulnerability assessment for the community or sector you are focusing on. This enables stakeholders to better understand who is vulnerable, how they are vulnerable, and where they are vulnerable. It is also a key step towards identifying and prioritising specific, practical adaptation actions and resilience building measures. This section clarifies what is meant by vulnerability and resilience and then presents a variety of different tools for conducting participatory vulnerability assessments, including rapid, intermediate and in-depth tools, as shown in Figure 20 below:



Each of these is intended to collect data that is not readily available from other sources. They provide opportunities for stakeholders, such as community members, government technocrats, CSOs and academia, to be part of processes that collect data on vulnerability and adaptive capacity in the areas where they live or sectors in which they work. Table 4 provides a summary of the type of data you would collect with the different tools, the advantages and challenges of each approach, and the human and other resources you need to apply them effectively.

**Table 4: Overview of different vulnerability assessment tools**

Tools	Type of data collected	Advantages	Challenges	Human resources/skills
<b>Rapid tools: These are simple tools that can be deployed quickly and easily in a short time frame. They are low cost and require minimal time, funding and technical expertise to prepare and implement.</b>				
Rapid community mapping	<ul style="list-style-type: none"> <li>• Qualitative</li> <li>• Quantitative (e.g. number of buildings, length of beaches, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid process</li> <li>• Can be less costly and time-consuming than other methods</li> <li>• Facilitates collection of information on location of key areas, including important infrastructure, livelihood activities and natural resources impacted by climate hazards or that help build adaptive capacity and resilience</li> </ul>	<ul style="list-style-type: none"> <li>• Certain socio-economic information may not be captured (e.g. while the map may easily show the location of the hospitals and health centres, it may not easily show the number of persons who have contracted dengue in the area without first performing a literature review or interviewing health officials)</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitator with knowledge or experience in mapping</li> <li>• May require assistant or assigned participant to ensure coherence with the agreed legend, and to assist with note taking relevant to features being mapped</li> </ul>
Impact and capacity matrix	<ul style="list-style-type: none"> <li>• Qualitative</li> <li>• Quantitative (e.g. rating or ranking of level of impact)</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid process</li> <li>• Less costly and time-consuming than other methods</li> <li>• Facilitates collection of information on a range of impacts and capacities to adapt to climatic and other hazards across different sectors or social groups</li> <li>• Flexible – hazards or sectors to be assessed can vary as needed</li> </ul>	<ul style="list-style-type: none"> <li>• Challenges ensuring hazards are appropriately identified, as opposed to issue caused by a hazard</li> <li>• May require skilled facilitation to gain consensus of multiple participants in ranking relevant impacts and capacities noted in the matrix</li> <li>• May not explicitly factor in some informational such as historical trends or institutional analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Skilled facilitator and possibly assistant facilitator may be required if the tool is to be used to assess impacts in multiple sectors in one session</li> </ul>
<b>Intermediate tools: These generally require more time, funding and effort to prepare and implement as well as effective communication and facilitation skills.</b>				
Surveys	<ul style="list-style-type: none"> <li>• Quantitative</li> <li>• Qualitative</li> <li>• Yes/No or multiple choice responses to questions</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitates collection of the same information from every respondent</li> <li>• Eliminates or limits interviewer bias (depending on how administered)</li> <li>• Can be administered without using human resources (e.g. online, via mail or email)</li> <li>• Analysis is relatively simple, particularly if confined to closed-ended questions and/or online survey tools are used</li> </ul>	<ul style="list-style-type: none"> <li>• Low response rates to surveys administered online or via email/mail</li> <li>• May require a lot of interviewers if administering a large face-to-face survey</li> <li>• Interviewees seeking to provide the 'right' answer rather than reflecting on and providing their own opinions /perceptions</li> <li>• Analysis software can be costly</li> </ul>	<ul style="list-style-type: none"> <li>• Interviewers with at least basic training in interview techniques</li> <li>• Interviewers good understanding of the purpose of the survey and of the organisation administering it</li> </ul>

**Table 4** *continued* : **Overview of different vulnerability assessment tools**

Tools	Type of data collected	Advantages	Challenges	Human resources/skills
Semi-structured interviews and focus groups	Mainly qualitative apart from basic demographic data	<ul style="list-style-type: none"> <li>Facilitates more in-depth exploration and discussion of people's knowledge attitudes and practices</li> <li>More flexible and adaptive to respondents' interests and responses</li> </ul>	<ul style="list-style-type: none"> <li>Requires more skill to compile and administer effectively (e.g. ability to think and adapt on their feet without introducing personal bias or influencing answers, good recording skills)</li> <li>Transcribing responses can be very time-consuming</li> </ul>	<ul style="list-style-type: none"> <li>Interviewer/focus group facilitator with relevant skills, preferably perceived to be neutral (i.e. no personal stake in the outcomes)</li> <li>Where possible, an assistant facilitator to organise the digital recorder, note down people's responses and summarise them afterwards (essential for focus groups, desirable for all but short interviews to allow the interviewer to engage in uninterrupted conversation with respondents)</li> </ul>
Participatory photo journaling	<ul style="list-style-type: none"> <li>Qualitative</li> <li>Quantitative (e.g. number of persons, buildings/ infrastructure affected)</li> </ul>	<ul style="list-style-type: none"> <li>Can be a rapid method</li> <li>Involves a wide range of stakeholders</li> <li>Very visual so makes vulnerabilities easier to understand and see</li> <li>Good method to use for people with low literacy</li> <li>Smartphones can be used as more affordable and accessible option for taking photos</li> </ul>	<ul style="list-style-type: none"> <li>May not capture all aspects of vulnerability without further written or spoken explanations</li> </ul>	<ul style="list-style-type: none"> <li>Good photographer to train others</li> </ul>
Participatory video	<ul style="list-style-type: none"> <li>Qualitative</li> <li>Quantitative (e.g. number of persons, buildings/ infrastructure affected)</li> </ul>	<ul style="list-style-type: none"> <li>Involves a wide range of stakeholders and gives community a direct voice i.e. to tell their own story</li> <li>Very visual so makes vulnerabilities easier to understand and see</li> <li>Good method to use for people with low literacy</li> <li>Smartphones can be used as a more affordable and accessible option for taking video clips</li> </ul>	<ul style="list-style-type: none"> <li>May require additional fieldwork to capture footage; can be time-consuming</li> </ul>	<ul style="list-style-type: none"> <li>Videographer, with video capture and editing skills</li> <li>Skilled facilitator who can guide development of storyboard, collection of footage and compilation of video.</li> </ul>

**Table 4** *continued* : **Overview of different vulnerability assessment tools**

Tools	Type of data collected	Advantages	Challenges	Human resources/skills
<b>In depth assessment tools: These are more complex tools that require significant time, funding and other resources to prepare and implement, including specialised facilitation skills and technical expertise.</b>				
Participatory three-dimensional modelling	<ul style="list-style-type: none"> <li>Qualitative</li> <li>Quantitative (e.g. number of buildings, length of beaches, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Because the model is produced to scale the information collected can be placed into a geographic information system (GIS) and used by a variety of planners</li> <li>Enables a wide variety of stakeholders to be involved in discussions</li> <li>The final model can be used in further planning processes</li> </ul>	<ul style="list-style-type: none"> <li>Can be time consuming</li> <li>Can be expensive</li> </ul>	<ul style="list-style-type: none"> <li>GIS expert</li> <li>Skilled facilitator to support model development and vulnerability analysis</li> </ul>
Livelihood analysis	<ul style="list-style-type: none"> <li>Livelihood activities and the assets they draw upon;</li> <li>Exposure and sensitivity of livelihood activities and assets climate change threats;</li> <li>Current and future adaptive capacity</li> <li>Priority actions to reduce livelihood vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>Provides information on exposure, sensitivity and adaptive capacity for specific livelihood activities</li> <li>Takes into account cultural, economic, environmental, social and political factors in assessing vulnerability and impacts on livelihoods</li> <li>Provides information on ways to improve livelihoods as well as assessing their vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>Can be time consuming</li> <li>Needs a trained facilitator to help with livelihood analysis</li> </ul>	<ul style="list-style-type: none"> <li>Skilled facilitator for livelihood analysis with relevant skills, preferably perceived to be neutral (i.e. no personal stake in the outcomes)</li> </ul>
Value chain analysis	<ul style="list-style-type: none"> <li>Qualitative</li> <li>Quantitative (e.g. number of persons or inputs such as funds and materials involved in activities)</li> </ul>	<ul style="list-style-type: none"> <li>Provides information on ways to improve the enterprise while assessing its vulnerability</li> <li>Provides information on all the enterprise's assets</li> <li>Provides information on sensitivity, exposure and adaptive capacity of the enterprise</li> </ul>	<ul style="list-style-type: none"> <li>Can be time consuming</li> <li>Needs a small business development expert to help with value chain analysis</li> <li>Requires lots of background information on the enterprise</li> </ul>	<ul style="list-style-type: none"> <li>Enterprise owners</li> <li>Enterprise staff</li> <li>Small business development expert, with understanding of value chain analysis process and climate change impacts and responses</li> </ul>



## 3.2 Understanding vulnerability and resilience

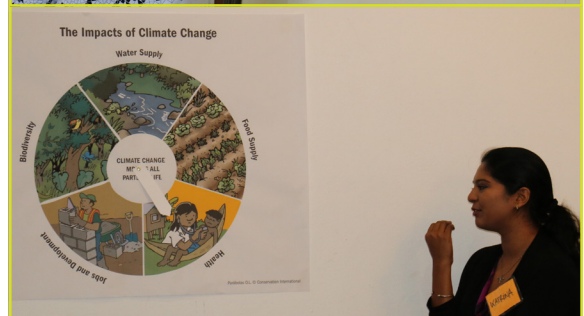
Before you undertake a vulnerability assessment, it is important to understand the components of climate vulnerability and what it means to have adaptive capacity for and develop resilience to climate change.

**Climate vulnerability** (see definition in Box 11) is determined by the extent to which a community, organisation or natural system is **sensitive to climate impacts, its exposure to climate stresses, and its adaptive capacity**<sup>23</sup>. For example, a coastline where the mangrove forest is degraded is more sensitive to climate change than one with healthy mangrove forests that can withstand storm surges and protect the coast.

Our **exposure** to climate stresses relates to how likely it is that an impact will occur in our region (see definition in Box 11). So in assessing vulnerability in the Caribbean, consideration needs to be given to the trends we are experiencing. As discussed in section 1, these include higher temperatures on land with more hot days and fewer cold nights, higher sea temperature, greater rainfall variability, more frequent and extreme weather events, sea level rise and ocean acidification.

**Adaptive capacity** refers to the ability of a community, organisation or natural system to cope with the impacts of climate change (see definition in Box 11). For example, a person who only farms tomatoes for income is considered to have low adaptive capacity.

<sup>23</sup> In the Fifth IPCC Assessment Report (AR5) in 2014, the conceptualization of vulnerability was altered from the framework outlined in the 2001 and 2007 assessment reports, with a greater focus on climate risk management. However, the original conceptual framework continues to be widely used and form the basis of vulnerability assessments in a range of sectors (e.g. GIZ, 2014; Conservation International 2016; FAO and CIFOR, 2019).



Figures 21 - 24: As part of the Climate ACTT project, representatives of the five beneficiary CSOs participated in a four-day training workshop designed to enhance their capacity for assessing vulnerability and building resilience to climate change. Photos: CANARI



Figures 25 - 28: As part of the vulnerability assessment workshop under the Climate ACTT project, participants went into the field and worked in teams to conduct rapid vulnerability assessments to understand how climate change will impact the coastal community of Salybia in north-east Trinidad. Photos: CANARI

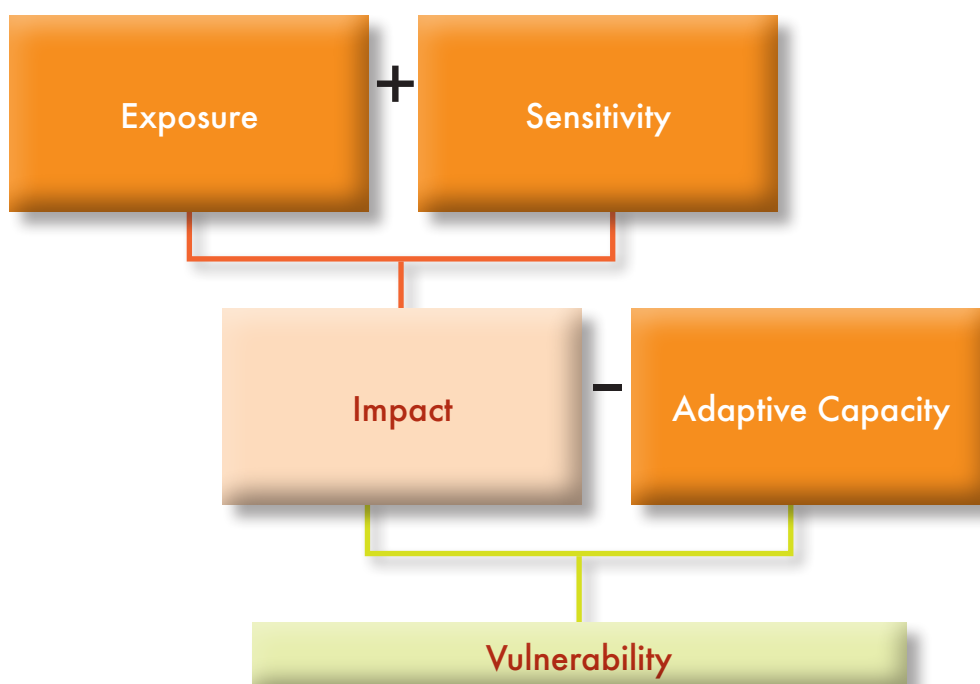


Figure 29: Framework for conceptualizing vulnerability to climate change. Source: IPCC, 2001



But someone who farms tomatoes, corn, and beans and also fishes to earn income has high adaptive capacity because if one source of income is impacted negatively by climate change there are alternate income streams.

**Climate resilience** is the ability of a community, organisation or natural system to anticipate and recover from a climate hazard quickly and return to its original conditions. A community with high adaptive capacity is generally more resilient and will recover from a negative climate impact more quickly with fewer losses or damages (Conservation International, 2016).

### 3.3 Steps common to all vulnerability assessment tools

Although each tool is administered differently and uses different methods to collect data, there are some phases of the process that are common to all, as outlined in 3.3.1 – 3.3.3.

#### 3.3.1 Planning

The planning phase is common to all the different vulnerability tools and involves the following steps:

##### Step 1. Define the main objective(s) and scope of the assessment

List the main reason(s) for doing the assessment using the chosen tool, what information you already have, and what information you need. Consider how the information you collect with and from community or sectoral stakeholders can be used to assess vulnerability and help them to build resilience to climate change.

##### Step 2. Identify the stakeholders that you want to involve in the process

You may want to involve stakeholders in three different ways:

- **to participate in the gathering and analysis of information:** in selecting who you want to involve, you need to consider the different groups within the community/sector and who possesses relevant knowledge or expertise. You also need to decide on sample size, particularly for surveys, interviews and focus groups. Other criteria for selecting participants might include age, gender, education, income, occupation, location, direct experience with specific climate change threats and capacity and willingness to participate.
- **to act as facilitators/interviewers:** you may want to use community members to collect data, for example in conducting household surveys. However, you need to weigh up whether doing so is more or less likely to create the necessary conditions of trust, respect and confidentiality or whether it would be better to use neutral, external interviewers and facilitators. If you use community members, you should ensure that you provide adequate training.
- **as target audiences** for the data you have collected, e.g. in the planning for and implementation of adaptation strategies (see Section 4 and 5).

It is useful to do a systematic identification of key stakeholders<sup>24</sup> (an exercise that should be continued throughout the mobilisation and engagement process as you are unlikely to be able to identify all of them from the outset). Depending on the tool, you may also want analyse who are the key stakeholders, for example, to determine who has relevant expertise, who will be most affected by the impact of climate change, who might be resistant to the changes that adaptation would require, what are their communication preferences, and when and where is the best time for engagement of different categories of stakeholders.

### **Step 3. Mobilise and engage the stakeholders that you want to involve in the process**

- Determine how you will notify stakeholders of opportunities to take part in vulnerability assessments, e.g. individualised invitations via emails, fliers in popular places in the community, loudspeaker van announcing a meeting, announcements in churches, mosques and temples. It is also useful to send out text or phone reminders closer to the date of the meeting;
- Select a day and time for meetings tailored to the different types of stakeholders, e.g. non-working mothers of schoolchildren may prefer daytime during the week, fishers and farmers may prefer afternoon or evening, and certain days will not suit members of different religions.



#### **Tip**

An equitable and effective participatory process requires sensitivity to the needs and constraints of groups that might otherwise be marginalised, for example, as a result of gender, disability, age, low literacy level or livelihood activity. This affects where, when and how you engage with your stakeholders. Someone elderly or in a wheelchair cannot participate in a meeting upstairs unless there is an elevator. You may find it more productive to engage farmers, fishers and young men in the places they work or congregate, e.g. the field, the fishing depot and sports field. Women may have constraints on their time, particularly single heads of household, or may prefer to meet without men present in order to express themselves more freely. Members of different religions also have varying constraints on their time. And you will need to use visual or audiovisual tools rather than written materials to engage those with low literacy.

Being sensitive to these needs means your process may take longer than you originally anticipated, but it is worthwhile because it ensures you are accessing diverse expertise and opinions and developing greater and more sustained buy-in to the adaptation planning process and the final plan.

<sup>24</sup> For more information, see CANARI, 2004. Guidelines for stakeholder identification and analysis: A manual for Caribbean natural resource managers and planners. CANARI Guidelines Series No. 5. Laventille: Trinidad. Available at <http://www.canari.org/wp-content/uploads/2016/04/Guidelines-5-Guidelines-for-stakeholder-identification-and-analysis.pdf>

- Decide where you will hold meetings with stakeholders (see Tip below). Particular approaches may necessitate special conditions. For example, for participatory three-dimensional modelling, you need a site that is well-ventilated to construct the model and space to store materials on or near the site while the model is being built.
- Make sure that any communication products you are using in the engagement process are suitable for the target audience (see Section 2).

#### **Step 4. Source any background information that might be useful, for example:**

- published statistics on, for example, population, employment, average income, literacy rates, health and nutritional status, and land use and tenure;
- maps of the geographical area, including administrative units, watersheds or ecological zones, past and potential disasters, and resource use;
- project reports and research relating to livelihoods and various threats, including climate change; and
- any earlier disaster risk or vulnerability assessments.

#### **3.3.2 Data analysis**

Once you have collected all your data, you will need to analyse it. How you do this will vary according to the tool, e.g. survey and focus group data might be analysed using software such as Excel, online survey tools or a specialised statistical analysis program (see Step 5 under 3.4.1 for more information), whereas analysis of a photo journal, community map or 3D model is best done through a participatory process with those that have helped compile it and other relevant stakeholders.

Questions to consider in your analysis, particularly those captured via surveys, interviews and focus groups:

- Are common themes emerging from respondents' answers?
- Are there unexpected answers or answers that you expected but are missing?
- Are there particular themes or issues raised within a specific demographic, e.g. people of a specific age, gender, income bracket or level of education?
- Are there any significant trends in responses, for example, an increasing or decreasing focus on an issue based on location or over a time period?
- Are there any major divergences among participants' answers, e.g. community leaders holding a different view from the majority of households?



## Box 12: Tips for integrating gender concerns into vulnerability assessments

Gender needs to be considered as a cross-cutting issue for vulnerability assessments, while also respecting local culture. It should be systematically included in all steps, including planning, designing and implementing the assessments. Although climate change may appear to be 'gender-neutral', it often impacts men, women, boys and girls differently and may require different types of adaptation actions for, and by, them. For example, fishers within the harvest sector are typically men, although women may harvest shellfish and sea-moss in nearshore areas. Fish vendors and processors in the post-harvest sector can be both men and women. These different fisherfolk may experience different risks and vulnerabilities from climate change and related hazards and have different adaptation needs based on their activities.

To support a gender analysis, stakeholder analysis and scoping of target communities for the vulnerability assessments should take into account gender, and there should be a gender balance within data collection teams. Specific questions should be included which draw out gender perspectives for analysis, and community leaders of different genders should be engaged to provide inputs into the vulnerability assessments. Activities like focus groups could be facilitated separately for females/males/other gender identities if appropriate. In particular, the tools or methods used for a vulnerability assessment must be selected or adapted to adequately capture gender disaggregated data to support useful analysis of different vulnerabilities to climate change among men, women, boys and girls and other groups.

Key questions to consider in integrating gender into vulnerability assessments and applying the various tools in this toolkit:

### Planning and design

- Are various genders and their viewpoints adequately represented in the planning, design and implementation of the vulnerability assessment?
- Is there sufficient information to define the gender context and address gender issues in conducting the vulnerability assessment?
- Will the vulnerability assessment tools selected capture the different views and experiences of men, women, boys and girls concerning climate change impacts and vulnerabilities? How can they be adapted to capture the view of male, female and other gender participants?
- Do partners have specific commitments and plans for achieving gender equality?

### Implementation (including data gathering/analysis/adaptation planning)

- How are climate change impacts experienced by different genders and groups?
- What actions can be taken by the range of genders identified, including vulnerable and low-income participants, to build their climate resilience?
- What information, knowledge and capacities and resources do different types of people and organisations need to better respond and adapt to climate change?
- Are there any gender-based differences in priorities expressed by stakeholders and how they were considered?
- What role can government or other actors play in enabling different groups to better respond to climate change?
- Are key decision-makers taking into account gender in addressing climate change?
- What benefits and opportunities generated by the vulnerability assessment are accessible to men/women/other groups?
- Are there indicators to be used to monitor progress towards addressing the needs of various genders?

### 3.3.3 Communication of findings

The most productive way to share the findings will be in the context of planning and implementing adaptation strategies (see Sections 4 and 5). At this stage, you can also use the maps compiled through the various mapping tools to note the location and nature of proposed adaptation actions.

In some instances, you may want to distribute the findings to selected stakeholders before you have reached that stage, e.g. those that contributed or collected data. As with all communication processes, you will need to decide on the most appropriate products and dissemination channels to reach your target audiences (see Section 2).

## 3.4 Rapid community mapping

Community mapping can be used to gather and interpret spatial or geographic information about vulnerability to climate change and natural hazards. This tool can be used to identify and document locations of key areas impacted by, or at risk from climate hazards, including important infrastructure, livelihood activities and natural resources in the community. It can also be used to identify key resources and services that enable adaptation to the impacts of climate hazards.

Community mapping can be a rapid exercise where, for example, participants draw a rough map on a sheet of paper or it could be a detailed exercise where carefully scaled and drawn maps are used. The tool is also easily integrated with other tools (e.g. mapping to inform selection of field sites for photo journaling or as part of semi-structured interviews). The section below describes a rapid mapping process.

### 3.4.1 Steps specific to using rapid community mapping to assess vulnerability

#### **Step 1. Collect tools and equipment that will be needed.**

There are several different ways in which you can approach the mapping exercise. For very rapid mapping where limited time is available with participants, you might have the community create its own rough sketch map of the area, to which they add boundaries and the features they think are important. This ensures that the map represents community members' perspectives on the relative importance and size of, and distance between, the features they map. Alternatively, you can source an existing map of the area that already shows basic features such as main roads, waterways and key infrastructure (e.g. from Google Maps or the Lands and Survey Division). This then forms the base for the community mapping exercise – participants can annotate these or trace several blank copies onto sheets of paper to populate themselves.



## Materials required for rapid community mapping:

- Sheets of paper (letter size or larger)
- Transparencies or tracing paper
- Pens, coloured pencils, markers, crayons etc.
- Clip boards
- Base maps

**Time required: 2 - 3 hours**

### Step 2. Planning the community map

Brief participating stakeholders on the rapid community mapping exercise. Explain the purpose of the exercise is to understand the layout of the community and key features and resources that have been impacted or may be at risk from climate hazards. Participants should note areas of interest that are or will be affected by climate change on the community map, such as settlements, critical facilities and resources in the community. These may include major buildings, jetties and ports, markets, housing settlements, beaches, mangroves, coral reefs, waterways, drains, roads and popular tourist sites. For example, an eroded beach may be a feature that is captured on a community map. Participants can also identify the location of resources that support their adaptive capacity, such as community centres, emergency response services, sea walls and reforested areas.

- Identify what makes sense to map and how. Ask participants to share their own perspectives on which hazards are of most concern (including climate-related hazards e.g. flooding, drought, sea level rise) and why. These can be noted on flip chart paper and referenced to inform the mapping. Based on the assessment's objectives and questions to be answered, participants can also be divided into groups to map different types of information on their community and the surrounding coastal and marine area. You may want groups to map information about vulnerability to climate hazards in different areas of the community (e.g. one group focuses on the north of the community and one on the south) or to do maps which focus on different sectors (e.g. tourism, fishing and farming).

### Step 3. Creating the community map

Using the available materials, ask participants to work collectively or in groups to create their maps, adding major boundaries, roads and the key landmarks or features they think are important.

Ask the participants to identify ‘what is at risk?’ – areas and features that are exposed to or impacted by climate hazards, such as floods, storm surge and droughts – and locate them on their map. These could include the following which may be important to the community:

1. Community assets and infrastructure (e.g. key government buildings, jetties, market, hotels, recreation grounds, schools, heritage sites)
2. Livelihood activities (e.g. fishing, farming, vending, hotels, tour and dives sites)
3. Natural resources (e.g. ecosystems and resources important for livelihoods like coral reefs, mangroves, seagrass, rivers, forests)

Participants can also be asked to identify the location of areas, such as sea walls, storm drains or mangrove restoration areas, that show their adaptive capacity. Note: While exposure and sensitivity to climate-related hazards may be easily captured, adaptive capacity may be more difficult to capture on a map.

Participants should collectively ensure there is a clear and agreed upon legend and features on the map are clearly labelled. Remind the participants to note new features on the legend as they identify them.

A north arrow should also be included to help orient the map. Participants can also annotate the map to provide additional detail on specific features of interest.

#### **Step 4. Presentation of findings**

After all elements have been mapped, ask participants to present their findings and discuss. This could be an overview of features they highlighted and why (i.e. the main hazards or impacts they were thinking about in relation to these features and priorities for action).

Verify whether there is consensus that the information is correct and make any adjustments as agreed to the maps. If multiple maps were created and there is time, you can ask the groups of participants to review all the maps with the different types of information and develop a single comprehensive map combining this information.

#### **Step 5. Analyse the information collected and finalise the map**

Further analysis can be done to examine influence of climate change on what persons identified in their maps. Using the maps created, facilitators can ask the following probing questions:

- Which hazards are the community most concerned about?
- Will these hazards become more or less frequent with climate change? Are there new emerging hazards?
- What areas of the community are most vulnerable to climate-related hazards and

impacts (e.g. sea level rise, more intense storms and storm surge, coral bleaching)?

- Who are the most vulnerable groups (e.g. elderly, youth, women, men, disabled persons, different types of resource users)? Why?
- What key sectors are more or less vulnerable to climate change and why?
- What resources/capacities are there in the community to deal with the identified climate-related hazards and impacts?

### Box 13: Tips for effectively facilitating community mapping

- Mapping can be designed to capture different perspectives and add depth to the story unfolding about the community. For instance, participants can be split up to focus mapping on various areas of the community which may be distinct from one another or do mapping of various key sectors.
- It is useful to start with a discussion or identification of key community features or landmarks to warm up and orient participants, especially if printed maps are being used.
- Facilitators should do research and scoping to understand where it may make sense to create different maps showing various aspects of the community e.g. fishing versus tourism or conservation activities. For ease, various maps can be created and layered to get an overall picture. Facilitators should be prepared with key questions to ask, based on their scoping, to ensure relevant information is drawn out from participants.
- Rapid community mapping does not have to be perfect. The maps are meant to serve as a tool to stimulate discussion and facilitate information gathering on the issues at hand, and so participants should not spend time perfecting their maps.
- In instances where there is more time, interest and engagement by participants, mapping could involve collection of information in the field where persons walk around the community, or take a boat ride along coastal and marine areas if possible, and identify features of interest. Other stakeholders not directly involved in the mapping can be included in the presentation of findings and asked to comment or add information.



Figure 30: Rapid community mapping in Matura Salybia, April 2016. Photo: CANARI

### Communication outputs:

- Community map showing vulnerable areas/features and any priority sites identified for adaptation (Note: It is strongly recommended that a copy of the finished map be provided to the community in a durable format for public display e.g. laminated or on canvas)



## Further resources:

- Australian Institute of Marine Science. (2000). *Socioeconomic Manual for Coral Reef Management*. Prepared by L. Bunce, P. Townsley, R. Pomeroy and R. Pollnac. Townsville, Australian Institute of Marine Science. Available at <https://www.sprep.org/att/IRC/eCOPIES/Global/261.pdf>

## 3.5 Impact and capacity matrix

The impact and capacity matrix is a useful participatory tool to highlight differences in the level of impact and capacity to adapt to climatic and other hazards across different sectors or social groups in a coastal or fishing community. It aims to determine the hazards that have the most serious impact on the community; determine which groups within the community, sectors, resources or livelihoods are most affected; and identify coping strategies to address hazards. This information is then useful to identify and prioritise possible adaptation options.

Together with community members, an impact and capacity matrix is developed by first setting out the climatic or other hazards<sup>25</sup> for the community along the (top) horizontal axis of a grid. The community features to be assessed such as relevant social groups, different sectors or sectoral resources, or specific community resources (biophysical, human, socio-economic, technical, etc.) are listed on the (left) vertical axis. The level of impact of each of the listed hazards on these community features is then filled into the corresponding grids (e.g. no to little impact, moderate impact or high impact). Notes on impacts, including changes in impacts over time, and past and current coping/adaptation strategies and their effectiveness can then be included or discussed. If time is limited, the matrix can be prepared beforehand and adjusted accordingly in consultation with participants.



### Materials required for the impact and capacity matrix

- Large sheet of paper (e.g. flip chart paper or ground for drawing blank matrix)
- Markers, chalk or other appropriate writing equipment
- Sticky dots (to identify priority items)

**Time required: 2 - 3 hours**

<sup>25</sup> The vulnerability and capacity matrix is often used in conjunction with the outputs of the historical timeline (hazard trend analysis) (see 3.1.1) and the rapid community mapping (see 3.1.4) or participatory Geographic Information Systems (P-GIS) that can help to identify relevant hazards and community features of importance to be assessed in the matrix (see 3.2.3).

### 3.5.1 Steps specific to developing an impact and capacity matrix

#### Step 1. Prepare matrix template

A matrix can be prepared in advance or collectively with participants as part of the facilitated session. This can be done on the ground or on flip chart paper. Key steps include:

- Identifying hazards or other stressors of interest: Ask participants to identify hazards which affect the community in general or hazards of specific interest to their livelihoods. Hazards may be natural or man-made. Do not limit the discussion to only climate-related hazards, but you may want to prompt the group if they are not identifying climate or environmental hazards. Alternatively, this information may be sourced from other assessments completed for the area such as a hazard trend analysis or other hazard and vulnerability assessments. The hazards should be noted in the horizontal axis of the matrix at the top.
- Identifying what will be assessed in terms of vulnerability to the hazards: Ask the group to identify their most important community resources (biophysical, human, socio-economic, technical, etc.), livelihood activities, assets/infrastructure or other factors they deem critical for their well-being. These can be identified from memory or using maps or findings from interviews or surveys already done for the community. These should be listed on the left side of the matrix on the vertical axis and can be categorised for ease. Assessments can also be done on specific social groups (e.g. defined by age, gender, ethnic groups, etc.) or focused within one sector or across multiple sectors (fisheries, agriculture, water, tourism, etc.). See the impact and capacity matrix template in Table 5.



#### Tips in identifying hazards

It is important to be specific in the hazards, and to ensure that the issues identified are actually hazards. Participants may identify conditions such as 'food insecurity' as hazards. It is up to the facilitator to ask the group to break down these conditions to determine if they are caused by hazards (e.g. food insecurity may be the result of a drought, which is a hazard). Similarly, some groups may identify scarcity of resources, such as 'lack of money', as a hazard. In this case, it should be determined whether the lack of a resource is the result of a hazard, or in some cases, whether the resource should be added to the list of priority resources identified in the previous step.

#### Step 2. Determine a scoring system

Ask participants to decide and agree on a scoring system for the hazards against the various factors to be assessed. The scoring system could be as follows: 3 = significant impact on the resource/heavily affected; 2 = medium impact on the resource/moderately

**Table 5. Impact and Capacity Matrix Template**

Resource Type:	Hazards						
.....							
<b>Coping/ adaptation strategies?</b>							

affected; 1 = low impact on the resource/minimally affected; 0 = no impact on the resource/not affected. Participants can alternately use symbols or different colours to help easily differentiate the information. Ensure that all members of the group understand the scoring system.

### Step 3. Develop the impact matrix

Examine each factor in terms of impact to the hazards identified. Ask participants to work collectively or in small groups (focused on a specific feature, sector or social group) to decide on the degree of impact that each of the hazards has on each of the community features and come to consensus on a score based on the scoring system developed in the previous step. The note-taker(s) should record key points of discussion that lead to the scores assigned, and any disagreements on the scores. Scores for each hazard can then be totalled to identify those hazards with the highest impact on the community.

### Step 4. Identify coping or adaptation strategies

Once the impacts have been identified, identify local coping and adaptation strategies (i.e. to identify the different ways that fisherfolk, and the wider community, have dealt with the key changes and related problems and impacts) and add to the matrix. Ask participants to list current or potential strategies to deal with the different hazards impacting the community. If time is limited, participants can focus on coping and adaptation strategies for the highest impact hazards (with the highest total scores) in the matrix. Further, ask participants to identify which ones have the most potential for success and the resources

needed for implementation, including what type of resources (e.g. capacity building, funding/equipment or policy interventions) and from whom (e.g. government, civil society or private sector).

## Step 5. Analyse and discuss matrix results

Using the completed matrix, identify and discuss, for example, why particular resources or groups are more impacted by certain hazards, how fisherfolk, the wider community and other groups have coped/are coping and priority items for action.

Scoring system: 3 = significant impact/heavily affected; 2 = medium impact/moderately affected; 1 = low impact/minimally affected; 0 = no impact/not affected

Community resources	Storms and storm surge	Sargassum seaweed	Sea level rise/ coastal erosion	Pollution (greywater)	Warmer ocean	Sahara dust	COVID-19 coronavirus	Stronger ocean currents
<b>Livelihoods</b>								
Fishing	3	3	2	2	2	2	2	3
Diving and tour guiding	3	3	1	2	2	2	3	3
Other businesses (hotels, restaurants)	3	3	2	2	2	2	3	0
<b>Assets &amp; infrastructure</b>								
Fishing boats	3	3	1	1	0	0	0	0
Fishing gear	3	3	1	1	0	0	0	1
Jetty	3	2	3	1	0	0	0	0
Other landing sites	3	3	3	1	0	0	0	0
Fishing facility	3	3	2	1	0	1	1	0
<b>Natural resources</b>								
Fishing grounds	3	2	2	2	2	2	0	1
Coral reefs	3	3	3	3	2	2	0	1
Seagrass	2	3	2	2	2	1	0	1
<b>TOTAL SCORE</b>	<b>32</b>	<b>31</b>	<b>22</b>	<b>18</b>	<b>12</b>	<b>12</b>	<b>9</b>	<b>10</b>

Figure 31: Impact matrix from Speyside, Tobago. Source: Granderson et al. 2021

Some probing questions are:

- Why are particular assets/livelihood/resources more vulnerable to certain hazards?
- What is the relative severity of one hazard compared with another?
- How do different individuals or groups in the community (e.g. women, elderly, youth or the disabled) cope with each particular hazard? How effective are these coping strategies?
- Are there other coping strategies that could be used to reduce the impact of hazards? What resources do you have that would help you to adopt these new coping strategies or what are constraints to this?
- What are the priority adaptation actions needed (e.g. practical actions on the ground or policy interventions)? Which have the most potential for success?

The note-taker should carefully transcribe the key points of the discussion.

## Communication outputs:

- Vulnerability and capacity matrix as a table, poster or other format (digital or printed)

## Further resources:

- CARE International. (2019). *Climate Vulnerability and Capacity Analysis Handbook*. Version 2.0. Geneva, CARE International. Available at <https://careclimatechange.org/wp-content/uploads/2016/06/CARE-CVCA-Handbook-EN-v0.8-web.pdf>

## 3.6 Surveys

Surveys can provide insights into people's level of awareness of climate change and its impacts, the types of strategies for addressing impacts, and the various resources available in a community or sector. You can ask questions that provide quantitative information (numbers and facts), such as household size, sources and level of income, or how often a community is affected by a particular climate hazard. You can also include questions that provide qualitative information (descriptions), such as perceptions and attitudes about an issue. Surveys, unlike semi-structured interviews and focus groups, typically use a fixed format where participants are asked exactly the same questions in the same order. This fixed format ensures reliable and comparable information across the surveys. Surveys can be administered in a variety of ways, for example face-to-face, online, via telephone or Skype, or via mail or email).



### Materials needed to conduct a survey

- Clipboards
- Printed copies of survey
- Pens

**Time required: 5 days - 1 month** (depending on number of participants)

### 3.6.1 Steps specific to conducting surveys

#### Step 2. Determine the sample size

In deciding on sample size, you should consider whether you need a sample that is representative of the entire community/sector or just of a particular group (e.g. community leaders, women, youth, or fisherfolk). Your sample size will depend on the objective of your survey and the type of information you aim to collect, the number of staff/volunteers available to conduct the surveys and analyse the data, and the time you have available to



complete the survey process. For example, if the goal is to assess knowledge of the local climate and how it has changed over last 30 years, you might select a small sample of 10 - 20 people who are over 50 years in age. If the goal is to examine the views of people throughout the community about climate change and its impacts on their livelihoods, your sample size would need to be much larger (e.g. 50 - 100 people).

### Step 3. Develop the survey questions

You can use two main types of questions:

- closed-ended questions, where the respondent selects from a limited number of possible answers, for example, the options for “Do you think climate change is a major threat to the community?” would be ‘Yes’, ‘No’ or ‘Don’t know’; or for “What is your level of access to climate information?” might be ‘High’, ‘Medium’ or ‘Low’. It is easiest to compare responses to this type of question.
- open-ended questions which provide for respondents to express opinions or perceptions, for example, “How could government support households to address climate change?”. However, this type of question will probably elicit more useful responses if it is part of a semi-structured interview (see Section 3.4).



#### Tips for developing survey questions

- **Keep them simple.** Avoid using technical terms or jargon that may be poorly understood by respondents.
- **Be concise.** Avoid long questions with multiple elements. They can be confusing as respondents don't know which part to answer.
- **Avoid leading questions that direct participants to a particular answer.** Instead of giving their honest opinion, participants will choose what they think is a good answer for you.
- **Avoid loaded terms.** Loaded terms, like corruption or fines, can result in a negative reaction regardless of the question asked.
- **Keep the survey short:** the quality of the responses will decline if it takes too long to get to the end of the survey.
- **Pilot the survey on a small scale before finalising and launching the full survey.** This enables you to check that your selected interviewers have the necessary skills and respondents find the questions clear are providing the type of information you need.

Box 14 provides a sample survey including questions on exposure, sensitivity and adaptive capacity related to climate change. Note that all the questions are closed-ended except for Question 3, which is open-ended.

#### **Step 4. Determine how you will administer the survey**

Decide on the most effective and efficient way to administer your survey based on scoping and feedback from key actors (e.g. community mobilisers). For example, face-to-face interviews would probably be most effective for a survey of households in a small community. On the other hand, you might choose to use an online survey when targeting young people between 18 and 25 years. A number of user-friendly online survey tools are available, including SurveyMonkey, SurveyGizmo or Google Forms.

#### **Step 5. Conduct the survey**

If you are conducting an **online survey**, you will need to send out targeted invitations with links to the survey as well as publicise it (including the closing date) through news releases or your social media platforms. You will also need to check periodically for responses and send out reminders until the survey is closed. Make sure there is an introductory section at the start of the online survey that explains the purpose of the survey, information about your organisation and how the findings will be shared. There should be an option to respond anonymously, and participants should specifically give their consent to the use of the data as outlined.



#### **Tips for conducting effective surveys**

- At the start of a face-to-face or telephone survey, introduce yourself and your organisation and explain the purpose of the survey. Explain options related to confidentiality and anonymity.
- Allow the participant to ask any further clarifying questions about the purpose of the survey and what will be done with the data they provide. Avoid discussing the expected outcomes of the survey as this can bias the respondent's answers.
- During the survey, stick to the questions as written and don't try to explain them as that could also bias the respondent's answers.
- Do not express any emotions or appear judgmental if you find an answer strange or surprising. Your role is just to administer the survey and accurately capture the responses.
- At the end of the survey, reiterate how you will share the findings and make sure you have their contact details if needed.

## Box 14: Sample Questions for Survey

Interviewer (if conducted face-to-face):

Date:

Name of participant:

Gender: Male ☐ Female ☐

Age: 0-17 ☐ 8-30 ☐ 31-45 ☐ 46-60 ☐ 61+ ☐

1. How do you earn a living? Farming ☐ Fishing ☐ Tour guiding ☐  
Office work ☐ Own business ☐ Other ☐ (explain):

2. Have you heard of climate change? Yes ☐ No ☐ Unsure ☐

If yes, where did you get information about climate change?

Radio ☐ TV ☐ Newspapers ☐ Community meeting/talk ☐

Workshop ☐ Other ☐ (explain): .....

3. Can you describe what is climate change? (if answered yes above)

.....

4. Have you noticed any of these changes in your community:

Hotter temperatures? Yes ☐ No ☐ Unsure ☐

Rising sea levels: Yes ☐ No ☐ Unsure ☐

More extreme floods or storm surge: Yes ☐ No ☐ Unsure ☐

More extreme droughts: Yes ☐ No ☐ Unsure ☐

If no or unsure for all, skip to question 8.

5. Have these changes in weather or sea levels impacted on your household or job (if not mentioned above)? Yes ☐ No ☐ Unsure ☐

If yes, how: .....

6. Do you use any strategies to deal with these changes? Yes ☐ No ☐ Unsure ☐

If yes, please describe strategies: .....

7. Is there potential for your community to work together to better address changes in weather or sea levels/conditions? Yes ☐ No ☐ Unsure ☐

If no, please describe why not: .....

8. Do you need other resources or support to better cope with changes in weather or sea levels/conditions? Yes ☐ No ☐ Unsure ☐

If yes, describe these resources: .....

9. Which organisations do you think can best provide these resources or support? (check all that apply) Local community groups ☐ Government ☐ NGOs ☐ Private sector ☐

For surveys administered **face-to-face or by telephone/Skype surveys**, you will need a team of staff/volunteers that has been adequately oriented. The size of the team will depend on the number of surveys and the time and funding available. Using fewer interviewers may reduce the margin of error or inconsistencies but, on the other hand, it means that the whole process may take longer.

Make sure all team members have reviewed the survey questions, are comfortable with the wording and know how to fill in the answers. If they are inexperienced, conduct an orientation session using the tips below. If any of the respondents is likely to speak a language not spoken by anyone on the team, you would need to recruit a new team member or use an interpreter.

### **Step 6. Analyse the information collected from the surveys**

Once the surveys are completed, pull together all the information collected for analysis. You may want to use software to support analysis. However, software can be costly and you will need to budget for licenses and training.

Quantitative information can be input into Microsoft Excel or more powerful software, such as Minitab, Stata or SPSS, for statistical analysis<sup>26</sup>. Using simple statistics, you can calculate the percentage of participants giving each answer and determine its significance. You can also do correlations and trend analysis. For example, are there answers common to a specific demographic, including people of a specific age, gender, income bracket or level of education? Are there trends in how participants answer a pair or group of questions? You can then create graphs, such as bar or pie charts, to visualise findings and aid statistical analysis.

Qualitative information, including text, can be analysed using Microsoft Word or specialised software like ATLAS.ti, NVivo and QDA Miner<sup>27</sup>. Online survey software, such as Survey Monkey, generally includes fairly easy-to-use analysis options and if you do a mix of online and face-to-face data collection, you can still input the face-to-face data into the online system for analysis.

### **Communication outputs:**

- Poster, brochure, slides or other format summarising survey findings (digital or printed)

<sup>26</sup> For more information on choosing your statistical analysis software, see Upadhyay, R. 2014. Choose your data mining and Statistics Software/ Language. <http://ucanalytics.com/blogs/choose-your-data-mining-statistics-software/> [Accessed 2 February 2017]

<sup>27</sup> For more information on choosing a software package for qualitative data analysis (CAQDAS), see University of Surrey. n.d. Choosing an Appropriate CAQDAS Package. <http://www.surrey.ac.uk/sociology/research/researchcentres/caqdas/support/choosing/> [Accessed 2 February 2017]

## Further resources:

- WCPA and Australian Institute of Marine Science. (2003). *Socio-economic Monitoring Guidelines for Coastal Managers in the Caribbean: SocMon Caribbean*. Prepared by L. Bunce, R. Pomeroy in collaboration with SocMon Caribbean Advisory Board. Available at [http://www.widecast.org/Resources/Docs/SocMonCaribbean\\_Coastal\\_Managers.pdf](http://www.widecast.org/Resources/Docs/SocMonCaribbean_Coastal_Managers.pdf)
- Wongbusarakum, S. and Loper, C. (2011). *Indicators to assess community-level social vulnerability to climate change: an addendum to SocMon and SEM-Pasifika regional socioeconomic monitoring guidelines*. Available at [https://reefresilience.org/pdf/SocMon\\_Climate\\_change\\_guidlelines\\_FINAL\\_april\\_2011.pdf](https://reefresilience.org/pdf/SocMon_Climate_change_guidlelines_FINAL_april_2011.pdf)

### 3.7 Semi-structured interviews and focus groups

Semi-structured interviews and focus groups are used mainly to collect qualitative data and to allow for more in-depth exploration and discussion of people's perceptions of the economic, political and socio-cultural factors shaping vulnerability to climate change. They contain mostly open-ended questions, which allow for dialogue, both with the interviewer and, in the case of focus groups, between peers. The interviewer is encouraged to probe responses in order to get to the root causes of the vulnerabilities and to better understand the types of adaptive capacity available. Based on respondents' answers to one question, the interviewer can introduce additional probing questions or diverge from the script (e.g. the order of the questions).

Semi-structured interviews and focus groups are best used to gain insights from key stakeholders with specialised knowledge or needs within a community or sector. The flexible format also allows for integration of other vulnerability assessment methods, including mapping, participatory photography and video, and livelihood analysis.



#### Materials needed to conduct semi-structured interviews and focus groups

- Digital audio recorder (especially if there is no human recorder but useful anyway)
- Printed copies of interview/focus group guide
- Notebook or paper
- Pen
- Registration sheet for focus groups

**Time required: 2 days – 2 weeks**  
(depending on number of participants)



### 3.7.1 Steps specific to conducting surveys semi-structured interviews and focus groups

#### Step 1. Determine the sample size

As with surveys, you need to decide on sample size and composition and the same considerations and criteria apply (see Section 3.6 on Surveys).

#### Step 2. Develop the interview or focus group guide

The interview or focus group guide comprises a set of core questions/areas you intend to cover in the interview or focus group, together with some back-up probing questions you may need to encourage more in-depth discussion. The interview guide is designed to encourage conversation, while ensuring that all critical topics are covered. Box 15 provides a sample interview guide including questions on exposure, sensitivity and adaptive capacity related to climate change.



#### Tips for designing the interview or focus group guide

- **Use simple, short, open-ended questions.** Use words like 'describe' and 'how' to prompt respondents to share their views and go into detail.
- **Have one core question per topic area and no more than 10-15 in total.**
- **Put in probing questions as reminders to the interviewer**, such as 'who?', 'what?', 'where?', 'when?' 'why?', 'how many?', that encourage further elaboration or clarify answers that are confusing or complex.
- **Pilot the guide** to check that your selected interviewers/moderators have the necessary skills and that respondents find the questions clear and that they are generating the type of conversation you intend. Make sure the process is not too lengthy e.g. aim for interviews to be no longer than 1 hour and focus groups between 1.5/2 hours depending on group size.

#### Step 3. Determine how you will administer the interview or focus groups

You need to decide whether you will interview participants individually, in pairs, or in groups. Face-to-face interviews are preferable to telephone or an online communication tool (e.g. Skype or Zoom) for this type of data collection. If you want to collect sensitive information, such as income level or job status, an individual interview is probably best. Paired interviews or focus groups encourage respondents to reflect and build on their peers' inputs and are also good for exploring shared experiences, such as a recent hurricane or flood in the community. Focus groups are usually comprised of people with similar

backgrounds and/or interests, with no more than 6 - 10 persons to allow everyone to participate fully.

To ensure gender sensitivity, consider conducting focus groups with men and women separately to ensure you capture their different perspectives. This may be especially useful as in any community, male and female respondents may experience different types of vulnerability to climate change and other hazards.

#### **Step 4. Conduct the interviews or focus groups**

Once your team of interviewers/moderators has been adequately briefed and oriented, they should be guided by the tips outlined below.



#### **Tips for conducting effective interviews and focus groups**

- **Start by introducing yourself and your organisation and explain the purpose of the exercise.** Request participants' consent if you are using a digital recorder and explain the guidelines relating to confidentiality and anonymity.
- **For focus groups, ask participants to introduce themselves,** preferably using an icebreaker technique to put people at ease. For example, you could ask them to add a word starting with the same letter as their first name that describes their personality – strong Susan, brave Brian, generous Geena, shy Sam, etc. – when introducing themselves. This exercise can give you an indication of who may have a tendency to dominate the discussion and who may need to be drawn out.
- **Encourage participants to ask any further clarifying questions about the purpose of the interview or focus group and what will be done with the data they provide.**
- **Focus on building rapport with the respondent(s) and encouraging them to share their views openly.** Emphasize that there are no 'wrong' or 'right' answers. Listen attentively to what they have to say and treat all responses with respect. Allow for silences, and give them time to think.
- **Avoid stating any personal opinions.** Use neutral comments such as "I see" or "that is an interesting point".
- **Take detailed notes even if you are using a digital recorder.** Try to capture some of what people say verbatim so that you do not lose the flavour of what is being said.
- **At the end, remind them of how you will share the findings and make sure you have their contact details if needed.**

## Step 5. Analyse the information collected from the interviews and focus groups

Once the semi-structured interviews and focus groups are completed, pull together all the information collected for analysis. You will need to write up or transcribe information from audio or video recordings. This process is time-intensive so plan accordingly. For example, an experienced transcriber can take four hours to transcribe one hour of tape. Consider hiring a transcriber if you have a lot of recordings and limited staff/volunteers.

As with surveys, you may want to use software to support analysis. However, software can be costly and you will need to budget for licenses and training. Quantitative information can be input into Microsoft Excel or more powerful software, for example, Minitab, Stata or SPSS, for statistical analysis<sup>28</sup>. Qualitative information, including text, photographs, audio and video, can be analysed using ATLAS.ti, NVivo or QDA Miner<sup>29</sup>. Use graphs, such as bar or pie charts, to visualise your findings and aid analysis.

### Communication outputs:

- Poster, brochure, slides or other format summarising interview/focus group findings (digital or printed)

### Further resources:

- WCPA and Australian Institute of Marine Science. (2003). *Socio-economic Monitoring Guidelines for Coastal Managers in the Caribbean: SocMon Caribbean*. Prepared by L. Bunce, R. Pomeroy in collaboration with SocMon Caribbean Advisory Board. Available at [http://www.widecast.org/Resources/Docs/SocMonCaribbean\\_Coastal\\_Managers.pdf](http://www.widecast.org/Resources/Docs/SocMonCaribbean_Coastal_Managers.pdf)
- Wongbusarakum, S. and Loper, C. (2011). *Indicators to assess community-level social vulnerability to climate change: an addendum to SocMon and SEM-Pasifika regional socioeconomic monitoring guidelines*. Available at [https://reefresilience.org/pdf/SocMon\\_Climate\\_change\\_guidlelines\\_FINAL\\_april\\_2011.pdf](https://reefresilience.org/pdf/SocMon_Climate_change_guidlelines_FINAL_april_2011.pdf)

<sup>28</sup> For more information on choosing your statistical analysis software, see Upadhyay, R. 2014. Choose your data mining and Statistics Software/ Language: <http://ucanalytics.com/blogs/choose-your-data-mining-statistics-software/> [accessed 2 February 2017]

<sup>29</sup> For more information on choosing a software package for qualitative data analysis (CAQDAS), see University of Surrey, UK: <http://www.surrey.ac.uk/sociology/research/researchcentres/caqdas/support/choosing/> [accessed 2 February 2017]

## Box 15: Sample Semi-Structured Interview Guide

Interviewer:

Date:

Name of participant:

Organisation/Title:

Age:

Gender:

### A. Awareness and knowledge of climate change

1. **What have you heard about climate change?** *If useful/relevant probe for e.g.*
  - *understanding of difference between natural and human-induced climate change*
2. **What do you think are the causes of climate change?** *If needed, probe whether*
  - *have heard of “greenhouse gases” and how those drive climate change*

### B. Perceptions, attitudes and behaviours

3. **Have you observed any effects of climate change in your community, and if so what are they?** *Probe for those you would expect in this community*
4. **Who do you think is most affected by these effects of climate change and how?** *If useful/relevant, probe e.g.*
  - *how is climate change affecting farming and different crops?*
  - *how is climate change affecting fishing and fish catch?*
  - *what are the main impacts of climate change on your livelihoods/well-being/health*
  - *do you think you and your family are amongst the most vulnerable to climate change? Why?*
  - *between men and women, who is the most vulnerable to climate change? Why?*

### C. Practices in Climate Change Adaptation/Adaptive Capacity

5. **What have you and other community members done to address climate change in the community?**
6. **What resources do you or other community members have to take action on climate change? What other resources would you need?** *If useful and relevant, probe*
  - *What barriers are there to effective community cooperation and action on climate change?*
  - *What role do you see for the government in supporting your community to address climate change?*
  - *What role do you see for CSOs or the private sector in supporting your community to address climate change?*

### 3.8 Participatory photo journaling

Participatory photo journaling brings together the community and other stakeholders to take photographs (photos) that are then organised to tell the story of climate change vulnerabilities in a given area or sector. The stakeholders decide what they want to show and how they want to show it. The photos can be used to highlight aspects of vulnerability, including exposure, sensitivity and adaptive capacity to different climate-related hazards. For example, a photo of fish landing sites clogged by sargassum, damaged boats/gear, or a man walking through a flooded house shows exposure and sensitivity, while photos of a seawall or someone planting trees along the beach front to stabilise an eroded coastline show adaptive capacity. Photo journaling is thus a useful tool to document and share the local realities of climate change with a wide audience.

A photo journal helps the community to illustrate their opinions, concerns and recommendations on issues through photographs, presented in a particular sequence. The process typically involves the participatory development of a story-board, capturing still shots, collating the journal with community participants and drafting captions that describe the images and convey messages about a specific issue and the desired actions. The emphasis here is not to create a professional portfolio but rather to let the photo journal be the voice of the stakeholder. The final product can be an electronic or printed copy of the photo journal.



#### Materials required for participatory photo journaling

See step 3.

**Time required: 1 - 5 days**

#### 3.8.1 Steps specific to developing a participatory photo journal to assess vulnerability

##### Step 1. Establish the basis on which the photo journal will be created

Before you can start to photo journal, you will need to:

- choose the geographic area you propose to cover, using criteria such as community interest in doing a vulnerability assessment there, or that the area has already been prioritised for a vulnerability assessment;
- determine the vulnerabilities in the area, either by extracting data from a previous vulnerability exercise or through a special vulnerability assessment exercise related to the photo journal. In the case of the latter, this would probably involve both brainstorming with stakeholders and assessment in the field. If using a previous



assessment, it is useful to review with participants if the information is still relevant or there are gaps.

It is important to involve key stakeholders throughout this step (see Step 2 in Section 3.2.1 for guidance on determining who they are).

## Step 2. Determine what the photo journal should depict

In conjunction with key stakeholders, determine which of the identified vulnerabilities you want to capture in the photo journal. Note these in a **storyboard**. The storyboard is a series of drawings that show the images that are to be captured. The storyboard will show the title of the photo journal, the kinds of images that will be captured and the order in which they will appear in the photo journal. You can visit the area prior to the brainstorming session to collect ideas on what should be captured in the photo journal.

You may also want to determine how the photo journal can best be presented to your target audiences, e.g. as photo story, as a slide show, or in print format (see Section 2 for how to select products and dissemination channels). You may decide to do this later in the process when it becomes apparent which stakeholders are most vulnerable to climate change and who you need to target to build these stakeholders' adaptive capacity (e.g. local village council, national government agencies or donors).



Figure 32: Storyboards with pictures and messages to create a photo journal. Photos: CANARI

## Step 3. Ensure you have the necessary equipment

You will need the following equipment:

- Still shot camera: use a camera with at least 20 mega pixels and large storage capacity
- Memory cards: the number and size of memory cards you will need depends on the amount of information you expect to collect and how often you are able to download from the card(s) to a computer; as a guide, choose memory cards that can hold at least 32 megabytes of information

- Spare batteries
- Notebook (or clipboard with paper), pens and pencils to collect information in the field and to keep track of the photographs collected
- Tripod to steady the camera
- Projector, preferably with 3000 lumens or above as a good projector will be faithful to the quality of photograph especially if it is bright
- Computer with software to collate the information and clean the photographs; choose one with a good processor, ports for external connections through USB and HDMI ports and software such as Adobe Photoshop
- Underwater cases if collecting images underwater

#### **Step 4. Create your photo journaling team(s)**

Assign teams to collect the information. At least two persons should work together in a team. Each team should be given part of the storyboard to collect the relevant information.

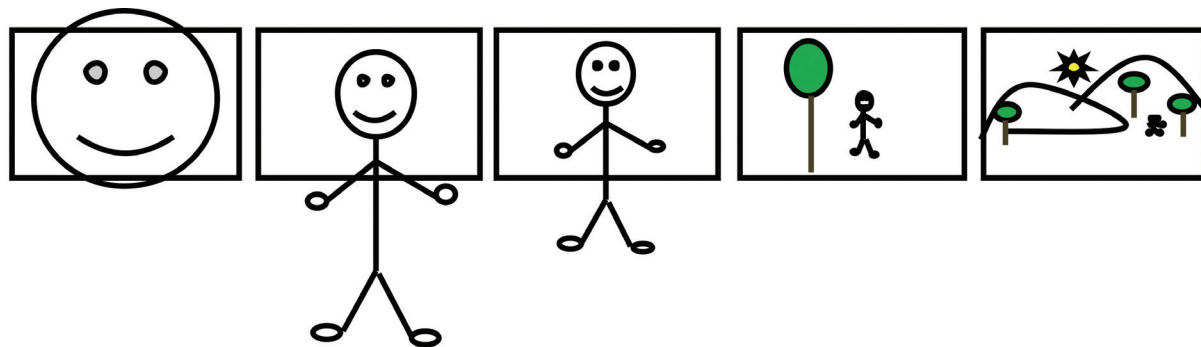


#### **Tips on effective photo journaling**

To photo journal, you need to:

- understand the different parts and functions of the camera. The power button, lenses, and menus are of particular importance;
- know the correct way to hold the camera. Each camera is different but a good rule if you are not using a tripod is to place your elbows on your body to anchor your arms. This keeps the camera steady. Standing with your feet slightly apart can also keep you steady and minimise shaking;
- understand that there are basic types of shots ranging from an extreme close up to an extreme long shot. Each can be used to convey something different. An extreme close up can convey deep emotion while an extreme long shot can tell you where an image is located (See Figure 33 below)
- practice using the camera before going into the field; and
- know how to download the photographs onto a computer after collecting the images in the field.

If you are not already familiar with these techniques, you will need training before you start.



From left to right:

**Extreme close up; close up; mid shot; long shot; extreme long shot**

*The image inside the box or frame will be captured in the video.*

Figure 33: Five types of 'shots'. Source: CANARI

## Step 5. Collect the images in the field

Images can be of people, things and places that show the various elements of vulnerability. For example, pictures of:

- floods, coastal erosion, sea level rise, and high temperatures (e.g. showing hard, cracked earth on a sunny day to evoke the feeling of heat) illustrate exposure;
- people, places and things affected by the impacts of climate change illustrate sensitivity (e.g. damaged landing site facilities, fishing boats/gear affected by the impacts of climate change); and
- actions or assets that illustrate adaptive capacity, e.g. storm drains to reduce floods, planting mangrove or trees on hills to stabilise them and prevent landslides, etc.).

You can also take pictures of areas affected by climate change where things clearly need to be done but this is not happening as this would imply a lack of adaptive capacity.

In the field, it is useful to make notes about photos taken or other observations to assist in developing captions and providing context for the story. Participants are also encouraged to talk to others they meet in the community, which can be a useful source of contextual and anecdotal information for developing the journal.

*Note: Remember to plan and inform participants accordingly as it can take from half a day to several days to collect photos.*

## Step 6. Compile and edit the photos for the photo journal

Once the images have been collected, you will start to put them together in a story. This involves downloading onto the computer the photographs you have taken. It is a good idea to create separate folders for each part of the storyboard. All participants should work together to choose and clean the images that best illustrate the exposures, sensitivities and adaptive capacities in the community or sector. Invite others from the community or other stakeholders who did not participate in the participatory photo journal to offer opinions on the images. Return to the field to collect further images if needed or consider any secondary sources (e.g. existing photos from community residents or groups).

Once you have all the images you need, you can make the final decisions on the product formats you will use and create them. Work with participants to decide a title for the journal, caption the photos appropriately and note any main messages or ideas they want to include.

In collating the photo journal, participants:

- should ensure there is a good flow and the story of vulnerability is being told effectively by including proper introductions and ending statements, captions that really convey the issues, and key priorities and recommendations from the community; and
- can be creative in the way they choose to illustrate vulnerability and personalise the journal. For example, they can show before and after photos or include relevant photos of community members and quotes to highlight key messages.



Figure 34: Participants capture and review photos to develop photo journals at vulnerability assessment training workshops in Saint Vincent and the Grenadines in February 2020 (left) and Saint Kitts and Nevis in November 2019 (right). Photos: CANARI



## Box 16: Case study: Photojournaling Caura Valley's Water Woes

The Caura River flows through the Caura Valley in Trinidad and Tobago and is a popular site for recreation and religious activities. The Caura Valley community, however, felt that the river was slowly dying since the water level had reduced. Some households also had no access to pipe-borne water and depended on the Caura River for their water. Although deforestation was identified as the major factor for the reduction of water in the river, climate change was also perceived to be both a current and future threat.

Participants in a pilot project to look at community-based climate change adaptation in the area decided to document the impacts of the uses of the river and climate change on the Caura River and on their livelihoods. The group determined their objectives, messages and target audiences then created a story board that identified what they wanted to show. They also learned to use cameras to take photographs.

Over two weeks, they collected images of places, people and things either affecting the Caura River or impacted by the use of the Caura River. The participants got together to choose the best images, clean

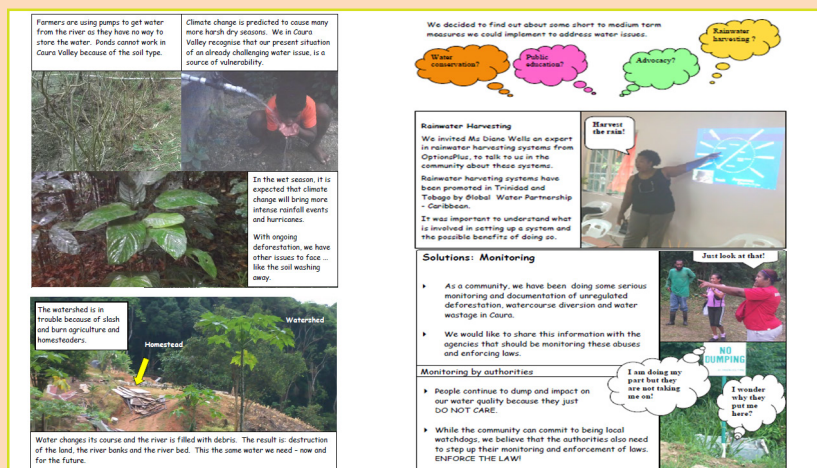


Figure 36: Snippets from the Caura Valley photojournal. Photo: CANARI



Figure 35: Caura Valley community storyboards its photojournal. Photo: CANARI

them and put them together in a photo journal. The photo journal was shared with decision-makers and technical persons in government agencies and private sector organisations to encourage adaptive action. The Caura Valley community decided to pilot a rainwater harvesting system to supplement supply of water from the river (see Box 24 in Section 5 *Rainwater harvesting to ensure local water security, Trinidad and Tobago*).

## Communication outputs:

- Photo journal (digital or printed)

## Further resources:

- Example of a photo journal highlighting climate impacts: Caura Valley Community. (2012). *Caura Water Woes: A Photojournal*. Caura, Trinidad. Available at <http://www.canari.org/cauras-water-woes-a-photojournal>



### 3.9 Participatory video

Participatory video (PV) is a tool that can be used by community stakeholders to make their own video to tell the story of their vulnerability and capacity to adapt to climate change. It gives the community a direct voice using a very powerful communication medium that brings their challenges and issues alive for a wider audience. PV can be useful for supporting advocacy, building consensus and exchange of ideas and experiences between groups or communities, including facilitating dialogue between groups, communities and stakeholders from outside the community. It can also be used for participatory monitoring and evaluation.

PV is not traditional documentary film-making. Community stakeholders are fully involved in all stages of the production of the video. The persons involved in the PV often move from being the “object of study” to become the “subject” of the process and, therefore, this enhances the participants’ motivation and attitude to take action. They decide what the issues and questions are, who should be part of the process, who needs to hear the messages and how those messages should be crafted and possible solutions. This includes creating a storyboard, capturing video clips of interviews with stakeholders and scene shots, and direct editing of the video clips. The final product may take the format of a documentary, a skit or a music video.



#### **Materials required for participatory photo journaling**

See step 2.

**Time required: 3 - 10 days**

#### 3.9.1 Steps specific to developing a participatory video

##### *Planning for the PV*

##### **Step 1. Mobilise stakeholders**

Before going into the community to work, ensure that all the key stakeholders engaged in the process are willing to work on the project for its duration. Ensure they are clear about the objectives and expected outcomes of the PV, and they are also interested in the process and understand what is needed from them. Sharing information in advance and a site visit to the community may help participants to understand what is expected of them and the potential benefits associated with the process. It also helps the community to understand the time needed to be part of the process

## Step 2. Prepare equipment

Ensure that you have the correct equipment to suit your objectives. Specific equipment includes:

- Video cameras or Smartphones – These are two of the more popular devices to capture video. Video cameras often provide more versatility because they are designed for that function. Ensure that the quality of video is good (720P or higher resolution).
- Still shot cameras – These can be used to document the process as well as provide images that may appear in the video.
- Batteries – Many cameras are packaged with their own rechargeable batteries. Keep extras on hand that are charged. If you must purchase, try buying rechargeable ones. They will save you money.
- Tripods – These can steady the cameras. Mid-range tripods can be bought for a reasonable price.
- Microphones – Some cameras do not have very good audio. A good microphone with sound recorder can improve the quality of the final video.
- Memory cards – Many cameras and Smartphones use memory cards to store the images. Ensure that they are of good quality (e.g. class 10). Use the maximum size card allowed by the device. Have extras in case more are needed.
- Computers – Good quality personal computers can be used to view and edit the videos. Use computers with a Windows 7 operating system or higher with a good processor (e.g. Intel Core i5 or higher). Ensure that the sound and video cards are good quality ones. If using a laptop, an external mouse will make navigating on the computer easier.
- Software – Different software can be used to edit videos. Adobe software is one of the more accessible software to use.
- Projector – A good projector will be faithful to the quality of video especially if it is bright. A projector with 3000 lumens or above is recommended.
- Speakers – Good external speakers can help participants hear the video better.
- Storage devices – An external hard drive or online cloud storage (e.g. Google Drive) can be used to store the videos and photographs collected in the field. 500GB or more is recommended. Flash drives can be used to put videos on to distribute to the participants.

### Step 3. Planning to facilitate

A good facilitator always prepares thoroughly to facilitate any session. This includes the following:

- **Knowing the audience:** The facilitator needs to know who is expected to attend the session, what are their interests and expectations, what perceptions and conflicts may exist, and what are their overall level of competency (e.g. understanding about the issue, skills in using video, etc.). Planning for how many people are expected is especially important to know if the session will be done all in plenary or small groups, and how will participants be divided into small groups.
- **Logistics:** The facilitator needs to ensure that the location where the session will be held is easily accessible, well equipped and comfortable, that good food and refreshments will be provided, that facilities are suitable (including having electricity available).

### *Facilitating the PV process*

### Step 4. Agree on objectives and outcomes

The first step is to remind the participants involved in the PV process what the overall objectives and the expected outcomes are. Explain that they will discuss in detail and agree on what will be the specific focus of the PV that they will develop.

### Step 5. Understanding the issue

This step involves:

- **Participatory problem analysis and developing solutions:** It is important for participants involved in a PV process to have a common understanding of the issue that they want to present and the purpose of the video. If the video is for monitoring and evaluation or research, the problem may be defined and a problem analysis may not be necessary. If the video features analysis of a problem or challenge (which is important for advocacy or planning PVs), it is important to understand the real cause or the root problem. One approach is to review recent vulnerability assessments and facilitate a group discussion with participants on what are the key problems and possible solutions to showcase in the PV. Another approach is to develop a problem tree (see Section 3.1.2 on Problem tree for more information). Once the problem tree is developed it is important to turn the problems into solutions. A solution should be written for each problem. To do this, follow the same steps that were used to create the problem tree. The result is called a solution tree. Remember to include things that you can do and things that others can do.
- **Developing objectives of the video:** Help participants to define the specific focus of their PV and what they want to achieve. The objectives of the video are linked to the change they want to see happen. Create objectives that are SMART – specific,

measurable, attainable, realistic and time-bound. Be very clear if you want to raise awareness, to share knowledge, to effect a change in behaviour or to advocate for action (you can further define the action you want).

- **Identifying target audiences:** The objectives of the video tell us what we want to achieve. We can use the solutions developed to determine who the video should target in order to achieve the objectives. Break the audience into distinct groups (e.g. resource users, wider civil society, government ministries, policy-makers, funders). For each audience, determine the interests, beliefs and agenda. This can help to fine-tune the messages.
- **Developing key messages:** Write or draw a list of messages you want to appear in the video. These should be messages that directly engage your target audiences to achieve your objective. Use the 5C's of communication: keep messages clear, concise, correct/credible, comprehensive and consistent.
- **Determining communication pathways:** Choose the most appropriate pathway for what you hope to achieve. A combination of pathways can be used to achieve the most impact. Options include: meetings with the target audience, presentation to communities or at regional/international conferences, social media (e.g. YouTube or Facebook), hosting on partner websites and local television stations. More guidance on communication and identifying target audiences, messages and pathways is available in CANARI's toolkits on communication (see the Further Resources).

## Step 6. Creating the storyboard and script

A storyboard is a set of drawings that show the images that will be captured in the video. It lets all participants see what is planned so that they are aware of what would appear in the video. Creating a storyboard also helps to keep the video concise and clear. The steps include:

- Return to the list of key messages that were developed with the participants.
- Determine the type of film that is being made.
- Set out blank sheets of letter-sized paper and markers so that everyone has access to them.
- Ask participants to determine, for each message, how they would like to see that message conveyed in the video. Ask the participants to draw the image or images to depict the particular message. Remind the participants that most of us are not artists and stick figures are also appropriate. Some participants may be uncomfortable with drawing. Assist participants as needed but ensure that they direct the process. Involve everyone.
- Ask the participants questions to determine, for each image, where the scene will be captured, who will be filming the video and who will appear in the video. Ask

the participants to explain the image to everyone creating the storyboard.

- Participants should also come up with the relevant script (i.e. any words that will be said in the video) for each scene. This can be very general, and participants can refine it when the video is being edited.
- Rearrange all the images once drawn in the order they will appear in the video.
- Ask the participants if there are any scenes that they believe are left out. If there are, have the participants draw them and place them in the appropriate place in the storyboard.
- Verify once again that the storyboard is complete.
- Ask the participants to think about a title for the video and to suggest what music should appear in the video, if any.
- Assign duties by asking the participants if there are scenes that they would like to capture or be a part of. Have them explain what will be captured to everyone present so that they are all sure of what will be done.
- Congratulate the participants on a job well done.

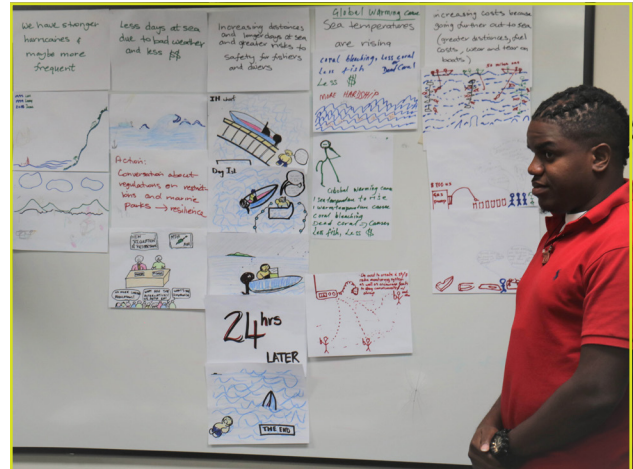


Figure 37: Anguilla fisherfolk develop a storyboard for PV, Anguilla, November 2018. Photo: CANARI

## Step 7. Practicing and capturing footage

- Participants will have to learn to use the cameras and microphone before capturing footage. This helps them to be comfortable with them and to reduce the time spent in the field.
- Once a schedule is created, the facilitators should meet with the participants to support them to capture the footage. Facilitators are not to capture any footage for the video themselves, but they can help the participants to:
  - Compose the scene by assisting with the placement of microphones



Figure 38: Participants at a workshop in Caura, Trinidad and Tobago, learn to use the video editing programme from an experienced videographer (standing left), June 2012. Photo: CANARI





Figure 39: Montserrat fisherfolk capture and review footage for a PV, Montserrat, November 2018. Photos: CANARI

and cameras

- Fine-tune panning, zooming and framing the shots
- Put the interviewees at ease by chatting with them beforehand
- Determine appropriate questions to ask the interviewees
- Play back the video captured in the field to determine the quality

*Note: If possible, it is always good practice to ask people to sign consent forms so that any video footage collected can be used as agreed.*

After fieldwork, help the participants to organise the footage captured and place them in specific folders on a computer or on an external drive. Do the same with any photographs and music that form part of the video. Folders can be named according to the scenes as a way of finding them quickly. Assist the participants to take notes of the video captured, quality (digital video, high definition video), frame rate, length, date captured, interviewer and interviewees. This can help the participants to organise and later edit the footage.

Once footage is reviewed against the storyboard, participants may have to go back out to capture additional footage as needed, if there are gaps. Participants may also decide that voice-overs are necessary to capture to go along with the various shots taken and the script that was developed.

### **Step 8. Get feedback from participants and local community**

Regular screening of the video with the participants and the local community helps to build awareness of the video and promote a sense of ownership among the community members. It also offers an opportunity for viewers to analyse the video and make changes to the storyboard and make decisions about editing (what clips should be included and in which order).

## Box 17: Getting participants familiar and practicing with video equipment

- Place the participants in pairs or small groups depending on the number of video recording devices available i.e. whether video cameras, still shot cameras, or smartphone camera.
- Give each group a device and microphone if needed.
- Explain the different parts and functions of the camera and the microphone, depending on the device/s being used. Ask the participants to identify them to ensure they understand the different functions.
- Show the participants the correct way to hold the camera while filming. Each camera is different, but a good rule is, if you are not using a tripod, place your elbows on your body to anchor your arms. This keeps the camera steady. Standing with your feet slightly apart can also keep you steady and minimise shaking.
- Explain to the participants that there are basic types of shots ranging from an extreme close-up to an extreme long shot. Each can be used to convey something different. An extreme close-up can convey deep emotion while an extreme long shot can tell you where an image is located.
- Consider the following tips if using a smartphone:
  - Ensure you have enough memory by removing old files; clean your camera lens; and put your phone on airplane mode or silent to make sure your video doesn't get interrupted in the middle of shooting.
  - Always shoot with your phone horizontally/lengthwise to avoid 'black bars' on the sides of your video.
  - Activate the 'grid view' on your phone's camera settings and place your subject/points of interest where lines intersect for attractive compositions.
  - Increase video resolution/size to the maximum (720P, 1080P, HD, FHD, 4K) for the best quality. Experiment with the record settings to see which works best.
- Give the participants an exercise to practice using the camera. Ask them to practice telling a one-minute story each. Each person in the group should be allowed to capture footage and to appear in front of the camera. Try this for 30 minutes. Remind the participants to view the footage in the field to see if it is one they would like to share.
- Note that participants should be aware of the following when taking and reviewing footage for use: sound quality, wind and other background disturbances, shaky footage, inverted or sideways images.
- Return to plenary and show the participants how to download video footage onto a computer so that they can all view it.
- Download all the video footage in a specific folder on the computer and view them together. Ask the participants to note what was good and what can be improved in the shooting.
- Create a schedule with the participants to capture the video. Try to ensure that facilitators are present to assist with problems that may arise.
- Leave the cameras with the participants, if possible, so that they can capture other images and footage. These are sometimes useful in the video.

Select a suitable venue (e.g. community centre or school). Show all the footage captured. Ask the persons present to identify those that should appear in the video. Take note of start and end times of clips within videos where only a small portion of it is relevant. Leave all unedited, good quality footage with the community members so that they too can have the clips. If collective screening is not possible, ensure to have at least one community member on hand to be part of the screening and pass the information onto others. This ensures that the participants remain part of the process.

### **Step 9. Editing the video**

There are many different computer programmes that can be used to edit video. It is recommended that the facilitators train in video editing before training others. Several tutorial videos are available and can assist facilitators. The participants should also be trained to edit video. For some, this may be the first interaction with a computer. Be patient and encourage them.

### ***Communicating your PV***

### **Step 10. Sharing with participants**

Give participants copies of the completed video and all footage used. In many cases, participants prefer to give the video to the leaders in the community or organisations participating in the process. They should also be given links to where the video is hosted online, for example on YouTube.

*Note: Remember the participants who made the PV own it! The facilitator should ask permission to use it or disseminate it, including on a website or social media (e.g. Facebook or YouTube).*

### **Step 11. Disseminating to target audiences**

Disseminate the video to the target audiences via the pathways you identified. Remember that the video can be posted on YouTube, featured at a specially-arranged event (e.g. film launch), hosted on a partner organisation's website or shown at a meeting with the target audience.

### ***Evaluation and learning***

### **Step 12. Evaluation and learning**

It is important to return to the participants after the video was disseminated to the target audiences to assess the ways the video was shared and the impact of the video. Were the objectives achieved? What lessons were learned? What was the follow-up? Were any additional actions taken? Sometimes the participants can create another video to evaluate the results of the first video.

## Communication outputs:

- Video (Note: *the video should be posted to YouTube or another freely accessible online platform to facilitate knowledge sharing and dissemination*)

## Further resources:

- CANARI. (2014). *Giving voice to stakeholders: A guide to participatory video*. CANARI Guidelines No. 9. Laventille, Trinidad, CANARI. Available at <http://www.canari.org/wp-content/uploads/2016/04/Guidelines-9-PV.pdf>
- InsightShare. (2006). *Insights into participatory video: A handbook for the field*. Available at <http://insightshare.org/resources/insights-into-participatory-video-a-handbook-for-the-field/>
- For examples of PV by Caribbean fisherfolk, see:
  - o CANARI. (2020). *Our Changing Fisheries: Voices from Montserrat* [video]. [https://www.youtube.com/watch?app=desktop&v=sHbVbjlWl\\_8](https://www.youtube.com/watch?app=desktop&v=sHbVbjlWl_8)
  - o Anguilla Fisherfolk. 2020. *Anguilla's Fishing Dilemma* [video]. [https://www.youtube.com/watch?app=desktop&v=\\_IerKOuQP5o&t=2s](https://www.youtube.com/watch?app=desktop&v=_IerKOuQP5o&t=2s)

## 3.10 Participatory three-dimensional modelling

Participatory three-dimensional modelling (P3DM) is another tool that uses local knowledge to assess vulnerability and identify possible adaptation strategies. It facilitates the engagement of a wide range of stakeholders, such as community members, government ministers, technical persons, civil society and academia, in the process of assessing vulnerabilities in the areas where they live and work. The three-dimensional model can be used to depict the past, present and future and is therefore a good tool to show the impacts of climate change and to plan for adaptation and resilience building. As the model is produced to scale, the information collected can be digitised and placed into a geographic information system (GIS) and used by a variety of planners to support decision-making. P3DM, however, takes time to complete (typically between two weeks and two months).



## Materials needed to conduct P3DM

- Table (or wood for a table that is built prior to model-building) – size and scale determined by the GIS specialist
- Corrugated cardboard
- Nails of varying lengths
- Glue, scissors
- White crepe paper

### Mapping materials

- Push pins, thumb tacks and map pins (varying colours)
- Paint (white and other colours to be determined by the stakeholders)
- Wool or twine
- Paint brushes of various sizes
- Paint thinner
- Fans (for drying glue, paints)

### Record keeping

- Cameras
- Logbook or notebook

### Cleaning supplies

- Paper towels or cloth towels
- Buckets

Reference materials: Maps of the area (e.g. Google maps), information about climate change to be placed on walls around the model building site

**Time required: 8 days** (1 - 2 months to prepare)

### 3.10.1 Steps specific to using P3DM to assess vulnerability

#### *Preparatory phase*

#### **Step 1. Identify goals for P3DM, partners and key stakeholders**

Determine what is to be achieved by using the model, i.e. the goals and objectives. Plan for at least eight days to build the 3-D model and conduct participatory analysis of vulnerabilities to climate change.



Determine who your partners are in the P3DM process. These may be government or CSOs (e.g. fisherfolk organisations, divers associations, conservation groups). Your partners will help to deliver the results by assisting with facilitation, providing resources or information that will contribute to the exercise.

Identify the key stakeholders in the process. Use the goals and objectives to help you determine the key stakeholders (e.g. if the goal is to determine the most at-risk fishing facilities and infrastructure in the area, then fisherfolk and any fisherfolk organisations will be key stakeholders). Other partners may be identified during this step.

## **Step 2. Identify any specialist expertise you will need**

Unless you already have GIS expertise on your team, you will need to engage a GIS specialist to:

- provide or create contour maps.<sup>30</sup> of area to be mapped;
- recommend the scale of the model (e.g. 1:5000 km);
- provide an estimate of the materials that will be needed, based on the proposed scale; and
- geo-reference<sup>31</sup> and digitise the model once completed.

## **Step 3. Develop the contour base maps**

Ask the GIS expert to determine the scale of the model and ask him/her to produce contour maps in the chosen scale. Print at least four copies of these contour maps to scale. For example, if you want to produce a scaled model of 1:5000 km, the printed maps should be the size of the finished model. This means that the printed maps are large.

## **Step 4. Purchase the necessary materials**

See list of materials above.

## **Step 5. Organise a venue for the P3DM workshop**

Get written permission from a stakeholder, such as the village council, for an appropriate site to build the model and host the P3DM workshop. The site should be well ventilated. Request permission to store purchased material on or near the site where the model will be built.

<sup>30</sup> A contour shows the height of the land above sea level. A contour map shows contours in increments above sea level.

<sup>31</sup> Georeferencing means that the coordinate system of a map or aerial photo image can be related to a ground system of geographic coordinates.

## *Mobilisation phase*

### **Step 6. Work with partners to develop a mobilisation plan**

The mobilisation plan should include identification of the target audience(s), the products (e.g. flyer or concept note) that will contain information about the model being built and that will be used to mobilise the key stakeholders. Also include how the flyer or concept note will be disseminated to the target audience. Ensure that the product will be effective for the type of stakeholder. For example, letters can be used to inform stakeholders from the government, but a phone call or face-to-face meeting may be more effective to encourage an individual fisher to attend the sessions. Note: School children can be invited to build the blank model as it is a fun, craft activity that also teaches geography.

### **Step 7. Create communication products and implement the plan to mobilise the stakeholders**

Create communication products such as flyers, media releases, radio announcements, etc. that can be used in different phases of the P3DM exercise to raise awareness and mobilise stakeholders. Implement the mobilisation plan using these products as appropriate. During model building, be prepared to do additional mobilisation as needed to ensure good participation of stakeholders.

## *Model building and analysis phase*

### **Step 8. Facilitate the model building**

#### **a) Preparations**

- Place at least one map of the area (e.g. a Google map) on the wall, and preferably several maps showing different types of information (e.g. land use maps, satellite images).
- Place information about what is climate change and expected impacts on the area on walls around the room as well. This allows the stakeholders to refer to information about climate change and its impacts when needed.

#### **b) Constructing the base model**

- Place one of the large, scaled base maps on the table and glue it to the table. This is the reference for the model. It is recommended to anchor the base maps at the pre-identified reference points by hammering nails from below the table.
- Use the other maps to trace individual contours onto the cardboard and cut out the individual contours. These individual contours form the layers of the model.
- Glue the cardboard to the table. Use the notebook to keep track of the contours that have already been completed and those that remain.

- Once all the contours have been glued to the table, leave the model to dry for at least three hours. Then glue crepe paper to the outer layer of the model, which makes it easier to work with. Leave to dry for at least ten hours.
- Now paint the model white. More than one coat of white paint may be needed, and the model should be left to dry after each coat of paint. This is the base model. The stakeholders will use the base model to populate features such as roads, rivers, forests, sea level past and current, and protected area boundaries, etc.



Figure 40: Montserrat stakeholders go through the various steps for building their P3DM base model, March 2018  
Photos: CANARI

### *c) Creating the 3D Model*

- Invite groups of stakeholders (informants) to model-building sessions at different times. For example, you may want to invite fisherfolk for a three-hour session to input information on the model on the first day, then invite the Fisheries Division for a similar three-hour session on the fourth day. This allows the stakeholders to have meaningful discussions on issues pertaining to particular sectors.
- Begin each session with a brief overview of the exercise and of climate change and climate change vulnerability.
- A key preparatory step is to discuss and work with participants to develop a legend for the model. In this step, participants start to identify features they would like to place on the model and come to consensus on the preferred symbology to use. For example, a red push pin can be used to represent fire houses while green wool can be used to represent a forest trail, or blue thread to depict rivers. Participants are encouraged to both consult and add to the legend as various stakeholders take turns in populating the model i.e. the legend will be completed while the model is being built. In the end, the legend should show all the information that is on the model.
- Once the legend items have been agreed, invite participants to populate the model using their local knowledge. Help the informants to find their location on the model so that they are properly oriented.
- Use probing questions to elicit the information you require from the stakeholders.

Ask about where things are currently located, where they were located in the past and where they could potentially be located in the future. Ensure that information is collected on different aspects of vulnerability (exposures, sensitivities and adaptive capacities).

*Note: as the model is a spatial tool it will mainly be physical information that is collected.*

- Use tacks, pins, twine and wool in the initial stages of information gathering as these are not permanent and can be moved as needed. Label the tacks, etc. by placing small pieces of paper with information on or near them. These are largely temporary and can be changed as informants add new information to the model. You may want to keep some of the tacks and map pins as permanent symbols to denote features such as buildings. Continue to note any new symbols on the legend.
- Once the informants have agreed upon the placement of the information about climate change vulnerability in the area, you can begin painting the information onto the model. The paint will be permanent. Note the colours on the legend. Leave the painted model to dry for at least 24 hours.
- Take high quality photographs of the model and the legend and give these to a GIS specialist to digitise the map. The map and datasets can then be shared with other stakeholders in GIS software.

### **Step 9. Use the model to facilitate analysis on climate change vulnerability and adaptation**

The completed 3-D model can be used to facilitate participatory analysis of key climate change impacts and vulnerabilities and potential adaptation actions for various sectors of interest. Facilitators can ask participants to note climate and disaster impacts already shown on the model and any missing information/gaps. Participants can also be asked to identify future climate change impacts that are not on the model (e.g. coastal areas that may be flooded with rising sea levels and storm surges can be assessed and further depicted on the 3-D model using transparencies or extra crepe paper or on other static map[s]), and potential adaptation actions they think are needed to address key vulnerabilities.

### **Step 10. Hand-over the model to the community**

The final 3-D model should be officially handed over to the community group or local authorities to house and use the model. Discuss with participants to identify two to three community participants who will represent and share their experience on the P3DM exercise along with government stakeholders at the hand-over. Participants can be asked to share their experience of the process, information from the model should be presented on key climate change impacts, vulnerabilities and priorities for adaptation from their perspectives and how the completed model can serve as a useful tool for decision-making.



## Box 18: Case study on assessing vulnerability to climate change and disasters in the fisheries sector in Anguilla and Montserrat using P3DM

Under the Darwin Plus: Overseas Territories Environment and Climate Fund project, *Climate change adaptation in the fisheries of Anguilla and Montserrat*, CANARI partnered with the Department of Fisheries and Marine Resources – Anguilla, the Fisheries and Ocean Resources Unit – Montserrat and the Centre for Resource Management and Environmental Studies (CERMES) of the University of the West Indies from February to March 2018 to engage stakeholders from the public sector, civil society including fisherfolk and their organisations, and the private sector in P3DM in order to assess the vulnerability of their fisheries sector to climate change and natural disasters and identify priorities for adaptation.



Figure 41: Left: Participants add their knowledge to the Montserrat 3-D model. Right: Participants view the final model. Photos: CANARI

The P3DM process aimed to capture local and scientific knowledge on resource use, livelihoods and areas critical to the fisheries sector. Participants used the model to identify and locate vulnerable elements such as key fishing communities, landing sites and ecosystems such as coral reefs and seagrass, areas experiencing coastline changes and other issues such as coastal pollution.

As part of the process, potential adaptation actions were also identified in order to start developing an action plan for the fisheries in each country. From the built models, GIS outputs (maps and datasets) were produced to support spatial planning and decision-making on sustainable fisheries development. For more details, see: <https://canari.org/climate-change-adaptation-in-the-fisheries-of-anguilla-and-montserrat/>

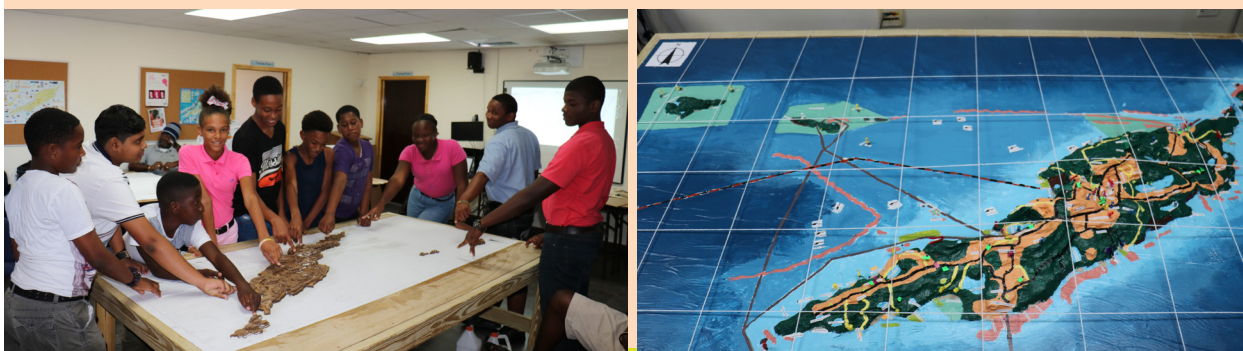


Figure 42: Above: Participants working on the Anguilla 3-D model (left) and final model results (right) Photos: CANARI



## Communication outputs:

- Completed 3-D model (Note: a durable cover for the model is highly recommended for safe storage and public display)
- Digitised map based on the 3-D model
- GIS datasets

## Further resources:

- Bobb-Prescott, N. (2014). *Case study on the use of participatory three-dimensional modelling to facilitate effective contribution of civil society in the Caribbean islands in planning for action on climate change*. Laventille, Trinidad, CANARI. Available at <http://www.canari.org/documents/401CasestudyP3DM.pdf>

### 3.11 Livelihood vulnerability analysis

Livelihood vulnerability analysis is a systematic, participatory approach for analysing the vulnerability of a community's livelihoods to climate change. It aims to engage the community in identifying how climate change is affecting their livelihoods, the drivers of vulnerability and ways to build resilient and sustainable livelihoods. The analysis focuses not just on how community members earn a living, such as fishing, farming or tourism, but also focuses on the wider concept of livelihoods assets and wellbeing. It also examines the opportunities and assets available to the community, and the different policies and institutions shaping these opportunities.

Through understanding the livelihood activities and assets within a community, you can analyse how they will be affected by climate change and the factors that make them more or less vulnerable. You can identify ways that communities can respond using their available assets. Additionally, you can identify entry points for building adaptive capacity and resilience into the future.



#### Materials required for livelihood analysis

- Flip chart easel and flip chart paper
- Laptop and projector for slide presentations.
- Note paper
- Markers
- Pens
- Masking tape
- Printed copies of the activity guide and handouts

**Time required: 1 – 2 weeks**

## Box 19: Key concepts in livelihood vulnerability analysis<sup>32</sup>

**A livelihood is sustainable and resilient** when it:

- can cope with and recover from threats and shocks;
- does not depend on external support;
- can maintain or enhance its capabilities and assets now and in the future;
- does not compromise the productivity of the natural resource base; and
- does not undermine the livelihoods of others.

**Livelihood activities** are the strategies that people develop to make a living and support their basic needs. These strategies include how people earn an income e.g. paid labour, professional work or a small business. Livelihood activities also include subsistence strategies e.g. farming or fishing to feed your family.

**Livelihood assets** are the resources upon which people draw to pursue their livelihood activities and ensure human well-being. The DFID (1999) livelihoods framework, suggests that individuals and households must be able to access a balanced portfolio of assets to ensure their well-being. Individuals or households that have a range of livelihood assets are generally less vulnerable to threats or shocks. The DFID framework identified five types of livelihood assets (financial, human, natural, physical, social). CANARI research suggests that in the Caribbean context it is also important to include cultural and political assets.

### Types of livelihood assets (DFID, 1999):

- **cultural assets:** beliefs, values and worldviews, and sites of historical and religious significance (e.g. culture of cooperation and trust, festivals, and heritage sites);
- **financial assets:** inflows of money, credit/debt, property and insurance (e.g. savings and income from employment, trade and remittances);
- **human assets:** knowledge and education, technical or other skills, and health (e.g. literacy and nutrition, local expertise, and availability of productive labour);
- **natural assets:** access and ownership of natural resources (e.g. biodiversity and ecosystem services, land, water, and coastal areas);
- **physical assets:** infrastructure (e.g. housing, roads, schools, health centres and telecommunications), equipment and goods (e.g. livestock and handicrafts);
- **political assets:** power and ability to access and influence decision-making and policy (e.g. political representation, policy forums, local councils and action plans); and
- **social assets:** people's networks and relationships (e.g. family ties, active community groups, professional associations), and their means of interaction such as via websites or email lists.

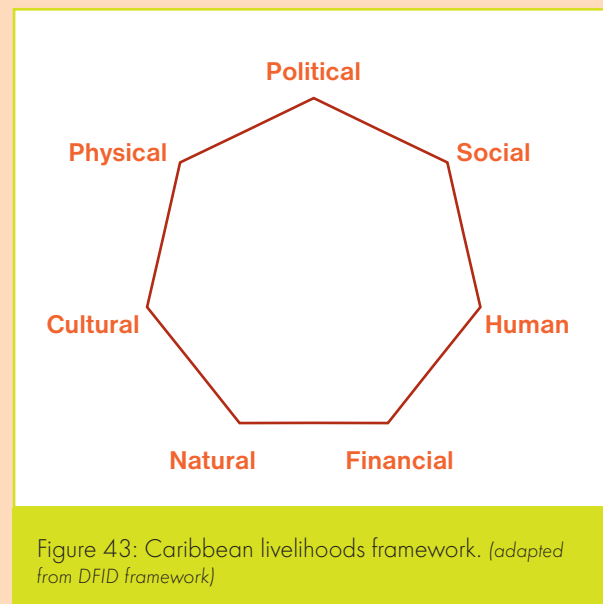


Figure 43: Caribbean livelihoods framework. (adapted from DFID framework)

<sup>32</sup> Adapted from DFID (1999)

Livelihood vulnerability analysis can focus on an entire community. In this case, you will need to analyse the livelihoods of a range of different stakeholders (e.g. farmers, fisherfolk, government workers, business owners and pensioners). Or your analysis could focus just on a specific demographic (e.g. women or youth) or sector (e.g. forest or coastal management), in which case, the analysis will be narrower in scope focusing only on the relevant livelihoods and stakeholders.

### **3.11.1 Steps specific to conducting a livelihood vulnerability analysis**

#### **Step 1. Identify and mobilise stakeholders**

With the community leaders and other key stakeholders, determine the scope and focus of the analysis. The analysis can include livelihoods within one sector (e.g. the fishing sector) or across different sectors (e.g. agriculture, fishing, tourism and other sectors). It can also focus on a particular social group (e.g. women, youth, etc.). Once the scope is defined, identify the relevant individuals and groups within the community to engage in the analysis and ensure they are clear about the objectives, the time needed to be part of the process and expected outcomes. A site visit to the community may help participants to understand what is expected of them and the potential benefits associated with the process.

#### **Step 2. Collect data to support the livelihood vulnerability analysis**

Pull together existing information about the relevant stakeholders and their livelihoods. Potential sources of information include:

- published statistics on population, employment and average income, literacy rates, health and nutritional status, and land use and tenure;
- maps of the geographical area, including administrative units, watersheds or ecological zones, past and potential disasters, and resource use;
- project reports and research relating to livelihoods and various threats, including climate change; and
- other participatory vulnerability assessment tools, such as community mapping, P-GIS, participatory photo journaling, PV, surveys and semi-structured interviews.

#### **Step 3. Plan and design the livelihood vulnerability analysis**

A livelihood analysis will cover all or some of the following:

- identifying livelihood activities and the assets they draw upon;
- assessing the exposure and sensitivity of livelihood activities and assets to various threats from climate change;

- identifying ways that people currently cope with threats;
- determining how livelihood activities and assets can contribute to adaptive capacity into the future; and
- determining priorities and actions to reduce livelihood vulnerability (considering exposure, sensitivity and adaptive capacity).

The approach taken will depend on who is providing the information and factors such as literacy levels, time available etc. You can use various exercises and games that are interactive and facilitate dialogue and knowledge sharing, including diagramming, ranking of threats or people's strategies for managing threats, and developing storylines of livelihoods and how they have changed<sup>33</sup>.

Write up a guide for each exercise or game you use for the livelihood analysis. The guide should include a description of the exercise, the discussion questions to be covered, and whether the exercise will be done in pairs, small groups (three to five people) or with the whole group. The guide should also list any materials or equipment needed for the exercise.

Consider whether to organise a workshop or focus groups with the relevant stakeholders to conduct the livelihood vulnerability analysis, whether specialised facilitation skills are required, and make the needed arrangements. Workshops are best for larger groups of 15 or more people representing different interests or sectors. Focus groups are typically organised for less than 10 people to discuss specific issues of interest (e.g. focus group with fisherfolk).

#### **Step 4. Facilitate the livelihood vulnerability analysis**

##### **a) Define key concepts**

Review and explain what is a livelihood, including the concepts of livelihood activities and livelihood assets. Discuss how these concepts can be used to assess vulnerability to climate change and why this is important. Explain that you can assess: the different climate change threats affecting livelihoods (exposure); how badly livelihoods will be impacted by climate change (sensitivity); and identify ways that households and the wider community can respond using their available assets (adaptive capacity). Use examples and diagrams to illustrate these concepts.

##### **b) Identify the different livelihood activities within the community/target group**

Ask participants to identify the livelihood activities upon which they depend (e.g. farming, fishing, tour guiding, small business etc.) and list each of them on flip chart paper. Discuss which are the most common livelihood activities and why.

<sup>33</sup> For more information on exercises and tools, see International Federation for Red Cross and Red Crescent Societies (IFRC) Livelihoods Centre: <http://www.livelihoodscentre.org>

**c) Review and identify the different types of livelihood assets available to the community/target group**

Recap what are livelihood assets and the different types of assets. Ask participants to give examples to clarify that they have understood. Explain to participants that they will examine in depth their vulnerability to climate change focusing on livelihood assets and why this is important.

Ask participants to list all the different types of assets – cultural, human, natural, physical, political, social – that they draw upon for their livelihood activities. You can have them work in small groups of three to five people where each group is assigned one to two asset types to discuss (e.g. focusing on natural assets, they might list land, soil, forests, fisheries etc.).

**d) Analyse the exposure and sensitivity of livelihood assets to climate change**

Ask participants to consider how their livelihood assets might be impacted by various threats from climate change. For example, you can have participants remain in their small groups and answer the following questions for each asset they have listed:

- i. Potential climate change threats that asset is exposed to? (E.g. sea level rise and more intense droughts, forest fires and floods)
- ii. How sensitive is asset to threats from climate change? (Participants can assess sensitivity as high, medium or low)
- iii. What existing non-climate threats are impacting the asset? (E.g. deforestation is an existing threat to forests, soils and biodiversity under natural assets)

**Table 6: Example of analysis of exposure and sensitivity of natural assets**

<b>Asset Type</b>	<b>Potential climate change threats exposed to?</b>	<b>How sensitive is it?</b>	<b>Existing non-climate threats?</b>	<b>Level of concern?</b>
Natural assets (e.g. forests)	<ul style="list-style-type: none"><li>• Hurricane damage</li><li>• Drought</li><li>• Extreme heat</li><li>• Floods/landslides</li><li>• New invasive species</li></ul>	<ul style="list-style-type: none"><li>• High</li><li>• Medium</li><li>• Low</li><li>• Medium</li><li>• High</li></ul>	<ul style="list-style-type: none"><li>• Deforestation</li><li>• Overhunting</li><li>• Pests</li><li>• Uncontrolled burning</li></ul>	Medium
Natural assets (e.g. coral reefs)	<ul style="list-style-type: none"><li>• Higher ocean temperatures and coral bleaching</li><li>• Hurricane damage</li><li>• Sea level rise and coastal erosion</li><li>• Flash floods and coastal sedimentation</li><li>• Ocean acidification</li></ul>	<ul style="list-style-type: none"><li>• High</li><li>• High</li><li>• Low</li><li>• Medium</li><li>• High</li></ul>	<ul style="list-style-type: none"><li>• Land-based pollution</li><li>• Overfishing</li><li>• Invasive species (e.g. Lionfish)</li></ul>	High



- iv. Based on above, what is their level of concern for this asset? (Participants can list as high, medium or low)

See Table 6 as an example. You can discuss, as a group, how and why different asset types are impacted by climate change, whether there are commonalities or impacts unique to certain assets.

#### e) Analyse how livelihood assets contribute to adaptive capacity for climate change

Ask participants to explore how their livelihood assets can support adaptive capacity and assess whether they have the capacity to address climate change threats.

Firstly, you can identify strategies they have used to manage climate-related hazards and give examples (e.g. beach erosion, droughts, floods, storms/storm surge and forest fires). Then have participants discuss whether existing strategies have the potential to address future threats from climate change (e.g. sea level rise, more intense hurricanes and storms/storm surge, more floods, sargassum influx, ocean acidification).

Next you can ask participants to consider the livelihood assets available to the community to address climate change, and which can support the above adaptation strategies. They can consider the following questions for each asset they have listed:

- What role/influence does asset have within livelihood activities?
- How can asset contribute to adaptive capacity?

Participants can then rate their adaptive capacity for climate change based on each listed asset. The group should consider the role of the asset, potential threats from climate

**Table 7: Example of analysis of how natural assets contribute to adaptive capacity**

<b>Asset Type</b>	<b>Role/influence on livelihood activities?</b>	<b>Contribution to adaptive capacity?</b>	<b>Rating of adaptive capacity</b>
Natural assets (e.g. forests)	<ul style="list-style-type: none"> <li>• Timber and non-timber products for subsistence and sale in markets</li> <li>• Wildlife for hunting and pet trade</li> <li>• Plants for medicine and horticultural sector</li> <li>• Site for tourism and recreation</li> <li>• Protection of watershed and freshwater resources</li> </ul>	<ul style="list-style-type: none"> <li>• Forest biodiversity and ecosystem services can support a range of livelihoods over the long-term if sustainably managed</li> <li>• Healthy, intact forests act as buffers against natural hazards like floods, landslides, and heatwaves</li> </ul>	Medium
Natural assets (e.g. coral reefs)	<ul style="list-style-type: none"> <li>• Fish and related products for subsistence and sale in markets</li> <li>• Marine life for fishing and pet trade</li> <li>• Site for tourism and recreation</li> <li>• Protection of coastline and associated communities and infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Marine biodiversity and ecosystem services can support a range of livelihoods over the long-term if sustainably managed</li> <li>• Healthy, intact coral reefs act as buffers against natural hazards like coastal erosion and flooding, hurricanes, storm surge</li> </ul>	Medium

change and strategies available to manage these threats in their ratings. Participants can list adaptive capacity as high, low or medium. See Table 7 as an example.

**f) Assess overall vulnerability of livelihoods to climate change:**

Have participants reflect on the findings from the earlier exercises, including their exposure, sensitivity and adaptive capacity, and assess the overall level of vulnerability of their livelihood activities and assets to climate change. Ask participants to explain how they reached their decision. Discuss whether there is consensus about overall vulnerability or why there is none.

If you have time, you can include further discussion and exercises on how to address vulnerability and build sustainable livelihoods. You can focus on ways to reduce exposure and sensitivity to threats from climate change across livelihoods as well as ways to build adaptive capacity.

**Communication outputs:**

- Poster, brochure, slides or other format summarising findings (digital or printed)

**Further resources:**

- IFRC. (2017). *IFRC Livelihoods Centre* [online]. <http://www.livelihoodscentre.org>
- DFID. (1999). *Sustainable Livelihoods Guidance Sheets*. Available at [www.eldis.org/vfile/upload/1/document/0901/section2.pdf](http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf)

**3.12 Value chain analysis**

Value chain analysis can be used to gain an in-depth understanding of the entire process involved in delivering a product or service and assessing strategies that could be taken to reduce costs and increase the value of the product or service. Value chain analysis also provides an opportunity to analyse how climate change affects an enterprise, including the vulnerabilities of different parts of the value chain, and determine adaptation strategies to be undertaken. The elements of vulnerability – exposure, sensitivity and adaptive capacity – can be assessed at each step in the value chain. For example, instead of transporting fish to a facility 10 km away to be canned, fisherfolk might instead decide to do fish processing and canning near where the fish are harvested to reduce fuel costs and risks from floods and landslides disrupting transport of fish. Another example is that instead of transporting seeds to a facility 10 km away to be made into bracelets, the entrepreneur might instead decide to manufacture his bracelets near where the seeds are collected to reduce fuel costs.



## Materials needed for value chain analysis

- Paper
- Makers
- Pens, pencils, crayons
- Masking tape

**Time required: 3 days to 1 week**

### 3.12.1 Steps specific to a value chain analysis to assess vulnerability in enterprises

#### Step 1. Identify the scope and goals for the analysis and key stakeholders<sup>34</sup>

Determine what is to be achieved by the value chain analysis, i.e. the goals and objectives. It can be used to assess and reduce the climate change vulnerability of a specific enterprise (e.g. tuna fishing and processing) of importance to the community or a specific target group (e.g. fish vendors or spear fishers targeting multiple species) and add value to its products or services.

Identify the key stakeholders to engage in the process. Use the goals and objectives to help you determine the key stakeholders (e.g. if the goal is to analyse a tuna fishing enterprise, then tuna fishers, vendors and processors, wholesalers and any fisherfolk organisations will be key stakeholders).



Figure 44: A value chain analysis allowed Climate ACTT participants to assess the vulnerability of one of the small businesses in Salybia, Trinidad to climate change. Photo: CANARI

#### Step 2. Identify any specialist expertise you will need

Unless you already have a small business/enterprise development expertise on your team, you will need to engage a small business development specialist to help develop the value chain and assess potential impacts and vulnerabilities from climate change and options for climate proofing and adding value to the selected enterprise.

#### Step 3. Plan for the analysis

Collect existing information about the relevant stakeholders, the selected enterprise to be analysed and the wider socio-economic context to ensure you have a good understanding of the relevant issues.

<sup>34</sup> These steps are adapted from Sandy, Edwards and Leotaud (2017).

Organise a venue for the value chain analysis, which will typically require two focus group sessions or a one-day workshop, and mobilise the relevant stakeholders. If undertaken as two focus group sessions, the first session should focus on developing the value chain and the second session focus on analysing the value chain to identify vulnerabilities to climate change and strategies to build resilience in the enterprise.

Discuss and document the perceived sensitivity of the enterprise to the identified climate change impacts. Consider things like whether the buildings are sturdy and can withstand high winds, location of buildings in relation to the coast and susceptibility of the enterprise to diseases (e.g. high sensitivity to vector-borne diseases like chikungunya or dengue would affect productivity). Note whether the sensitivity is high, medium or low.

#### **Step 4. Identify the value chain steps and develop the value chain**

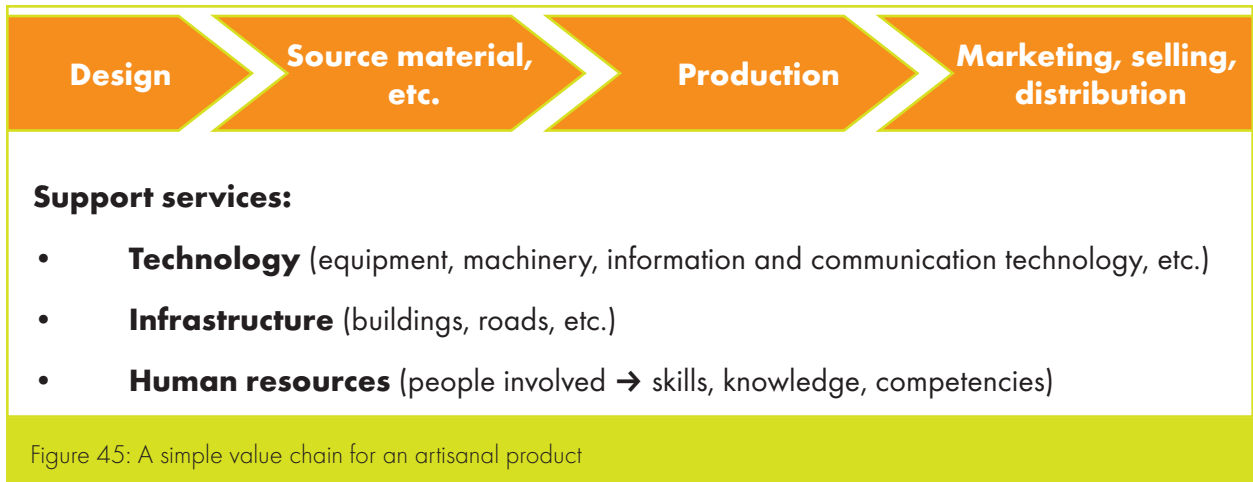
Explain what is a value chain to start off the focus group/workshop. A value chain is the full range of activities required to deliver a product or service to the consumer, from collecting the raw material (including planting, harvesting fish at sea or aquaculture farming), transporting it to be processed, processing the raw materials, packaging, storing, transporting to the stores, advertising and selling the products. It includes all the steps from harvesting to getting the product to consumers. It can also include technology and infrastructure associated with the enterprise as well as training to improve skills.

You can use probing questions to collect information from the participants on the steps in the value chain as well as observation of the processes in the enterprise. These probing questions can include:

- How do you catch/harvest the raw product/materials?
- What gear, equipment or other inputs do you need to do so?
- What do you do with the raw product/materials once harvested?
- Do you process the raw product/materials? If so, how?
- If you sell the product, do you sell to fixed buyers?
- How do you transport or store the product?
- What are the main markets for the product?
- How do you sell the raw or final products?

Construct a value chain that shows the various steps, including inputs and activities, in delivering the product or service for the enterprise. Figure 45 shows a simple structure for the value chain.

Discuss and document the things that are in place to help the enterprise recover from shocks. This might include number of persons with skills relevant to adaptive capacity, training for the enterprise, varied sources of raw material and different access routes to



markets, alternate sources of electricity, savings and/or bank account with access to credit, and access to technology. Also note if the adaptive capacity is high (good), medium or low (poor). For example, an enterprise with electricity both from the grid and a solar energy system, high levels of savings and insurance for its workers and equipment might be rated as ‘high’.

### Step 5. Determine the enterprise’s exposure to climate change

Identify and discuss the impacts of climate change and other hazards that could affect each step of the enterprise’s value chain, such as sea level rise, drought, intense rainfall or high winds during storms. For example, drought might affect availability of seeds for jewellery while landslides caused by intense rainfall could reduce access to markets. Coral bleaching might affect fish availability and catches while flooding and landslides caused by intense rainfall could damage the processing facility and reduce access to markets. Document the hazards affecting each of the different steps in the value chain and note whether the exposure is high, moderate or low.

### Step 6. Determine the enterprise’s sensitivity to the impacts of climate change

Discuss and document the sensitivity of the enterprise to the identified climate change hazards. Note the types of impact of the hazards on different steps in the value chain. Consider things like whether the buildings are sturdy and can withstand high winds, location of buildings in relation to the coast or river that floods and susceptibility of the enterprise to diseases (e.g. high sensitivity to vector-borne diseases like chikungunya or dengue would affect productivity). Note whether the sensitivity is high, medium or low.

### Step 7. Determine the adaptive capacity of the enterprise

Discuss and document the coping/adaptation strategies that are in place to help the enterprise recover from the impacts of climate change and other hazards at each step of the value chain. This might include relevant training or skills (e.g. First Aid or safety at



sea training) for the enterprise, varied sources of raw material, different access routes to markets, alternate sources of electricity, savings or bank account with access to credit, and access to insurance or more efficient technology. Also note if the adaptive capacity is high (good), medium or low (poor) based on the available coping/adaptation strategies. For example, an enterprise with electricity both from the grid and a solar energy system, high levels of savings and insurance for its workers, and equipment might be rated as 'high'.

### **Step 8. Identify and build consensus on key vulnerabilities and priorities for action**

Discuss and document which parts of value chain are most and least vulnerable to climate change and rank them in order of priority for action. Present the completed value chain analysis to other members of the enterprise for their input and build consensus about key vulnerabilities and priorities.

If you have time, you can include further discussion on how to address vulnerabilities and build a more resilient enterprise. You can focus on ways to reduce exposure and sensitivity to impacts from climate change across different parts of the value chain as well as ways to build adaptive capacity. The focus should also be on adding value to the enterprise, for example, by reducing production costs, increasing efficiency of production, improving quality of goods and services or improving markets. These increase income to the enterprise. In this way, addressing climate change becomes one of the priorities in strengthening the value chain and, therefore, the enterprise as a whole. For example, an enterprise that installs solar power to its fish processing facility to provide a stable power supply improves the efficiency of its operations and builds resilience by reducing reliance on the electric grid.

**Step 9. Develop and implement an action plan (see Sections 4 and 5)** to adapt to climate change and improve the resilience of the enterprise

### **Communication outputs:**

- Value chain (digital or printed)

### **Further resources:**

- Sandy, K., Edwards, A. and Leotaud, N. 2017. '*Climate proofing*' local green enterprises. Guidelines Series No. 10. Port of Spain, CANARI. Available at <http://www.canari.org/wp-content/uploads/2016/01/guidelines-10-climate-proofing-lges.pdf>

## Box 20: Case study: Using value chain analysis to assess a chocolate making enterprise

The Brasso Seco Chocolate Company in Trinidad and Tobago makes organic dark chocolate. The community-owned enterprise is located in the mountains of the Northern Range in Trinidad. The community entrepreneurs used a value chain analysis to determine how vulnerable its enterprise was to climate change. It worked with a business expert to develop a very simple value chain for its product, noting all the processes that went into getting the cocoa beans to transform into chocolate bars and then sold to the final consumer. For each part of the completed value chain, they discussed their vulnerabilities and then brainstormed possible adaptation actions. The entrepreneurs then determined priority actions based on needs and available budget. One of the key findings was that the enterprise was often affected by heavy rains that caused landslides. Landslides, in turn, damaged poles that took electricity to the community and interrupted production of chocolates. The entrepreneurs decided to install a solar energy system on their production house so that the enterprise would have a constant supply of electricity. Landslides also prevent access to markets and had damaged homes of workers, but there were not enough available funds to address these issues.

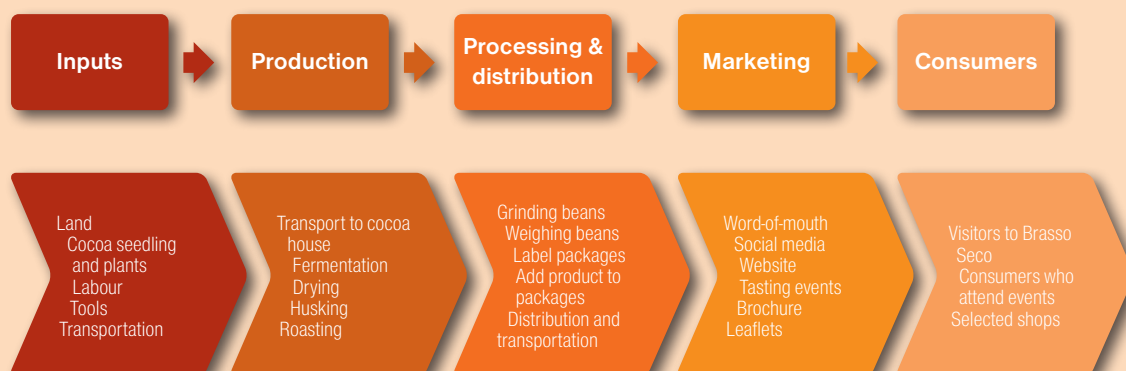


Figure 46: A cocoa products value chain from the Brasso Seco Paria Tourism Action Committee.  
Source: Nevis Fisherman's Co-operative (2020)

### 3.13 Useful resources

Bobb-Prescott, N. (2014). *Case study on the use of participatory three dimensional modelling to facilitate effective contribution of civil society in the Caribbean islands in planning for action on climate change*. Technical Report 401. Laventille, Trinidad: CANARI. Available at [http://www.canari.org/documents/401CasestudyP3DM\\_001.pdf](http://www.canari.org/documents/401CasestudyP3DM_001.pdf)

Caribbean Natural Resources Institute [CANARI]. (2004). *Guidelines for stakeholder identification and analysis: A manual for Caribbean natural resource managers and planners*. Guidelines Series No. 5. Laventille: Trinidad. CANARI. Available at <http://www.canari.org/wp-content/uploads/2016/04/Guidelines-5-Guidelines-for-stakeholder-identification-and-analysis.pdf> [Accessed 12 January 2017]

CANARI. (2011). *Facilitating participatory natural resource management: A toolkit for Caribbean managers*. Laventille, Trinidad: CANARI. Available at <http://www.canari.org/wp-content/uploads/2015/04/PNRM-ToolkitEnglish1.pdf>

CANARI. (2020). *An advocacy toolkit for Caribbean civil society organisations*. Port-of-Spain: CANARI.

CANARI. (2021). *Organisational strengthening: A toolkit for Caribbean civil society organisations*. Port-of-Spain: CANARI.

FAO and CANARI. (2021). *Toolkit for Vulnerability and Capacity Assessments in Caribbean Coastal and Fishing Communities*. Port of Spain, Trinidad, and Rome. 137pp.

International Federation for Red Cross and Red Crescent Societies [IFRC] Livelihoods Centre. <http://www.livelihoodscentre.org>

IFRC. (2018). *Enhanced Vulnerability and Capacity Assessment*. Available at: <https://www.ifrcvca.org/>

Sandy, K., A. Edwards and N. Leotaud. (2017). *'Climate-proofing' local green enterprises*. *Guideline Series No. 10*. Port of Spain: Caribbean Natural Resources Institute.

UK Department for International Development [DFID]. (1999). *Sustainable Livelihoods Guidance Sheets*, April 1999. Available at <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf>

# Planning for adaptation and disaster risk reduction

- 4.1. Introduction
- 4.2. Key steps in adaptation and disaster risk reduction planning
- 4.3. Useful resources

## Box 21: Key terms used in Section 4

<b>Adaptive capacity</b>	The ability of systems, institutions, humans and other organisms to adjust to climate change – including climate variability and extremes – to moderate potential damages, to take advantage of opportunities, or to respond to consequences. It is context specific as it is strongly influenced by culture, education, health, institutions and socio-economic factors (adapted from IPCC, 2021).
<b>Capacity building for climate change adaptation</b>	Efforts to develop the human knowledge, skills and resources needed within a community or institution to effectively respond to climate change (UNISDR, 2009).
<b>Climate change adaptation</b>	The adjustment of human or natural systems, including specific measures to address the actual or potential impacts of climate change, particularly to moderate harm or exploit beneficial opportunities (adapted from IPCC, 2021).
<b>Disaster</b>	A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Note: The effect of the disaster can be immediate and localised but is often widespread and could last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources (UNDRR, 2017).
<b>Disaster risk reduction</b>	Efforts aimed at preventing new disaster risk, reducing existing risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development (UNDRR, 2017).
<b>Disaster risk management</b>	The application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses (UNDRR, 2017).
<b>Hazard</b>	A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation (UNDRR, 2017).
<b>Resilience</b>	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (UNDRR 2017).
<b>Vulnerability</b>	The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards (UNDRR, 2017).



## 4.1. Introduction

CSOs can play a critical role in planning for effective climate change adaptation, disaster risk reduction (DRR) and building local resilience. They can act both as advocates to catalyse planning and as facilitators of the participatory processes needed for development of effective adaptation or disaster action plans. They can also bring their expertise to the table in planning processes initiated by others.

Planning processes should build on the findings from vulnerability assessments (see Section 3) to develop relevant and effective ways to address the impacts of climate change and related hazards on a particular geographic area or sector. Planning should also consider how to take advantage of any opportunities that may arise as a result of climate change and related hazards.

It is also important to note that adaptation and DRR are two complementary approaches that can help address the problems posed by climate change and disaster risks. In recent practice, efforts are being made to integrate the two towards the overarching aim of building resilience and achieving sustainable development.

### Box 22: Climate change adaptation vs disaster risk reduction

#### Distinguishing between Adaptation and DRR:

- Adaptation and DRR efforts share the immediate common aim of building resilience of people, economies and natural resources to the impacts of extreme weather and climate change.
- However, DRR has a much wider scope than climate-related hazards. DRR considers the reality of a multi-hazard environment and so factors in, more broadly, risks from a range of hazards (e.g. earthquakes, volcanoes, pandemics etc.) as well as climate change. DRR looks to reduce the risk of both natural and man-made disasters through reducing exposure and vulnerability of people and property and increasing preparedness for such events.
- Adaptation is more focused climate-related hazards. It seeks to make adjustments to reduce the potential negative impacts of climate change on society with regard to both climate extremes (e.g. higher temperatures and heatwaves, drought, floods, storms and storm surges) and gradual changes, such as sea level rise.

#### Understanding the adaptation and DRR planning process

- **Adaptation and DRR planning are iterative rather than one-off processes.** Effective adaptation and DRR actions must respond to changing circumstances, whether in terms of climate change and disaster vulnerability, community demographics, local or national leadership, or policy. Effective CCA and DRR planning, therefore, requires continuous analysis, decision-making and action over time to ensure that future plans reflect new data and lessons learnt from earlier planning and implementation phases.

Source: Adapted from the Global Assessment Report, UNDRR 2019

### ***Adaptation planning***

Adaptation planning can result in the development of stand-alone climate adaptation plans, which specifically address the impacts of climate change and the vulnerability of the community or sector to these impacts. Alternatively, it can focus on integrating climate adaptation measures into existing plans for local or sectoral development, such as community disaster management plans or sectoral strategic plans. This is often referred to as ‘mainstreaming’ climate change. These comprehensive adaptation plans can then provide the basis for different stakeholders to take adaptation actions (see Section 5), based on their particular mission, skills and resources.

### ***Disaster risk reduction planning***

Recognising that we cannot eliminate disasters but can reduce risk, DRR planning involves determining what key actions different stakeholders can take to address vulnerabilities and reduce key risks identified, including what resources and capacities are needed to do so. DRR planning often incorporates climate change considerations as a subset of other factors affecting a particular location or sector.

## **4.2 Key steps in adaptation and disaster risk reduction planning**

The following presents some key steps to consider for adaptation and DRR planning.

### **Step 1: Determine the scope of your planning process**

Climate change adaptation and disaster risk reduction planning can be done on many different scales, for example, regional, national, local, community, or for a particular sector. CSOs will mainly be involved in leading community or sectoral level planning and contributing to plans at the other levels.

### **Step 2: Research and assess the context**

Once you have determined the broad scope of your planning exercise, you will need to do further background research on the community or sector you are working with before you start the formal, participatory planning process, including:

- review and analysis of existing assessments of the community’s vulnerability to climate change and/or facilitation of a participatory vulnerability assessment (see Section 3), including to get a sense of vulnerability of people, their livelihoods and ecosystems they depend on to effectively inform planning;
- systematic identification of key stakeholders.<sup>35</sup> (an exercise that should be continued throughout the planning process as you are unlikely to be able to identify all of them from the outset);

<sup>35</sup> For more information, see CANARI, 2004.

- analysis of key stakeholders, for example, to determine who has relevant expertise, who will be most affected by the impact of climate change, who might be resistant to the changes that adaptation would require, what are their communication preferences, and when and where is the best time for engagement of different categories of stakeholders.

This research should be done using a participatory approach<sup>36</sup>, involving new stakeholders as and when you identify them.

### **Step 3: Develop the goal of, and methodology for, the adaptation or DRR planning process**

This step involves:

- development of a broad goal and some specific objectives for the planning process, to be reviewed and refined with the wider stakeholder base;
- identification and securing of the expertise and resources (human, financial and material) that you need to conduct an effective adaptation or DRR planning process. This often includes sourcing additional external technical or facilitation expertise, for example, from government agencies, businesses or other CSOs that work in sectors relevant to climate and disaster resilience (e.g. agriculture, energy, environment, water, disaster management, transport or gender) or have specialised skills (e.g. participatory three-dimensional mapping or participatory video);
- creation of a project team with clear roles and responsibilities;

<sup>36</sup> For guidance on facilitating participatory processes, see CANARI, 2011. Facilitating participatory natural resource management: A toolkit for Caribbean managers



Figures 47 & 48: Amphibians are good indicators of environmental health because their skin is acutely sensitive to minor changes in temperature, humidity, and air or water quality. Photos: Natalie Boodram/CANARI (top); Carlos C. Martínez Rivera (bottom)



Figure 49: Certain species of plants are also important indicators of environmental health. Water lilies are a particularly good indicators of water quality. Photo: Natalie Boodram/CANARI

- development of a stakeholder engagement strategy that focuses on engaging the widest possible range of stakeholders in the subsequent steps; and
- development of a work plan and timeline.

#### Step 4: Collectively develop the adaptation or DRR plan

During this critical stage, you actively engage stakeholders in identifying and prioritising the key actions that could be taken to adapt to or reduce risks from climate change and improve resilience. When done effectively, this process helps to secure widespread buy-in to the final plan and starts to identify who is best placed to implement different actions. As the CSO leading the process, you must be sure that you, or the people you contract, have high levels of competency in the following:



Figure 50: Residents of Codrington, Barbuda plan for adaptation. Photo: CANARI

- communicating about climate change (see Section 2): climate change is a complex issue and participants may have a low or confused level of understanding of what is driving it and what adaptation and resilience mean;
- facilitation of equitable participatory processes (see Tip overleaf);
- managing conflict (it is rare that all stakeholders agree on everything) and building consensus; and
- documenting and feeding back to stakeholders the outcomes of their discussions.

Processes may vary according to what has already been done in the community or sector but should include:

##### a) Participatory visioning

Visioning processes encourage stakeholders to share their aspirations and vision for the community or sector and to think and plan for the long-term. Developing a collective, positive image of a sustainable and resilient community also helps to shift focus from their vulnerability to climate change and other challenges that are discouraging or seem overwhelming.

**b) Sharing and review of the findings of the vulnerability assessment** and any other relevant assessment, particularly with stakeholders who were not involved in the original exercise.



### c) Identification and prioritisation of potential actions

This activity is normally done by:

- brainstorming everyone's ideas for adaptive and resilience building actions to address the climate change impacts identified in the participatory vulnerability assessment. Potential actions can build on existing efforts to manage climate-related impacts or be entirely new. They might seek to reduce exposure (e.g. relocating inland to avoid rising sea levels) or sensitivity (e.g. irrigating a farm to reduce the impacts of rainfall variability) or build adaptive capacity (e.g. livelihood diversification to ensure a secure income and robust local economy).
- Developing collectively criteria for prioritising the actions, e.g. whether they address multiple threats or benefit a particularly vulnerable group;
- sorting the actions by order of priority, with the main focus on identifying the key priorities that could be acted on over the next few years.



#### Tip to use 'sticky dots' as a tool for rapid prioritisation of actions

Put the full list of the brainstormed actions (either on flip chart paper or, better still, on individual sheets of paper) on the wall. Then give each participant 3 - 5 sticky dots (depending on the number of potential actions identified) and ask them to stick these on the 3 - 5 actions that they see as the top priorities, based on the agreed criteria.

This can be done very quickly and generally results in a pretty clear consensus on the top priorities, plus an indication of other issues that it may be worth considering.

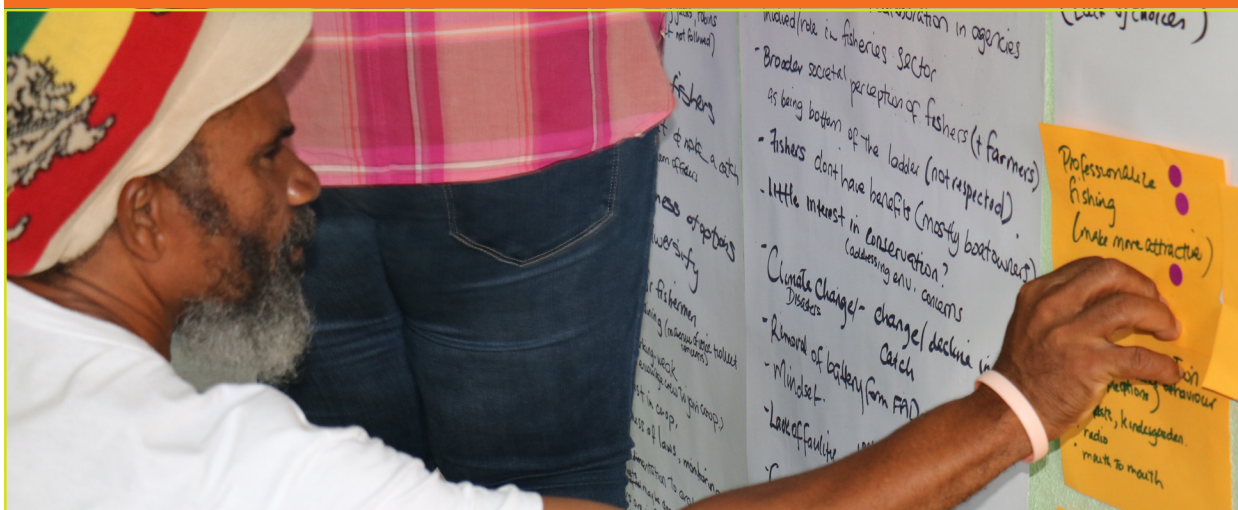


Figure 51: A stakeholder in Canaries, Saint Lucia uses sticky dots to vote on priorities for action. Photo: CANARI



### Step 5: Assess the feasibility of, and resources needed to implement, actions

Depending on the criteria used for prioritising the actions, you may need to further screen the identified priorities to ensure they are environmentally, financially, technically and socially feasible. At this point, you would probably just estimate a ballpark cost for each activity, with detailed budgeting being done during the proposal development and implementation phases.

### Step 6: Define lead roles and responsibilities for each priority action

It is also useful to identify which organisation or group is best positioned to lead on each action, so that they can begin the process of advocating for the action, seeking implementation partnerships, fundraising etc. This would be determined by the existing knowledge, skills and resources available to different stakeholders, but also by their interests. Encourage and support stakeholder groups that have a strong interest in and passion for a particular action to seek funding for any necessary capacity building in project proposals.

### Step 7: Document and share the adaptation or DRR plan

A clearly written and presented adaptation or DRR plan is essential to secure funding and provides a sound basis for advocacy. But it is also useful to document the process by which it was arrived at, and any lessons learnt.



#### Tips

Even when the main focus of your plan is on adaptation to climate change at the community or sectoral level, you may want to **include advocacy or practical actions that strengthen the capacity of the institutions critical to your success.** Such actions might include:

- capacity building to increase their understanding of climate change and its impacts, adaptation/risk reduction options, the national and international policy context, and how local institutions can facilitate local action;
- forging partnerships with meteorological and disaster management agencies, universities and other key stakeholders generating and sharing climate risk and other relevant information to provide technical assistance, funding and other resources to communities and CSOs; and
- supporting advocacy around the value of and strategies for multi-stakeholder participation in local institutions to effectively facilitate adaptation and DRR planning.

Similarly, you should consider how **local adaptation priorities could be integrated into wider planning processes** as this increases the potential

impact through tackling climate change adaptation on multiple fronts. You and/or other key stakeholders can advocate for the relevant government departments and agencies to implement priority adaptation actions and participate in relevant stakeholder consultations or public hearings to review proposed plans, projects and policies that could affect the outcomes of your local adaptation plan.

There are three main planning processes into which local adaptation priorities and actions can be integrated:

**1. Development planning**, which focuses on how to allocate resources to maintain or enhance economic growth, infrastructure and public services such as schools and health centres. It involves a range of sectors, including agriculture, education, energy, tourism, and water and sanitation. Local adaptation priorities can be effectively incorporated into plans within the various sectors, for example, climate-proofing tourism enterprises under a tourism re-development plan for the community or promoting rainwater harvesting systems as part of a strategy to improve rural water supply to farmers.

**2. Disaster risk reduction planning** is a way to reduce the risk of a disaster by planning ahead. It seeks to reduce a community's exposure or sensitivity and build resilience to future hazards ranging from earthquakes and tsunamis to pandemics and floods. Climate change can increase disaster risk in a variety of ways - by altering the frequency and intensity of hazard events such as hurricanes, floods, drought and forest fires, affecting vulnerability to hazards, and changing exposure patterns (UNDRR 2020). Planning what to do if these hazards strike, and become more extreme with climate change, can reduce the potential for major damage and loss to communities. For example, local adaptation priorities to enhance awareness and preparedness for climate-related hazards, like hurricanes, can be integrated into community disaster preparedness plans. Putting in place early warning systems to forewarn communities when a hazard is expected is also key.

**3. Environmental planning** involves actions to address environmental degradation and loss that focus on healthy ecosystems and their effective management, and can help build resilience to climate change and disasters. For example, mangroves protect against coastal erosion and inundation and mangrove conservation or reforestation can help address sea level rise and extreme storms and storm surges. Healthy ecosystems also contribute to the overall health and resource security of communities and enhance their adaptive capacity. Integrating local adaptation priorities into planning for coastal zone, forest or watershed management is therefore very valuable.

### 4.3. Useful resources

CARE International. (2010). *Community-based adaptation toolkit* [online]. Available at [http://www.careclimatechange.org/tk/cba/en/Open\\_Toolkit.html](http://www.careclimatechange.org/tk/cba/en/Open_Toolkit.html)

Caribbean Disaster Emergency Management Agency [CDEMA]. (2011). *Climate Smart Community Disaster Management Module and Facilitator's Handbook*. St. Michael, Barbados: CDEMA. Available at [http://www.cdema.org/cris/climate\\_change\\_adaptation\\_mitigation/CSCDM\\_FINAL\\_Facilitators\\_Handbook\\_web\\_version.pdf](http://www.cdema.org/cris/climate_change_adaptation_mitigation/CSCDM_FINAL_Facilitators_Handbook_web_version.pdf)

Conservation International. (2013a). *Adapting to a changing climate: A community manual*. Washington, DC: CI. Available at [http://www.conservation.org/publications/Documents/CI\\_Climate-Change-Adaptation\\_Training\\_Community-Manual.pdf](http://www.conservation.org/publications/Documents/CI_Climate-Change-Adaptation_Training_Community-Manual.pdf)

Conservation International. (2013b). *Adapting to a changing climate: A training guide*. [http://www.conservation.org/publications/Documents/CI\\_Climate-Change-Adaptation\\_Training\\_Training-Guide.pdf](http://www.conservation.org/publications/Documents/CI_Climate-Change-Adaptation_Training_Training-Guide.pdf)

WeADAPT Climate adaptation planning, research and practice. <https://www.weadapt.org/>

# Taking action to adapt and build resilience

- 5.1. Introduction
- 5.2. Why focus on community-based adaptation actions?
- 5.3. Why focus on ecosystem-based adaptation actions?
- 5.4. Steps in implementing your adaptation or DRR project
- 5.5. Useful resources

## Box 23: Key terms used in Section 5

<b>Adaptive capacity</b>	The ability of systems, institutions, humans and other organisms to adjust to climate change – including climate variability and extremes – to moderate potential damages, to take advantage of opportunities, or to respond to consequences. It is context specific as it is strongly influenced by culture, education, health, institutions and socio-economic factors (adapted from IPCC, 2021).
<b>Capacity building for climate change adaptation</b>	Efforts to develop the human skills and resources needed within a community or institution to effectively respond to climate change (UNISDR, 2009).
<b>Climate change adaptation</b>	The adjustment of human or natural systems, including specific measures to address the actual or potential impacts of climate change, particularly to moderate harm or exploit beneficial opportunities (adapted from IPCC, 2021).
<b>Community-based adaptation</b>	Climate change adaptation activities developed in collaboration with at-risk communities, in order to promote local awareness of, and appropriate and sustainable solutions to, current and future climatic conditions (CARE International, 2010).
<b>Community-based disaster risk reduction</b>	The involvement of potentially affected communities in addressing disaster risk at the local level. This includes community assessments of hazards, vulnerabilities and capacities and their involvement in planning, implementation, monitoring and evaluation of local action for disaster risk reduction (UNDRR, 2017).
<b>Ecosystem</b>	A system of living organisms, the physical environment and the interactions and relationships within it. Coral reefs, dryland savannas, forests and mangroves are all examples of ecosystems.
<b>Ecosystem-based adaptation</b>	The conservation, sustainable management and restoration of natural ecosystems to help individuals, communities and organisations adapt to climate change and build resilience. This is a type of nature-based solution that harnesses biodiversity and ecosystem services to reduce vulnerability and build resilience to climate change (Conservation International, 2013; IUCN, 2017).
<b>Ecosystem-based disaster risk reduction</b>	The sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim to achieve sustainable and resilient development (Estrella and Saalismaa, 2013; UNDRR, 2020).
<b>Nature-based solutions</b>	Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits. Common societal challenges are climate change, food security, disaster risks, water security, social and economic development as well as human health (IUCN, 2016).
<b>Resilience</b>	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (UNDRR, 2017).
<b>Vulnerability</b>	The conditions which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards. These conditions are determined by physical, social, economic and environmental factors or processes (UNDRR, 2017).



## 5.1. Introduction

Once an overall adaptation or DRR plan has been established, CSOs can play a key role in taking action to adapt and build resilience to climate change. This role might include:

- raising awareness of climate change to promote better understanding of climate change and its impacts and promote changes in behaviour to enable adaptation or DRR actions;
- conducting research to build the knowledge base, for example, on local impacts and vulnerabilities to climate change;
- designing and implementing practical adaptation or DRR projects;
- identifying and documenting best practices and innovations in adaptation, DRR and resilience building;
- advocating for changes in planning, policies and legislation at the local and national levels to create an enabling environment for adaptation, DRR and resilience building; and
- serving as a watchdog to ensure that businesses, government and the public comply with climate change policies and regulations.

The type of action the CSO selects from the adaptation or DRR plan will depend on its mission, capacities and resources. In some instances, actions will be most effective if they are done in partnership with other key climate change stakeholders, such as government agencies, academia, businesses and other CSOs at both the national and community level. When the action focuses on adaptation or DRR at the community level, it is also critical to identify and engage as many community stakeholders as possible in the design and implementation of the action.



Figure 52: Growing certain tree species on coffee farms in Jamaica and protecting nearby forests can help to increase resilience to climate change. Photo: Wendy Willis



Figure 53: Reserva Privada Zorzal – the Dominican Republic's first private protected area. Photo: Charles Kerchner



Figure 54: The National Parks Trust in the British Virgin Islands designated sanctuaries to preserve and protect its terrestrial and marine habitats for generations to come. Photo: British Virgin Islands National Parks Trust

Section 5 highlights the benefits of both community-based and ecosystem-based approaches for adapting or reducing risks from climate change – these include community-based adaptation (CBA) and community-based disaster risk reduction (CBDRR), as well as ecosystem-based adaptation (EBA) and ecosystem-based disaster risk reduction (Eco-DRR). It also provides examples from the Caribbean of adaptation and DRR actions taken by CSOs using these approaches. Finally, this section briefly outlines the steps and resources needed for implementing any project effectively.

## 5.2 Why focus on community-based approaches?

Community-based approaches for addressing climate change and related risks commonly include both community-based adaptation (CBA) and community-based disaster risk reduction (CBDRR).

**CBA** actions are those you design and implement in partnership with at-risk stakeholders in communities in order to promote local awareness of, and appropriate and sustainable solutions to, current and future impacts of climate change (adapted from CARE International, 2014). As noted earlier, many communities in Caribbean islands are extremely vulnerable to the impacts of climate change.

CBA seeks to reduce these vulnerabilities and build resilience and CSOs can play a critical role in leading and facilitating the CBA process. All communities possess a wide range of expertise and extensive knowledge of their local climate, environment and the issues affecting their livelihoods. However, community members may lack the full understanding of the causes and potential impacts of climate change needed to plan and adapt effectively.

**CBDRR**, though broader in scope, is a similar concept to CBA. Both advocate for similar approaches which are people-centred and embrace the idea of local capacities, knowledge and action. CBDRR is a participatory and “bottom up” approach that seeks ways to help communities effectively use local resources and capacities to assess and better prepare for disaster risks and adopt measures to reduce their vulnerability. It aims to address the specific local needs of vulnerable communities and recognises that local communities are often the first line of defence or first responders to disaster risks, including from climate change.

CBDRR approaches often include actions and initiatives such as community vulnerability and capacity assessments, development of community disaster plans, community early warning systems and community emergency response teams (CERT), facilitation of training and drills and implementation of local DRR actions.

The underlying principles of CBA and CBDRR are inclusion, community ownership and leadership of the process and empowerment of all stakeholders. Their value and benefits include:

- building local awareness of the impacts of climate and other natural hazards and potential solutions;

## Box 24: Rainwater harvesting to ensure local water security, Trinidad and Tobago

Increased drought poses a significant challenge across the Caribbean. As rivers and reservoirs dry up, water supply will be disrupted and communities will experience water shortages. The community of Caura Valley, Trinidad, has taken steps to enhance its water security through installing a rainwater harvesting system for its community centre in 2013. In the Caura Valley, several households do not have access to pipe-borne water. They rely on the supply of water to communal tanks by the Water and Sewage Authority or collect water themselves from local rivers and springs. The rainwater harvesting system helps provide these households with an alternative water supply and reduces demand on the existing water supply.

The project was implemented by the Caura Valley Village Council under a small grant from the Global Environment Facility Small Grant Programme, with technical support from CANARI. A team from the community received six weeks of training before installing the rainwater harvesting systems. These systems comprise a catchment area (e.g. galvanised roof), delivery system (e.g. guttering and pipes), storage tank, and a treatment system that ensures the water is safe for use. The training drew on the pioneering work of the Global Water Partnership – Caribbean in installing rainwater harvesting systems to address water shortages and climate change regionally. This community-based adaptation project now serves as a successful model for other communities in Trinidad and Tobago.

See <http://www.canari.org/wp-content/uploads/2014/09/CauraValleyCommunityCaseStudy2013.pdf> for more information about rainwater harvesting in Caura Valley.



Figures 55 & 56: Caura Valley residents install a rainwater harvesting system. January 2013.  
Credit: CANARI



- taking into account the local context and needs and ensures actions are ‘fit for purpose’;
- drawing on local and indigenous knowledge, values and practices;
- empowering local communities to identify their priorities and make decisions about how to respond;
- encouraging priorities to be set for the most marginalized or vulnerable areas and groups;
- recognising existing capacities and coping mechanisms and mobilising local resources and networks to implement actions to address risks; and
- linking to development plans and, as such, considering core factors such as poverty, social inequalities and environmental degradation in building resilient communities.

## Box 25: Enabling local disaster resilience through capacity building, collaboration and practical actions

The Community Resilience Building in the Caribbean project is a three-year initiative being implemented from 2019 to 2022 by the Canadian Red Cross in 17 communities in Belize, Saint Vincent and the Grenadines and Suriname, with a regional component for the entire Caribbean. It is funded by Global Affairs Canada with project implementation support provided by the IFRC Caribbean Regional Coordination Office and national Red Cross Societies in the project countries.

The project focuses on building resilience in the target communities through applying ecosystem-based and gender-responsive approaches to community disaster risk management and climate change adaptation. Key elements include:

- **Community needs assessments and development of community disaster plans in collaboration with the community.**
- **Community training in disaster mitigation and management.** This covers areas such as first aid, community disaster response and gender and social inclusion in emergencies, and online training on climate change awareness incorporating gender and EBA solutions.
- **Community implemented micro-projects to build resilience.** Several micro-projects are already planned or in progress in target communities, with examples ranging from water harvesting for drought alleviation in Suriname, climate-smart urban agriculture in Belize, implementation of eco-based solutions for flood control and reducing mosquito infestation in Saint Vincent and the Grenadines, and a few projects incorporating physical improvements to community infrastructure e.g. retrofitting of community centres as hurricane shelters.

The project design and approach demonstrate several CBDRR principles and best practices via focus on: local needs (as part of community needs assessments); empowering communities to take direct action (through training and micro-projects); and incorporation of gender considerations, which help enhance inputs and participation. The activities reiterate the importance of participatory assessments and planning with communities to inform actions, the need for capacity building, and emphasis on practical actions by community stakeholders themselves for enabling successful CBDRR. Additionally, there has been strengthening of relationships and collaboration between communities and various key DRR agencies (including national disaster offices, Red Cross Societies, IFRC, and CDEMA) for better coordination and cooperation on local action.

The project builds on previous work by the Canadian Red Cross in the region from 2011 to 2015, where 45 communities were supported to develop risk reduction strategies in Dominica, Guyana and Jamaica. Activities included family disaster planning and training in first aid for emergencies and gender sensitisation.

For more information, see: <https://www.cadrim.org/community-resilience-building-proje>

Best practice in CBA and CBDRR is that they are:

- **community-driven**, where selected actions are based on the needs, values and priorities of the community;
- **participatory**, providing opportunities for equitable participation of all local stakeholders;
- **collaborative**, building linkages and networks that facilitate the integration of local and scientific knowledge to inform decision-making;



- **relevant and practical**, ensuring actions are culturally appropriate, have direct benefits locally and are viable over the long-term; and
- **learning-oriented** and able to adapt to new information or uncertainty.

CSOs can facilitate CBA and CBDRR processes to build community resilience by increasing awareness of climate change and its impacts and empowering community members to make decisions about how to implement adaptation or DRR actions. CSOs can also build linkages with external networks and organisations to facilitate community access to climate information, funding and other resources needed to implement effective adaptation or DRR actions.

Boxes 24 and 25 provide two examples of CBA and CBDRR in the Caribbean.

### 5.3 Why focus on ecosystem-based approaches?

Ecosystem-based approaches or actions for addressing climate change and related risks include both ecosystem-based adaptation (EBA) and ecosystem-based disaster risk reduction (Eco-DRR).

**EBA** involves the conservation, sustainable management and restoration of natural ecosystems to help people and systems adapt to climate change and build resilience. Like CBA, it uses a participatory and community-driven process, but with a strong focus on solutions that build ecological resilience over the long-term. For example, a healthy coral reef will protect against coastal erosion and storm surges and provide habitat and breeding grounds for marine biodiversity, supporting the fishing and tourism industries.

**Eco-DRR** is “the sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim to achieve sustainable and resilient development” (Estrella and Saalismaa 2013; UNEP 2019).

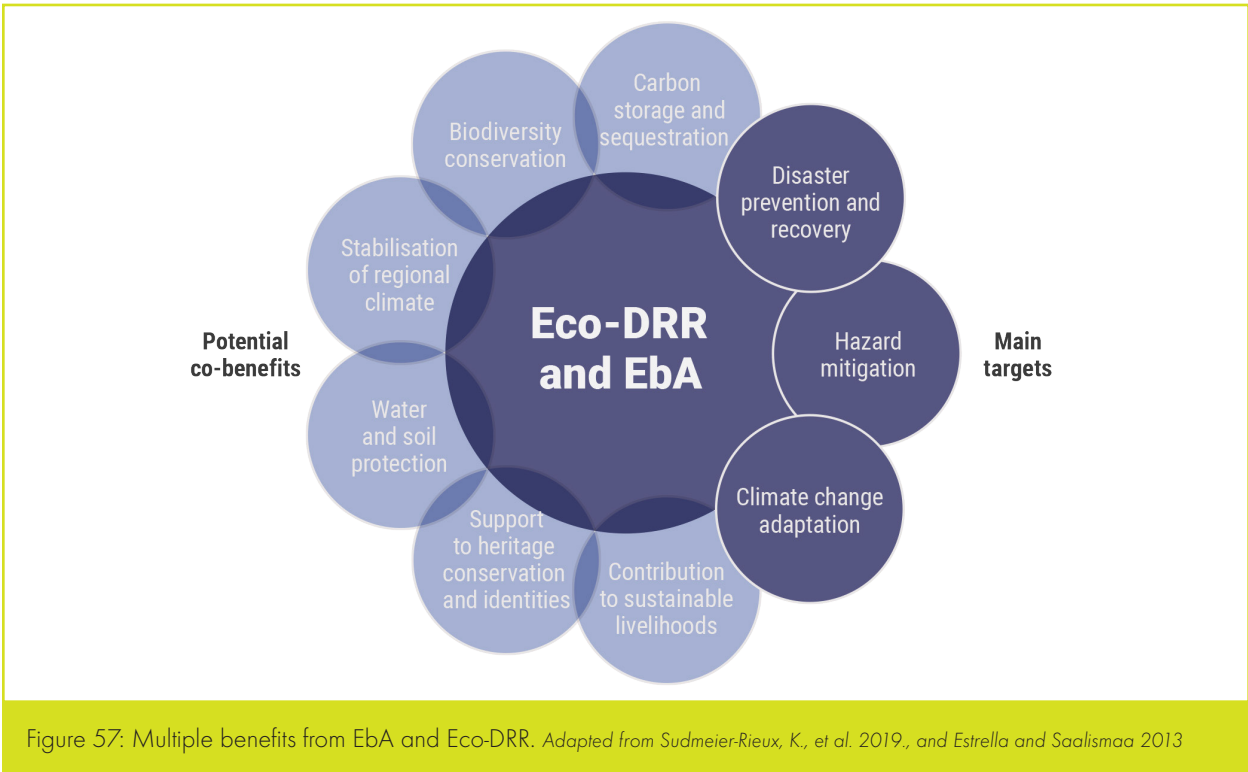
Eco-DRR combines natural resource management approaches, such as sustainable management of ecosystems, with DRR approaches, such as early warning systems and emergency planning, in order to have more effective disaster prevention, reduce the impact of disasters on people and communities, and support disaster recovery (Sudmeier-Rieux et al., 2019, UNDRR 2020).

EBA and Eco-DRR both fall under the umbrella of nature-based solutions and play an important role in reducing climate and disaster risk, in particular, in addressing systemic risk arising from an increasingly complex and changing landscape (UNDRR, 2020). They recognise that well-managed ecosystems, such as forests, wetlands and coastal ecosystems, act as **natural defences that reduce exposure to hazards and increase the socio-economic resilience of communities** by providing essential goods and services and sustaining local livelihoods. Ecosystem services further catalyse disaster recovery and enhance community resilience (see Box 27).



Ecosystem-based approaches or nature-based solutions may be land-based or coastal and marine-based. Land-based approaches include forest conservation and restoration, agroforestry and related practices, hillside and soil stabilisation and watershed rehabilitation. Coastal and marine-based approaches include, for example, mangrove conservation and replanting, coral reef conservation and restoration, sand dune restoration, seamount/seagrass replanting and seeding.

Ecosystem-based approaches are considered efficient, cost-effective, flexible, low-regret approaches to addressing the impacts and risks of climate change and disasters with multiple social, economic and environmental co-benefits. EBA and Eco-DRR can offer a more cost-effective option for adaptation than solutions involving infrastructure or technology (Baig, et al., 2016). For example, protecting the forests in a watershed to maintain freshwater supply and quality requires a lower financial investment than building a water treatment or desalination plant. Protecting mangroves to address coastal erosion and rising sea levels is also less costly than building a sea wall.



In addition, there has been increasing interest in combining and integrating community-based and ecosystem-based approaches for adaptation and disaster risk reduction and building overall climate and disaster resilience. For example, the Resilient Islands project was designed and implemented by the IFRC and The Nature Conservancy from 2017 to 2021 in the Dominican Republic, Grenada and Jamaica to help these Caribbean islands cope with the impacts of climate change by promoting ecosystem-based solutions that protect and restore coastal habitats proven to reduce risks. The project “works with communities and governments to design decision-support tools, train local leaders, integrate ecosystem-

based adaptation strategies into national policies and implement ecosystem restoration projects in vulnerable coastal areas” (The Nature Conservancy, 2021). Also, the CSOs for Disaster Resilience project has been implemented by CANARI from 2019 to 2022, working with CSOs and community stakeholders in six high-risk communities in Antigua and Barbuda, Dominica and Grenada to build their resilience through capacity building, mobilising local knowledge and partnerships, and supporting practical CBDRR and Eco-DRR actions on the ground.

### **Box 26: Community-Led Coral Reef Restoration at Laughing Bird Caye National Park, Belize**

Formally established in 2013, Fragments of Hope (FOH) is a CSO engaging in coral reef habitat restoration and advocacy for sustainable management of associated habitats. Internationally lauded as an example of lasting and effective restoration, FOH has been coordinating and engaging local stakeholders in community-based restoration and sustainable management of coral reef habitats in the Laughing Bird Caye National Park since 2006. The efforts have seen over 80,000 corals outplanted to date, and a 10 - 20% annual increase in coral cover, through three broad activities:

1. Training and employing local fishers and guides to restore and protect coral habitat;
2. Development and sharing of knowledge products e.g. reef restoration methods and manuals; and
3. Offering routine capacity-building workshops to local Placencia Village community members on restoration and sustainable reef habitat management.

FOH has trained over 60 Belizeans on coral and mangrove restoration activities and employs 15 locals as diving instructors. Half of these are women, who can earn up to three times more than the national minimum wage. In addition, extensive stakeholder engagement has seen their restoration approach endorsed by the Belize Fisheries Department, which has since engaged the CSO in national decision-making activities including the development of a national reef restoration plan. The local community's consistent involvement in and direct ownership of the restoration process has been key in the sustainability of the actions.

Emphasis on knowledge transfer and sharing has also been critical - from formal national exchanges and published restoration manuals, to community-based workshops and ecosystem tours to transfer restoration knowledge and engage coastal community members. FOH not only shares its lessons with others, but maintains the visibility of the organisation and its work through active engagement with various national, regional and international stakeholders. FOH's Board, which consists of and is led by key local stakeholders, plays an important role here. Additionally, the CSO has provided training and insights to various Caribbean and international partners, which shows the broader potential for greater coordination and interaction between regional CSOs.

Recognising the increasing potential for coral bleaching and damage from storms related to climate change, the active restoration efforts are expected to help combat or mitigate the effects of these impacts, as well as contribute to coastal protection and the livelihoods and well-being of coastal communities.

For more information, see <http://fragmentsofhope.org/portfolio/a-case-study-of-reef-restoration-at-laughing-bird-caye/>



Figure 58: Growth data being collected from the nursery. Source: Fragments of Hope. <https://www.facebook.com/FragmentsOfHopeBelize/photos/4771876782842279>

## Box 27: Importance of ecosystem services

Ecosystems provide essential services to people, including the biodiversity and natural resources that support local livelihoods. Ecosystem services can be categorised as follows:

- 1. Cultural services** including non-material benefits that people obtain from ecosystems, such as aesthetic experiences, spiritual enrichment, education and recreation;
- 2. Provisioning services** including the material or energy outputs from ecosystems, such as food, water, timber, fuel and medicines;
- 3. Regulating services** that regulate processes, such as flood control, pest control, water purification, and waste management. For example, a healthy forest ecosystem regulates water flow and reduces flash flooding; and
- 4. Supporting services** that make all other ecosystem services possible, such as photosynthesis, soil formation, the carbon and nutrient cycles, and pollination.

Ecosystem services are also an important safety net in times of disaster. For example, if roads flood and food shipments are disrupted, a community may still be able to fish in local rivers or coastal areas to feed themselves. These services can provide a community with alternatives and give it an opportunity to recover.



Figure 59: Dolphins help to control species populations by consuming a wide variety of fish and squid. Photo: Simon Mettler



Figure 60: Reptiles contribute to species biodiversity by dispersing the seeds of native vegetation. Photo: Stephen Mendes



Figure 61: River ecosystems contribute to all four categories of ecosystem services. Fresh water provision, sanitation, erosion regulation, recreation, ecotourism, soil formation, and nutrient cycling are only some of the services provided by river ecosystems. Photo: Natalie Boodram/CANARI



Boxes 26 and 28 provide further examples of EBA and Eco-DRR in the Caribbean.

### Box 28: The Vetiver System as a Community Climate Resilience and Adaptation Solution in the Caribbean

IAMovement, a socially and environmentally focused CSO based in Trinidad and Tobago, has been leading the way in education and promotion on the use of the non-invasive vetiver grass species as a simple and cost-effective green infrastructure tool for building climate and disaster resilience in rural communities. Vetiver grass when implemented correctly according to the Vetiver System (VS) can assist with many soil and water challenges, including slope stabilisation, erosion control, soil and water conservation, and can also be used to support community livelihoods through downstream craft-making industry. In the same way that mangroves are widely known and recognised as a climate-smart solution for coastlines, the Vetiver System can be an effective, low-cost solution for the land. Vetiver grass produces a deep and fibrous root system which extends to 10-feet deep in the first two years, supporting soil and land retention and making the established plant highly drought tolerant. It is also able to survive wildfires, maintaining its structural formation and regrowing quickly afterwards.

Working with Vetiver TT Ecological Engineering Solutions Ltd, IAMovement has refined and promoted the Vetiver Education and Empowerment Project (VEEP) model since 2016 with initial support from the Global Environment Facility Small Grant Programme. The model typically involves classroom and field training sessions, coupled with the establishment of vetiver nurseries, field interventions at target sites using the Vetiver System, and the integration of livelihood opportunities through use of vetiver for handicraft making or mulching as a best-practice approach in organic and climate-smart agriculture. Under the VEEP model, community stakeholders are involved in planning and design, land preparation, contour plotting and installation, inter-cropping, maintenance during establishment and long-term upkeep of vetiver hedgerows.

IAMovement has led implementation of the VEEP model in communities across Trinidad and Tobago, including for land stabilisation, topsoil regeneration and soil-water conservation along the steep hillsides of Paramin; the rehabilitation of quarries in Sangre Grande; coastal erosion protection and rehabilitation at Quinam Beach on the south coast; and riverbank stabilisation and infrastructure reinforcement at public and community sites in Santa Cruz, Moruga and Cedros. This work has been supported by the Inter-American Development Bank (IDB) Lab, Caribbean Catastrophe Risk Insurance Facility, Pan American Development Foundation, Environmental Management Authority, Global Environment Facility and the Green Fund of Trinidad and Tobago.

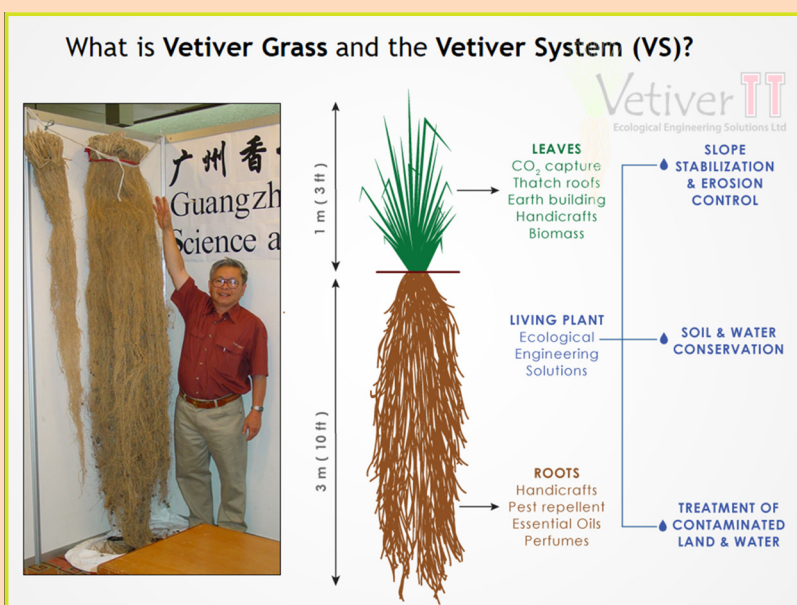


Figure 62: Educational graphic on vetiver grass and Vetiver System (VS).  
Photo: Vetiver TT EES Ltd./IAMovement

IAMovement has also expanded its work regionally. It is implementing training programmes on the VEEP model in Grenada with Eco Strategies Grenada Inc. supported by the Global Environment Facility Small Grant Programme. It is also supporting training in Antigua and Barbuda, Dominica, Saint Lucia and Tobago through the regional Inter-American Institute for Cooperation on Agriculture-led project supported by the Caribbean Biodiversity Fund from 2020 to 2023. These initiatives all work with target communities and stakeholders in these countries to introduce vetiver grass as a nature-based solution to address climate change risks and expand sustainable livelihood opportunities.



Figure 63: The Vetiver System (VS) for coastal erosion and rehabilitation implemented by Vetiver TT EES Ltd and IAMovement at Quinam Beach, on the south coast of Trinidad  
Photo IAMovement

For more information, see [www.iamovement.org](http://www.iamovement.org) or [www.vetivertt.com](http://www.vetivertt.com)

## 5.4. Steps in implementing your adaptation or DRR project

The main steps involved in implementing your adaptation or DRR project are those you would take in any project (see Table 8 for a list of key steps). However, you will find that adaptation or DRR is an iterative process that involves learning by doing. Often as you embark on a new step, it causes you to review and refine an earlier one. If you are implementing a community-based adaptation or DRR action, as with the planning phase, you should also ensure that you consult with and involve community stakeholders in every step.

If your CSO does not currently have project management skills, you will need to source external expertise, either to act as project manager and/or to build the capacity of permanent staff or volunteers within your CSO. You can also consult print materials that provide guidance, such as CARE's Project Design Handbook (CARE, 2002).



**Table 8: Key steps in designing and implementing a project**

Step #	Activity
1	<b>Select the relevant action from the adaptation or DRR plan</b> that best matches your mission, competencies and resources/access to resources. If you have no adaptation or DRR plan, best practice is to develop one before taking action.
2	<b>Define and document</b> (typically in the form of a project concept note or proposal) <b>the scope of your project</b> , including <ul style="list-style-type: none"> <li>• Overall goal</li> <li>• Specific objectives</li> <li>• Desired results (short and long-term)</li> <li>• Key stakeholders and beneficiaries</li> <li>• Indicators of success</li> <li>• Risks and assumptions</li> <li>• Workplan including breakdown of activities, associated timelines and inputs/resources needed</li> <li>• Budget</li> <li>• Timeline</li> </ul>
3	<b>Submit the proposal and secure funding/other resources needed.</b>
4	<b>Establish the project team</b> including to define clear roles and responsibilities and identify any technical experts needed
5	<b>Implement the project activities.</b>
6	<b>Monitor the project and adjust</b> in response to unexpected circumstances, e.g. a major disaster, difficulties in mobilising community partners, assumptions that were wrong etc. Seek the approval of the funder for any changes that affect your original budget lines.
7	<b>Evaluate and report on the project</b> at key stages, e.g. mid-term and end of project or at agreed-upon stages to trigger the receipt of more funding.
8	<b>Document lessons learnt</b> for future reference.

## 5.5. Useful resources

CARE International. (2002). *Project Design Handbook* [online]. Available at [http://www.careclimatechange.org/files/toolkit/CARE\\_Project\\_Design.pdf](http://www.careclimatechange.org/files/toolkit/CARE_Project_Design.pdf) [Accessed 20 December 2016]

CARE International. (2010). *Community-based adaptation toolkit* [online]. Available at [http://www.careclimatechange.org/tk/cba/en/Open\\_Toolkit.html](http://www.careclimatechange.org/tk/cba/en/Open_Toolkit.html) [Accessed 7 October 2016]

Caribbean Disaster Emergency Management Agency [CDEMA]. (2011). *Climate Smart Community Disaster Management Module and Facilitator's Handbook*. St. Michael, Barbados: CDEMA. Available at [http://www.cdema.org/cris/climate\\_change\\_adaptation\\_mitigation/CSCDM\\_FINAL\\_Facilitators\\_Handbook\\_web\\_version.pdf](http://www.cdema.org/cris/climate_change_adaptation_mitigation/CSCDM_FINAL_Facilitators_Handbook_web_version.pdf) [Accessed 6 March 2017]

Conservation International. (2013a). *Adapting to a changing climate: A community manual*. Washington, DC: CI. Available at [http://www.conservation.org/publications/Documents/CI\\_Climate-Change-Adaptation\\_Training\\_Community-Manual.pdf](http://www.conservation.org/publications/Documents/CI_Climate-Change-Adaptation_Training_Community-Manual.pdf) [Accessed 7 October 2016]

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International Federation of Red Cross and Red Crescent Societies [IFRC]. (2021). *Nature-based solutions* (Online) Available at: <https://www.ifrc.org/nature-based-solutions>

International Federation of Red Cross and Red Crescent Societies [IFRC]. (2021). *Road Map to Community Resilience v2*. Available at: <https://www.preventionweb.net/publication/road-map-community-resilience-operationalizing-framework-community-resilience-through>

The Nature Conservancy [TNC]. (2021). *The Blue Guide to coastal resilience. Protecting coastal communities through nature-based solutions*. A handbook for practitioners of disaster risk reduction. The Nature Conservancy. Arlington, VA

WeADAPT Climate adaptation planning, research and practice. <https://www.weadapt.org/>

# Civil society in action: Practical climate and disaster resilience projects in the Caribbean

- 6.1. Youth Climate Advocacy and Resilience Building Endeavour (YCARE), Trinidad and Tobago
- 6.2. Developing awareness of climate change in North East Tobago
- 6.3. Assessing vulnerability to climate change within the Lambeau community, Tobago
- 6.4. Building a resilient community enterprise using ecosystem-based adaptation in Fondes Amandes, Trinidad
- 6.5. Promoting awareness and action on climate change and its impacts on sea turtles
- 6.6. Increasing community adaptation and ecosystem resilience to climate change in Portland Bight (2011 – 2012)
- 6.7. Heart for climate: climate change advocacy in Trinidad and Tobago
- 6.8. #1point5toStayAlive, an advocacy campaign on climate justice
- 6.9. Rebirth of Ashton Lagoon using nature-based and community-based solutions for coastal resilience 131
- 6.10. Using a native plant to build climate resilience by diversifying the ecosystem in Harmonyville, Belize

Section 6 presents ten case studies of climate change adaptation and disaster risk reduction projects using community-based and nature-based solutions, implemented by CSOs based in Caribbean islands. Five of these case studies were implemented in Trinidad and Tobago under the Climate ACTT project (see Acknowledgements on px). The remaining five case studies describe activities in Belize, Jamaica, Saint Vincent and the Grenadines and Trinidad and Tobago, and one cross-regional example. They span projects that focus on public education and awareness building, to regional and global advocacy, as well as practical adaptation and DRR actions.



Figure 64: Members of the Antigua and Barbuda Disabilities Association engaging in climate-smart agriculture.  
Photo: HaMa and Refica Attwood



## 6.1. Youth Climate Advocacy and Resilience Building Endeavour (YCARE), Trinidad and Tobago



Implemented by Caribbean Youth Environment Network  
Trinidad and Tobago Chapter

### 6.1.1. About the organisation

The Caribbean Youth Environment Network (CYEN) is a regional non-profit, civil society, charitable body that focuses its resources on empowering young people and their communities to develop programmes/actions to address socio-economic and environmental issues. The CYEN programme aims at addressing issues such as poverty alleviation and youth employment, health and HIV/AIDS, climatic changes and global warming, impacts of natural disasters/hazards, improvement in potable water, conservation and waste management, and other natural resource management issues.

CYEN Trinidad and Tobago Chapter (CYEN-TT) is one of 18 CYEN chapters in the Caribbean region, and its focus is mainly on the themes of water, climate change, biodiversity, coastal and marine issues, and sustainable land management.

CYEN-TT firmly believes that youth should be engaged in environmental issues and has hosted several workshops to raise awareness of the impacts of climate change on water and other sectors. It has also successfully engaged young people in the United Nations Framework Convention on Climate Change (UNFCCC) process.

CYEN-TT actively engages in advocacy and has an online reach of over 50,000 persons through its social media. The organisation also interacts with various government agencies and United Nations bodies and is regularly invited to local and regional environmental meetings and actively contributes to policy decision-making.



Figure 65: Members of the CYEN-TT Youth Climate Advocacy and Resilience Building Endeavour (YCARE). Photo: CYEN-TT





Figure 66: The CYEN-TT YCARE Workshop. Photo: CYEN-TT

### 6.1.2. Project overview and approach

CYEN-TT's focus was on increasing the level of youth advocacy for climate change adaptation in Trinidad and Tobago through a pilot capacity building project to engage, enable, and empower members of the Holy Faith Convent Couva Eco-Heroes Environment Club (HFCC-EHC), the Couva community, and the CYEN-TT membership. CYEN-TT also recognised the need to add structure to its climate change advocacy work by developing a climate change adaptation advocacy strategy.

CYEN-TT trained several of its members, along with members of HFCC-EHC in advocacy tools such as photojournalism, social media, artistic expression, spoken word, and journalism. Together, they developed a photo journal on the climate change impacts and vulnerability in Couva, a spoken word video on climate change, hosted a YCARE blog to share climate change adaptation information, and filmed presentations on the various advocacy tools. The project participants developed an article and a report on the climate change impacts on Couva that were subsequently shared with the HFCC and the Couva community. CYEN-TT also produced a training manual of the process for use in other fora. In keeping with its advocacy focus, all products are available on its YCARE website

(<https://ycareblog.wordpress.com/>) to build youth awareness of climate change and capacity to advocate for adaptation.

With the help of the Global Water Partnership - Caribbean (GWP-C), CYEN-TT held several consultations with its wider membership to collect information as the basis for constructing the CYEN-TT Climate Change Advocacy Strategy. The strategy identifies what are the key messages CYEN-TT wants to share and who should be targeted using various communication products and dissemination pathways. CYEN-TT plans to share the Advocacy Strategy with all its members to inform their individual and collective climate change advocacy work. The strategy will also be shared with partners and potential donors so they can understand the strategic focus of CYEN-TT's climate change advocacy.

### 6.1.3. Key results

The key results of the YCARE project were:

- increased community resilience through raising awareness of climate change impacts and vulnerabilities;
- enhanced awareness of HFCC-EHC members on climate change impacts and capacity for advocacy and adaptation;
- enhanced capacity among CYEN-TT membership on climate change advocacy; and
- increased ability among CYEN-TT members to plan activities (e.g. project management, logistical arrangements for workshops and events, financial planning, etc.).



Figures 67 & 68: Utilising photojournalism as a climate change advocacy tool. Photos: CYEN-TT



#### 6.1.4. Lessons learnt

- Having a climate change advocacy strategy can make the organisation more effective in its efforts to engage youth in climate change fora.
- Visually appealing products, such as photo journals and videos with targeted messages, are effective at increasing community stakeholders' awareness of the importance of climate change adaptation.
- Participatory development of climate change adaptation advocacy products ensures that participants take ownership of the messages and increases their willingness to be involved in climate change adaptation advocacy and action.



Figure 69: Assessing the vulnerability of the fishing community in Couva, Trinidad to climate change. Photo: CYEN-TT

## 6.2. Developing awareness of climate change in North East Tobago



Implemented by Environmental Research Institute Charlotteville

### 6.2.1. About the organisation

Founded in 2011, Environmental Research Institute Charlotteville (ERIC) is a non-profit, civil society organisation comprising senior experts in conservation, resource management, rural development, marine and terrestrial ecology and responsible tourism. Since April 2014, ERIC has been fully operational in North East (NE) Tobago, with a rented facility including office, training room, dive centre, and a regularly-updated online presence ([www.eric-tobago.org](http://www.eric-tobago.org)).

Its recent projects have related primarily to organisational and technical capacity building of community-based organisations (CBOs) in NE Tobago towards co-management of a proposed marine protected area (MPA). ERIC is a member of the Council of the Presidents of the Environment (Trinidad and Tobago) and acts as vice chair of the Improved Forest and Protected Area Management Project (Steering Committee, Tobago). ERIC has hosted and provided short lectures on NE Tobago ecology and sustainable development for residents and visiting groups from the University of Trinidad and Tobago; Austin University, Texas; Trinity College, Connecticut, United States of America; Glasgow University and Cardiff University, United Kingdom; and the Adam Mickiewicz University, Poland.

### 6.2.2. Project overview and approach

While working and communicating with CBOs in NE Tobago that participate in decision-making about the future development of the area, ERIC's team identified the need for, and importance of, building their awareness of climate change issues and capacity to respond to



Figure 70: A Climate ACTT participant from ERIC displays a map highlighting the communities in NE Tobago. Photo: ERIC

them. None of the CBOs had persons that fully understood or focused on climate change issues. The CBOs also lacked capacity to gather and share information with other community members in order to make informed decisions regarding climate change adaptation and resilience.

This project sought to address these gaps. ERIC also wanted to show the impact of climate change on coastal resources and developed an innovative way to do this. The project aimed to raise awareness of climate change impacts from ridge-to-reef and the importance of implementing



adaptation strategies to improve resilience within NE Tobago communities. It did this through:

- training and creating a **network of NE Tobago climate change champions**, who then shared their knowledge of the impacts of climate change on both the terrestrial and marine environments, primarily with their respective communities; and
- creating a **coral reef climate change awareness snorkelling tour** where climate change champions shared the impacts of climate change on coral reef ecosystems with both locals and visitors.

ERIC held a series of climate change awareness workshops with representatives of 10 CBOs from NE Tobago to build the capacity of the climate change champions. ERIC first trained community members who were part of its organisation to be climate change champions so that they in turn could train their peers (i.e. training of trainers followed by peer training). As part of the training, the climate change champions assessed the vulnerability of the communities they lived in, using participatory community mapping. They then shared the information they collected with members of their organisations and other NE Tobago communities at a meeting, which resulted in preliminary discussions of no-regrets adaptation actions. For more information see: <http://www.eric-tobago.org/climate-change-champions.html>.



Figure 71: First annual NE Tobago climate change champions meeting. Photo: ERIC



The coral reef climate change awareness snorkelling tour (<http://www.eric-tobago.org/pirates-bay-snorkel.html>) was a practical experience to raise awareness of climate change impacts on coral reefs. ERIC's ecologists mapped the tour route and developed a guide to explain to visitors the features of the coral reef and the of climate change on it. Thereafter climate change champions were trained to safely deliver the tour to local and foreign visitors. The tour provided a source of income to the climate change champions and to ERIC, which marketed the tour. It is now a part of ERIC's regular programme of work.

ERIC maintained an online presence throughout the project through Facebook; it also submitted two articles to print media (<http://www.eric-tobago.org/press-and-media.html>) and had television coverage for certain activities.

### 6.2.3. Key results

The key results of the project were:

- increased local and visitor awareness of the impacts of climate change on the marine resources of NE Tobago and development of possible adaptation/resilience-building measures;
- development of, and increased engagement in, a network of 14 community climate change champions to build awareness of climate change in NE Tobago;



Figure 72: Coral reef climate change awareness snorkelling tour. Photo: ERIC

- increased peer communication about climate change in NE Tobago;
- increased income for four community members in NE Tobago through guiding the climate change awareness snorkelling tours; and
- increased income for ERIC through marketing the climate change awareness snorkelling tours.

#### 6.2.4. Lessons learnt

- Peer communication about climate change is an effective method of helping community members to understand about climate change.
- Practical examples increase stakeholders' understanding of climate change. A ridge-to-reef approach to climate change awareness can help community members to develop holistic, no-regrets adaptation measures.



Figure 73: Collaboration and peer to peer training between climate change champions in NE Tobago. Photo: ERIC

### 6.3. Assessing vulnerability to climate change within the Lambeau community, Tobago



Implemented by Environment Tobago

#### 6.3.1. About the organisation

Established in 1996, Environment Tobago (ET) is a national, environmental, non-governmental and volunteer and membership organisation. Its mission is “to conserve Tobago’s natural and living resources and advance the knowledge and understanding of such resources, their wise and sustainable use, and their essential relationship to human health and the quality of life”. ET accomplishes this through environmental education, community outreach and awareness programmes. The organisation also advocates for greater protection and sustainable use of Trinidad and Tobago’s natural resources.

ET has formed relationships with government and other environmental non-governmental organisations on matters affecting the environment, such as strengthening of policy and legislation, solid waste disposal issues and methods, and the implementation and enforcement of marine and terrestrial conservation laws. It is well-respected in the environmental field throughout Trinidad and Tobago and the region.

#### 6.3.2. Project overview and approach

Environment Tobago has been increasingly concerned about the impacts of climate change on communities around Tobago. ET sought to provide a baseline for future adaptation strategies and to build and demonstrate its capacity to serve Tobago’s communities



Figure 74: Crab trap, Little Rocky Wetland, Lambeau, Tobago.

Photo: ET

using Lambeau and environs as a pilot. Lambeau and environs had already been identified in reports as an area of ‘immediate impact’ from climate change. The reports found that the area would likely be exposed to climate variability, particularly hurricanes, drought and flooding (including storm surge) in the near term, while coastal erosion and slippage worsened prospects in the medium term. The potential impacts of climate change were shown to include soil aridity, saline intrusion, increased storm intensity, loss of



wetlands and destruction of coastal communities leading to loss of lives and livelihoods.

ET first conducted a review of the available literature on vulnerability in the area and in Tobago. It conducted knowledge, attitudes, practices and perceptions surveys with the persons making use of the assets in the community (shops, beaches, etc.). It also conducted interviews with key decision-makers, and climate change experts, the Tobago House of Assembly<sup>37</sup> and other organisations that have assets in the study area. ET identified and mapped climate change risks using geographic information system (GIS) tools, and produced a documentary film of the process and results, which it shared on its YouTube channel. The project and results were presented in a report.

ET found that Lambeau and environs were highly exposed and sensitive to climate change impacts (especially storm surge) and had limited adaptive capacity. They found in the community a lack of understanding of climate change.



Figure 75: Crab hole, Little Rockly Wetland, Lambeau, Tobago.  
Photo: ET



Figure 76: View of tourist accommodation from the coastline, Lambeau, Tobago. Photo: ET

<sup>37</sup> The Tobago House of Assembly is Tobago's local government body

### 6.3.3. Key results

The key results of the project were:

- ET members increased their understanding of the complexity involved in addressing climate change issues in a coastal community;
- Lambeau community members increased their interest in their natural surroundings as well as, awareness of the value of the natural assets;
- ET members increased their awareness of ecosystem services and their potential to improve or preserve resilience to climate change; and
- ET increased its competency to conduct and communicate vulnerability assessments and related activities that can help to build adaptation strategies.

### 6.3.4 Lessons learnt

- Awareness building is a critical step for stakeholders to build resilience and adapt to climate change.



Figure 77: Multiuse beaches, Lambeau, Tobago. Photo: ET



- Climate change awareness and education should be conducted with all stakeholders, including decision-makers and resource users, so they can understand ways to adapt and build resilience to climate change.
- As a result of the highly publicised nature of ‘climate change’, many persons have heard about climate change but do not really understand it or the importance of adapting to it in small communities.
- Collection of relevant data can be a slow process with dependencies on many external actors, necessitating effective preparation and communication.



Figure 78: Multiuse beaches, Lambeau, Tobago. Photo: ET

## 6.4. Building a resilient community enterprise using ecosystem-based adaptation in Fondes Amandes, Trinidad



Implemented by the Fondes Amandes  
Community Reforestation Project

### 6.4.1. About the organisation

The Fondes Amandes Community Reforestation Project (FACRP) was initiated by local community residents in 1982 to promote fire prevention and agro-forestry for sustainable development. Fondes Amandes is located within the St. Ann's valley in the Northern Range, Trinidad. During the annual dry season, the Fondes Amandes community and the surrounding watershed face major threats from forest fires. Frequent forest fires have led to the loss of forest and biodiversity, land degradation and reduced water quality. With support from the government and private sector, FACRP established a system of fire traces and community fire prevention efforts have kept a significant area of the watershed free from fire since 1997. Agro-forestry techniques have been used to convert fire-damaged areas into lush forest and enhance livelihoods. Local species of hardwood and fruit-bearing trees have been planted throughout the watershed. Seeds and other materials from these trees are collected for local craft and jewellery. With reforestation, the area's diverse flora and fauna are thriving, including rare species of birds, butterflies and large mammals like the ocelot (*Leopardus pardalis*). FACRP increasingly serves as a site for nature-based learning and tourism. It has established a visitor centre and trails for nature hikes and trained local residents as tour guides.

### 6.4.2. Project overview and approach

With climate change, FACRP faces a new set of challenges. More extreme weather disrupts tours and other outdoor activities as well as affecting biodiversity and freshwater resources. Hotter, drier conditions can also lead to more extreme forest fires. FACRP has sought to 'climate proof' its tourism enterprise, which is an important source of income for the community.

FACRP adopted an ecosystem-based approach to 'climate proof' its tourism enterprise and build resilience focusing on solutions that conserve and restore natural ecosystems. Using a participatory process, FACRP also engaged a range of stakeholders, including the Fondes Amandes community, government agencies such as the Office of Disaster Preparedness and Management and Tourism Development Company Ltd, and the University of West Indies in Trinidad and Tobago.

FACRP first assessed the threats from climate change and vulnerabilities within its tourism enterprise. It focused on threats to key resources, such as the river, trails, and herbal plants and seeds used for locally-made herbal products and jewellery. FACRP received additional training on value chain analysis to enhance the vulnerability assessment. Value chain analysis allowed FACRP to map out the production, marketing and sales processes for its various products and services and systematically assess threats from climate change.

Based on the vulnerability assessment, FACRP identified the major threats to its enterprise and priorities for action. It has now begun to implement ecosystem-based adaptation actions for three identified threats to its tourism enterprise: extreme heat, reduced river flow and the rising incidence of mosquito-borne viruses, such as Zika. Resilient hardwood tree species were

identified and propagated with the aid of community volunteers. These tree species will provide shade along trails reducing risks from heatstroke and support reforestation in highly exposed areas of the watershed. The most important herb species for locally-made herbal products were also propagated. FACRP has constructed a new nursery to house both hardwood tree and herb seedlings in a climate-controlled environment. With technical support from UWI, FACRP has mapped a new trail to upland streams to offer alternative options for river hikes and reduce overcrowding at the main river further downstream. FACRP has also developed and trialled an eco-friendly mosquito repellent using natural oils and local herbs such as lemongrass (*Cymbopogon citratus*).



Figure 79: Mosquito repellent developed by FACRP using natural oils and local herbs. Photo: FACRP





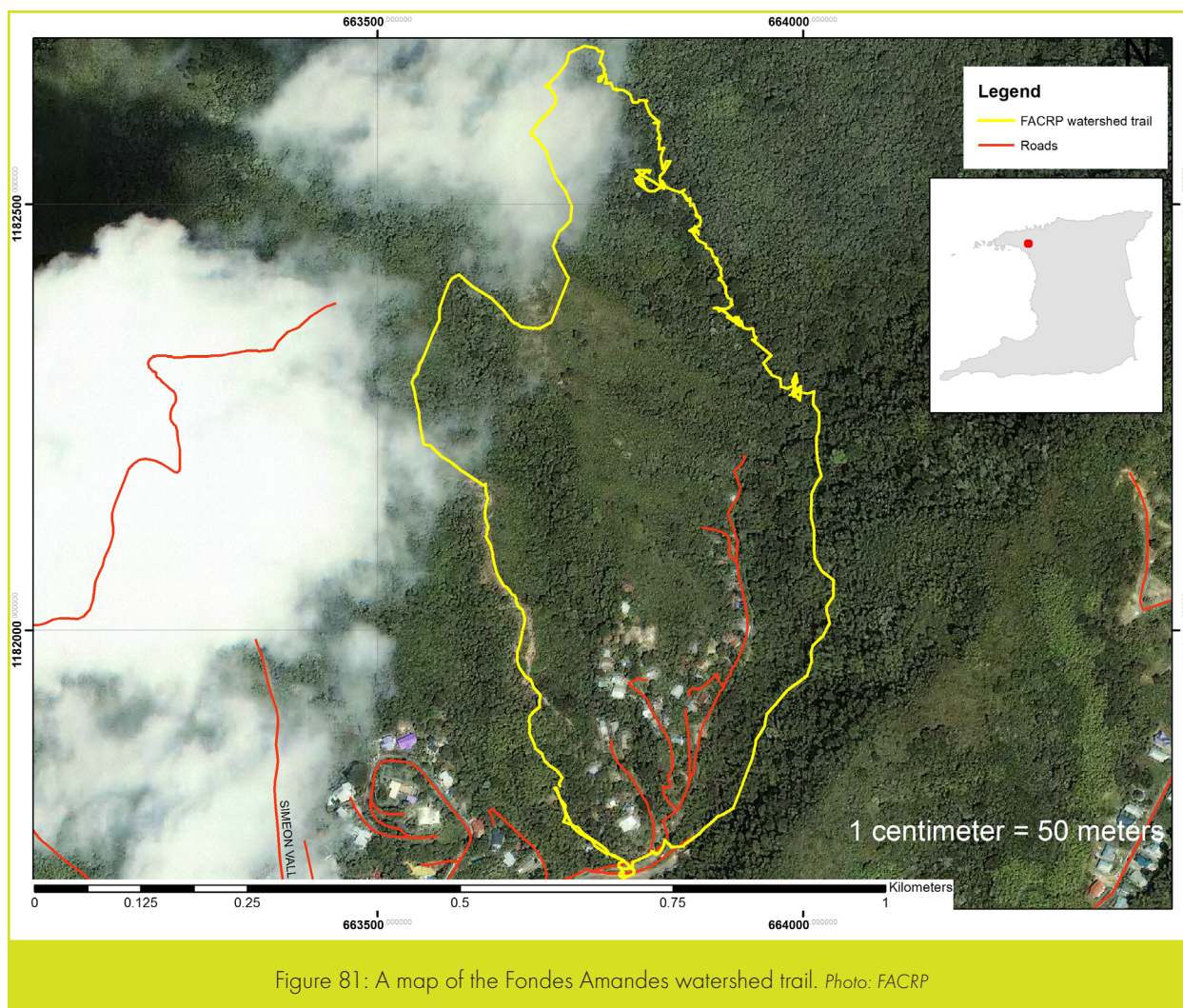
Figure 80: FACRP's new climate resilient species nursery. Photo: FACRP

### 6.4.3. Key results

The resilience of FACRP's tourism enterprise has been enhanced using an ecosystem-based approach. In particular, FACRP and the wider community have built their capacity to plan and adapt to climate change through:

- enhanced knowledge of climate change impacts and vulnerabilities within their tourism enterprise and potential adaptation actions;
- identification of and research into resilient, local tree species that can withstand hotter, drier conditions and more extreme weather to support reforestation. FACRP has so far identified 10 resilient species including hog plum (*Spondias mombin*), lucky seed (*Adenanthera pavonina*) and juniper (*Genipa americana*); and
- development of a nursery and a reliable local supply of herb and tree species for locally-made products and planting along hiking trails, which are central to the tourism enterprise.





#### 6.4.4. Lessons learnt

Key lessons from FACRP's efforts to 'climate proof' its tourism enterprise are:

- ecosystem-based adaptation is a cost-effective way to build resilience that provides multiple benefits, including biodiversity conservation, disaster risk reduction and livelihood security;
- value chain analysis is an innovative and comprehensive tool for assessing the vulnerability of a community enterprise to climate change;
- a participatory process that engages a diverse range of stakeholders is critical to ensure buy-in and enable a community organisation to access external expertise and resources for adaptation and building resilience; and
- ongoing monitoring and evaluation of climatic changes and adaptation outcomes is important to ensure success over the long-term and promote learning and innovation to respond to future uncertainty.



## 6.5 Promoting awareness and action on climate change and its impacts on sea turtles in Trinidad and Tobago



Implemented by Turtle Village Trust

### 6.5.1. About the organisation

Turtle Village Trust (TVT) is a non-profit organisation founded in 2006 as a partnership between five community groups in NE Trinidad and SW Tobago and a number of corporate sponsors. The goal was to strengthen existing sea turtle conservation efforts and use this as the basis for further community empowerment and the development of a wider eco-tourism product. Its activities have since expanded to include over 20 coastal communities. TVT has worked in partnership with government to conduct research on sea turtles, conserve sea turtle nesting sites through beach patrols and monitoring, public education, and promote eco-tourism. TVT's conservation efforts are of global importance since Trinidad and Tobago is home to the third largest nesting population of leatherback sea turtles in the world.



Figure 82: A leatherback (sea turtle) hatchling making its way to sea. Photo: TVT

### 6.5.2. Project overview and approach

With increasing impacts on sea turtles from climate change, TVT has turned its attention to raising awareness about climate change as a means to effectively engage and empower coastal communities and the wider public to take action.

Climate change poses a major threat to coastal and marine ecosystems and their biodiversity. Sea turtles – including leatherback, green, hawksbill, loggerhead and olive ridley – are under particular threat from rising sea levels and temperatures due to climate change. Rising sea levels erode and flood nesting beaches, while rising nest temperatures affect sex ratios among turtle hatchlings. More females will be hatched than males at higher temperatures, skewing the population. Within the marine environment, rising ocean temperatures and coral bleaching affect coral reefs, which are important foraging grounds and habitats for sea turtles. Climate change also leads to greater uptake of carbon dioxide into oceans, resulting in acidification and seaweed blooms that obstruct nesting beaches. These threats from climate change compound existing challenges for sea turtles due to coastal development, incidental capture in fishing nets, poaching, and plastic debris and pollution.

TVT initiated an education and awareness project on climate change and its impacts on sea turtles in 2016. Under the project, they implemented the following activities:

- development of a communication plan to identify target audiences, key messages and appropriate products and dissemination pathways to educate and raise awareness of climate change, its impacts on sea turtles and ways to take action;

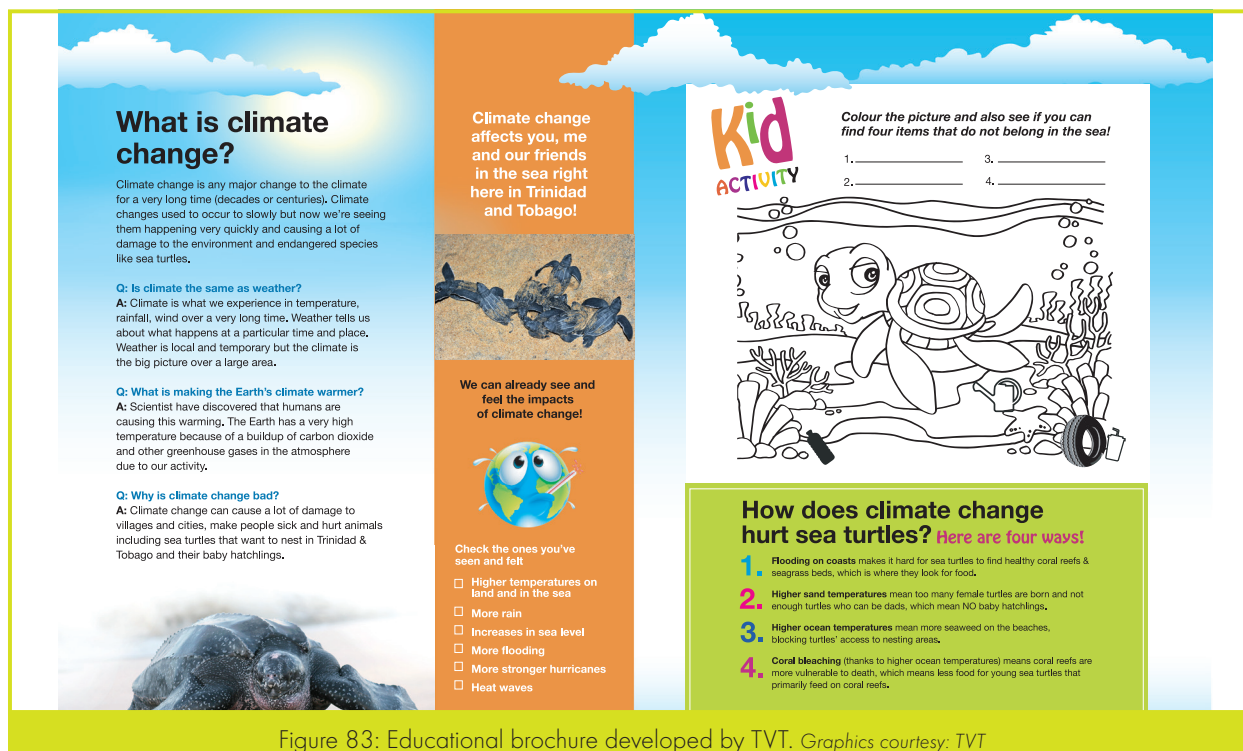


Figure 83: Educational brochure developed by TVT. Graphics courtesy: TVT

- design of a survey to assess the target audiences' understanding of climate change before and after TVT's education and awareness efforts, including their knowledge and perceptions of, and behaviours that contribute to or reduce, the impacts of climate change. Using this survey, TVT has collected data that will be used to refine their messaging and assess the impact of their education and awareness efforts over the long-term; and
- development of educational materials to support targeted outreach and awareness raising in coastal communities and schools in Trinidad and Tobago. Educational materials included brochures and a poster series highlighting climate change and its drivers, local and regional impacts and how these affect sea turtles, and ways to take action on climate change and conserve sea turtles.

### 6.5.3. Key results

The capacity of TVT to implement coordinated and strategic outreach and awareness raising on climate change has been enhanced through this project. Building on this capacity, TVT has begun to roll out its climate change awareness campaign in coastal communities and schools in Trinidad and Tobago. The aim is to enhance knowledge of climate change and its impacts on sea turtles and to shift behaviour towards sustainable and climate-friendly practices. These practices include less use of plastics, recycling and energy and water conservation that reduce greenhouse gas emissions and benefit sea turtles and their habitats. Enhancing knowledge is a key part of the process of empowering coastal communities to take concrete action to adapt to climate change, including building resilience of eco-tourism livelihoods based on turtle watching.

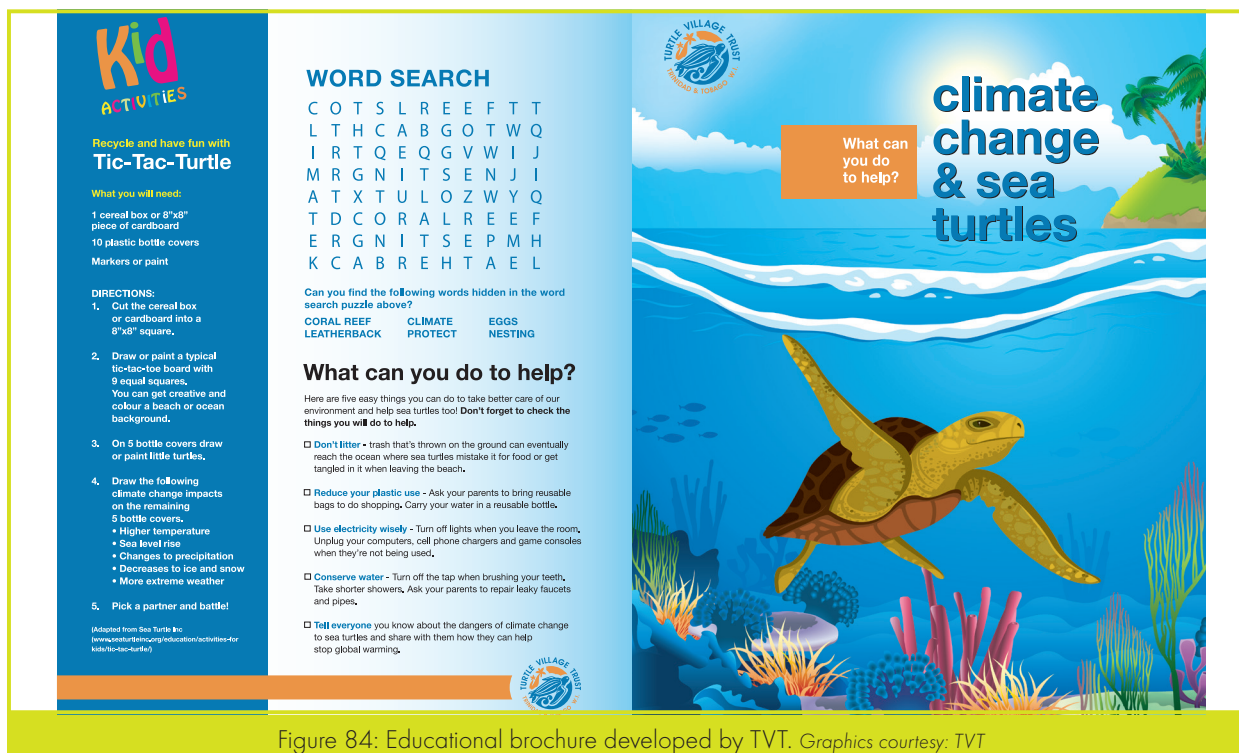


Figure 84: Educational brochure developed by TVT. Graphics courtesy: TVT



#### 6.5.4. Lessons learnt

Key lessons from TVT's education and awareness efforts are:

- it is critical to develop a communication plan to guide education and awareness on climate change and ensure the messages and methods of delivery are carefully tailored to the target audience. The communication plan should be developed through a participatory process that engages the organisation's key stakeholders, including the staff, board and local community partners, and ensures their buy-in and the sustainability of results;
- specialised training on communicating about climate change, including technical language and tools for disseminating information, is important to build the capacity of an organisation and enable it to effectively raise climate change awareness within their local communities; and
- ongoing monitoring and evaluation of education and awareness activities is key to identify best practices and gaps and ensure effectiveness over the long term.



## 6.6. Increasing community adaptation and ecosystem resilience to climate change in Portland Bight



Implemented by Caribbean Coastal Area Management Foundation (C-CAM)

### 6.6.1. About the organisation

Caribbean Coastal Area Management Foundation (C-CAM) was established in 1997 to promote coastal conservation in Jamaica. C-CAM's approach to natural resources management is based on the maximum involvement of communities through co-management based on the best available scientific and social information. C-CAM works with a wide range of stakeholders to manage the Portland Bight Area (extracted from <http://www.ccam.org.jm/about/who-we-are> and <http://www.ccam.org.jm/about/how-we-work>).

### 6.6.2. Project overview and approach

The Portland Bight Protected Area (PBPA) lies in south central Jamaica. It is the largest protected area in the island, covering a total area of 187,615 ha of which 51,975 ha are terrestrial. This includes 8,200 ha of wetlands. The coastal settlements are particularly vulnerable to climate change, including increased frequency of hurricanes, storms, floods, storm surge and droughts as well as sea level rise, because they are low-lying and their populations largely depend on fishing, charcoal burning and agriculture.

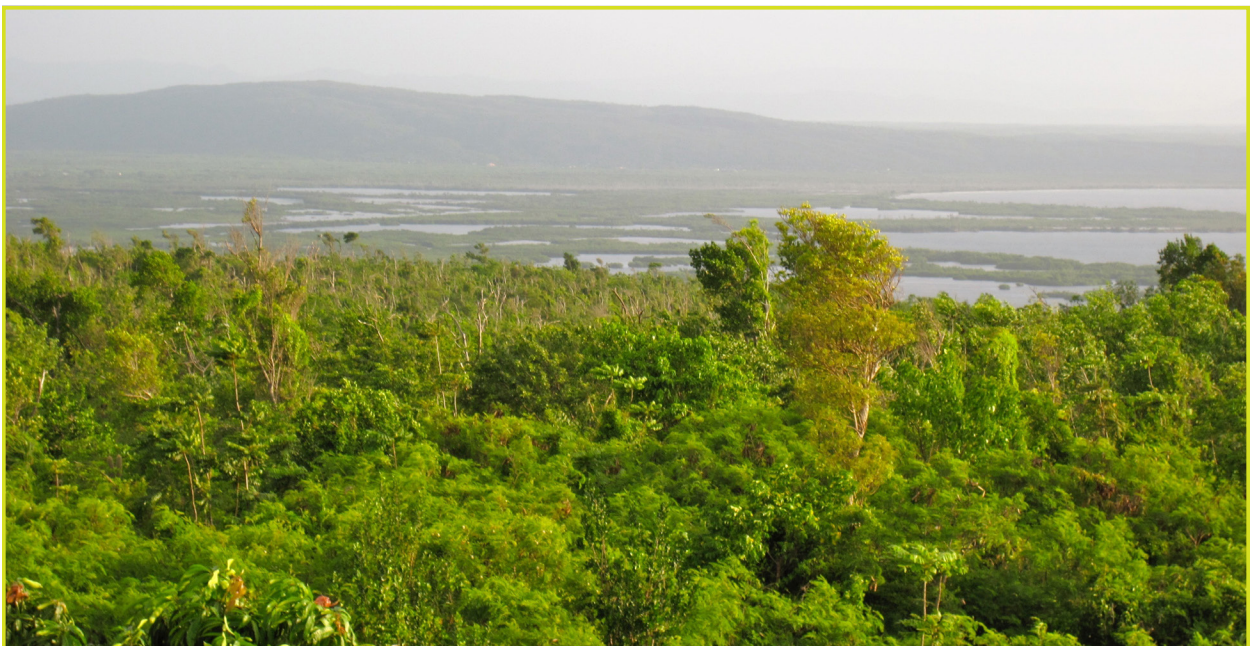


Figure 87: View from Portland Ridge, showing hurricane damage to forest in the foreground. Photo: Ann Sutton



The objective of the project was to increase community adaptation and resilience to climate change in the communities surrounding the three Portland Bight Fish Sanctuaries by:

- increasing awareness of the impacts of climate change in PBPA (through the schools' programme and Environmental Impact Assessment [EIA] workshops);
- decreasing potential impacts of climate change through improved land use planning (planning workshop); and
- demonstrating sustainable life styles (rainwater harvesting, alternative livelihoods, climate change adaptation expo).

This was C-CAM's first climate change adaptation project and it was very important because it has set the foundation for four subsequent projects, all of which used similar approaches, built on the recommendations arising from, and made use of the materials developed as part of this project.

### 6.6.3. Project methodology

The project focussed on a participatory approach from the outset, starting with a Vulnerability Risk Assessment (VRA) among stakeholders, consultations with fishers through a meeting of the Portland Bight Fisheries Management Council (PBFMC) and consultations on technical issues with relevant government agencies. We also established a Project Management Committee. This was critical in getting stakeholders' (government and community) input and advice during implementation as well as feedback to allow for amendments to ensure that we were meeting project targets.

The VRA process, which was repeated at the middle and end of the project, was particularly important because it engaged stakeholders in prioritisation of the proposed interventions and thus generated buy-in and engagement.

### 6.6.4. Key results

#### ***Result 1: Increased awareness of climate change impacts and adaptation at all levels of society, including:***

- schools climate change awareness programme, including a teacher's workshop, activities on World Wetlands Day (including a concert from Voices for Climate Change), display boards and manuals on climate change for teachers and students and a school competition;
- increased awareness of climate change among development planners through a special workshop attended by more than 30 planners and decision-makers many of whom had not previously been exposed to the concept;
- increased awareness of the general community through a climate change expo and through preparation and distribution of community disaster preparedness booklets for all the major settlements in the PBPA;

- increased capacity of local communities to respond to EIAs for mega-projects through workshops and the development and dissemination of a manual and meetings with the government to encourage it to make participation in the process easier for community members; and
- C-CAM functioning as first responder to disasters in southern Clarendon. One storage container was purchased, put in place and stocked with relief materials.

#### Long-term impacts

- All the educational materials developed were well received and all are still in use by C-CAM and its partners. C-CAM is still trying to influence the government to make the EIA process more accessible to communities.

#### ***Result 2: Community-based monitoring established***

- Development of community monitoring programme (including workshops for community monitors and the development and circulation of a manual), and purchase of monitoring equipment.

#### Long-term impacts

- The community monitoring programme is still on-going and is providing useful data, as well as engaging community members.

#### ***Result 3: Stakeholders involved in activities designed to minimise the impacts of climate change***

- Rainwater harvesting demonstration projects provided systems to more than 20 vulnerable families and community groups.
- Sustainable livelihoods entrepreneurship workshop held.
- Proposal for mangrove restoration submitted to Canadian International Development Agency by CaribSave to be implemented in partnership with C-CAM. Proposals submitted to Critical Ecosystems Partnership Fund and Forest Conservation Fund. Concept note submitted to Global Environment Facility by Clarendon Parish Development Committee to be implemented in partnership with C-CAM to implement green projects in Clarendon. Proposal submitted to Office of Disaster Preparedness & Emergency Management for mangrove restoration in the PBPA.

#### Long-term impacts:

- The rainwater harvesting solutions are still in use. The projects were funded and have led to many further activities in the area including the on-going construction and equipping of the Portland Bight Discovery Centre, which will have climate change as one of its themes and will serve as a focal point for alternative livelihoods including eco-tourism in the PBPA.



Figure 88: Mangrove islet at Two Bush Cay, Portland Bight Protected Area in 2011. This Magnificent Frigatebird nesting islet was badly damaged by hurricanes, from which it failed to recover because of sea level rise. This islet has since completely disappeared. Photo: Ann Sutton

### 6.6.5 Lessons learnt

Many things contributed to the success of this project, with the most important being:

- the development of partnerships with funders, government, local communities and other stakeholders, which ensured smoother implementation, financial and in-kind support and buy-in;
- a Project Management Committee supports transparency and accountability;
- VRAs and other participatory approaches ensure input, financial support and buy-in from stakeholders and validate approaches; and
- the biggest challenge was the large number of community-based activities, which was a very large demand on the time of community participants and C-CAM team members.

The main sponsor of the project was the United Nations Development Programme Community Based Adaptation Programme. Other sponsors/partners were National Commercial Bank Foundation, Panos Caribbean, National Environment and Planning Agency, Christian Aid, Office of Disaster Preparedness & Emergency Management, Red Cross and Ministry of Labour & Social Security.



## 6.7. Heart for climate: climate change advocacy in Trinidad and Tobago



### 6.7.1. About the organisation

IAMovement (pronounced 'I Am Movement') <http://iamovement.org/> is a non-profit organization based in Trinidad & Tobago, which aims to effect positive change through education, community building and environmental awareness initiatives.

### 6.7.2. Project overview

As citizens of Small Island Developing States, the co-founders of IAMovement were concerned about climate change in Trinidad & Tobago and, after gathering background information, realised there was no platform for a climate conversation for the general public. This kick-started their first project - the People's Climate March held on September 21st 2014 at the Queen's Park Savannah, in tandem with over 2,600 events taking place in 162 countries around the world. This local event saw over 150 people coming out and taking part in the largest simultaneous global climate march in history.



Figure 89: Port-of-Spain to Paris People's Climate March. Photo: Dylan Quesnel

The success of this inaugural march set the stage for the following year. On November 29th 2015, IAMovement hosted a second Climate March event, dubbed 'POS to Paris' which was officially endorsed by the United Nations, the European Union, and the French Embassy of Trinidad & Tobago. This event was held alongside the rest of the world to shed light on the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21). In addition to the march around the Queen's Park Savannah, IAMovement organised an 'Eco-Village' featuring 25 local environmental organisations which showcased their work on environmental education, awareness, and climate change adaptation and mitigation projects around the country. This allowed the public to engage with environmentalists and see first-hand what had been happening in Trinidad & Tobago.

At the end of the march, participants were encouraged to form a human 'Heart for Climate', which became an iconic statement for IAMovement and Trinidad & Tobago.



Figure 90: Heart for Climate. Drone photo: Robert Krogh

### 6.7.3. Project methodology

In order for IAMovement to reach out to stakeholders during the planning phases of the 2015 event, the co-founders created an invitation list of environmental organisations, intergovernmental organisations, government ministries, embassies and schools. They also identified key stakeholders and invited them to be 'ambassadors' of the event. As ambassadors, these persons would share and promote the event within their communities. Lastly, they created a list of potential sponsors and partners based on identified costs for the event.



Once these lists were confirmed, IAMovement sent out individual invitations and personal follow ups, and used social media (Facebook and Instagram) to advertise the event. There was an in-house graphic designer and videographer who created a short video and digital flyers, which were posted repeatedly on social media platforms and shared amongst ambassadors and their stakeholders.

#### 6.7.4. Key results

For the POS to Paris event:

- more than 400 people gathered to learn more about climate change;
- IAMovement attempted to host a ‘green’ event by not using single use plastic items such as disposable bottles and cutlery for anyone who brought these items, there were recycling bins around the Eco-village provided by Plastikeep;
- financial sponsorship was received from the French Embassy, European Union, and private companies, with in kind donations of portapotties, banners and a medic; and
- opening speeches were given by Richard Blewitt, Resident Coordinator of the United Nations Trinidad and Tobago and His Excellency Hedi Picquart, Ambassador-designate of France to The Republic of Trinidad and Tobago.

Longer term impacts

- While IAMovement felt the POS to Paris event achieved its goals, it wanted to continue the climate conversation in Trinidad & Tobago using other communication means. This led to the creation of a documentary entitled ‘Small Change’, which premiered on September 23rd 2016 (see <https://vimeo.com/166644895>). The film takes the conversation forward and discusses climate change in a local context, with a focus on the state of our local economy and moves that can be made in the grassroots, private and public sectors to improve the existing state of our environment, while also having significant social and economic benefits for citizens of Trinidad & Tobago.
- IAMovement has plans to create a package of educational tools for varied target audiences that will create a groundswell of citizen awareness on climate change and what citizens can do to curb emissions.

#### 6.7.5. Lessons learnt

One of the biggest lessons learnt was to establish sustainable partnerships and funding mechanisms while planning for any project. Having these at the start of all projects allows for proper execution.

Another lesson learned was to start planning at least six months prior to any event. This allows for further reach to engage a wider range of stakeholders, and also enhances vision for successful projects.

Lastly, the way in which you communicate with your target audiences will have an effect on how your message is received. IAMovement chose to focus on the positive aspects of economic diversification through eco-tourism and transitioning towards renewable energy versus the ‘doom and gloom’ of the fossil fuel industry. As a result, we have received positive feedback and interest in this movement by a wider range of stakeholders.

## 6.8. #1point5toStayAlive, an advocacy campaign on climate justice



Implemented by Panos Caribbean

### 6.8.1. About the organisation

Since its inception in 1986, Panos Caribbean has been working to help empower the most marginalized and vulnerable persons in the region through projects and other activities on issues related to children and youth, public health, media community and environment as well as gender. Panos Caribbean works to amplify the voices of the poor and the marginalized through the media and ensure their inclusion in public and policy debate, in order to enable Caribbean communities and countries to articulate and communicate their own development agenda. Panos Caribbean is a regional organisation that helps journalists to cover sustainable development issues that are overlooked and misunderstood.

### 6.8.2. Project overview and approach

In the second half of 2015, Panos Caribbean led a major regional awareness and advocacy campaign aimed at raising awareness of climate change issues in the region and at supporting Caribbean negotiating positions at the 21<sup>st</sup> Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21).

The campaign found its origin in the support provided by the Caribbean Community Climate Change Centre (CCCCC) to the region's response to the climate change challenge and in a meeting convened in Saint Lucia in July 2015 by Panos Caribbean, in collaboration with Saint Lucia's Ministry of Sustainable Development, Energy, Science, and Technology and several other partners<sup>38</sup>. At this meeting, in which government negotiators, journalists, artists, and civil society organisations participated, it was agreed that this regional campaign should be launched, under the banner **#1point5tostayalive**.

The campaign was formally launched on 8 October 2015 in Saint Lucia, at a ceremony involving then Minister of Sustainable Development, Dr James Fletcher, as well as representatives from the GEF Small Grants Programme, the diplomatic corps, the Commonwealth Foundation and Panos Caribbean.

38 These were the CCCCC; the High Level Support Mechanism Project on Climate Change for SIDS and LDCs, with implementing partners Climate Analytics and Charles & Associates; Friedrich Ebert Stiftung, Jamaica and the Eastern Caribbean; the Organization of American States; and the Organisation of Eastern Caribbean States (OECS) Commission

The main activities and instruments used were:

- an online campaign with a trilingual website ([www.1point5.info](http://www.1point5.info)), and the active use of social media, with a Twitter account (@1point5OK) and Facebook pages (<https://www.facebook.com/savethecaribbean> for the English language page);
- the involvement of Caribbean artists in the production and dissemination of songs<sup>39</sup>, paintings, photographs, poems, public service announcements, photographs and handicraft — all helping to convey the messages of the campaign prior to, during and post COP21;
- the participation of two Caribbean singers in COP21 (Figure 91), with a number of performances taking place over three days at a Wider Caribbean Pavilion;



Figure 91: Jamaican Aaron Silk and Belizean Adrian Martinez perform at COP21 in Paris, December 2015.

- the hosting of multiple events, including a meeting of the Haitian Civil Society Platform on Climate Change, held prior to COP21 and which helped to mobilise civil society, inform media houses and build linkages with government; and
- the formulation and implementation of a media liaison strategy that included the participation of Caribbean journalists in COP21, the production and dissemination of releases and articles for the print and electronic media, as well as arrangements for interviews and press conferences during COP21.

<sup>39</sup> Click this link <https://soundcloud.com/panos-caribbean/1pont5-to-stay-alive> for the theme song, which is now being produced in video format.



### 6.8.3. Key results

It is always difficult to assess the impacts of communications work, but several tangible outcomes can be identified:

- stronger collaboration between governments, inter-governmental organisations, civil society and the media, thanks to a demonstration of converging interests and of the value of cooperation;
- empowered delegations in international processes, as indicated by one leading Caribbean negotiator in COP21, who said afterwards that he “felt that Caribbean people were behind us, that our work in Paris was followed and supported back home, and that increased our determination to succeed”;
- increased capacity of the media to understand and report on climate change issues, and to approach them with a perspective that is relevant to the Caribbean and its people; and
- contributions to securing the language “holding the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels, recognising this would significantly reduce the risks and impacts of climate change” in the Paris Agreement.

### 6.8.4. Lessons learnt and recommendations

- Communication is an essential tool in the effort to articulate and defend Caribbean climate change interests at the international level. It gives visibility to the issues and challenges facing the region and enables accountability from all stakeholders, including, critically, international actors.
- In communication initiatives, it is useful to employ a variety of media. When a particular message



Figure 92: Painting by Jonathan Gladding of Saint Lucia, which became the emblematic image of the #1point5tostayalive campaign.

is conveyed simultaneously through several channels, for example at a press conference hosted by government officials and by artists or civil society activists, it becomes more powerful.

- Art can convey important messages more effectively than other media. The emblematic image of this campaign was without doubt Jonathan Gladding's painting (Figure 92), showing that artists can play a special role in any effort to raise awareness and mobilise participation, given their visibility and credibility. They are also able to express and convey messages in culturally relevant forms. The voice of a prominent reggae musician or a painting by a creative visual artist can have a greater impact than conventional educational material.
- Communication campaigns must be based on and relevant to the realities of the region and people they are meant to serve. Awareness of climate change and its impacts is growing in the Caribbean, but this awareness is fed primarily by global (northern) media, with little focus on the concerns of Caribbean people. Giving a voice to Caribbean issues and actors was one of the key factors of the success of this campaign.
- Issues of climate change are development issues: in and for the Caribbean. Dealing with climate change requires much more than science, technology and economics, it requires fairness in international agreements and instruments, bridging the gap between rich and poor, promoting gender equity and equality in negotiations and solutions, protecting the most vulnerable, and addressing the fundamental causes of climate change. The fight against climate change is a fight for climate justice.

## 6.9. Rebirth of Ashton Lagoon using nature-based and community-based solutions for coastal resilience



Implemented by Sustainable Grenadines

### 6.9.1. About the organisation

Sustainable Grenadines Inc. (SusGren) is a non-governmental transboundary organisation working between the countries of Grenada and Saint Vincent and the Grenadines since 2002. SusGren started initially as a project in 2002 and transitioned into an NGO in 2010. It now functions as the hub of a network of civil society organisations in the Grenadines. Its membership is made up of academic institutions, local businesses and community-based organisations. Some of these members also play a role on the Board of Directors.

SusGren is committed to implementing projects and influencing policies towards the conservation of the coastal and marine environment and sustainable livelihoods with a focus on the transboundary Grenadine islands. SusGren's mission is to **empower the people of the Grenadines to make wise use of their natural resources through environmental education and stewardship-building, sustainable livelihoods, biodiversity conservation, climate change adaptation and strengthening of civil society organisations.**

It achieves this by strengthening civil society partners, so that they can better participate in bringing about change that is equitable and lasting. Core activities include training workshops, project support through small grant funding, attachments and exchanges, networking and awareness and facilitating project development and implementation with the engagement of local groups.

Read more on the organisation here: <https://susgren.org/>

### 6.9.2 Project overview

From 2016 to 2019, SusGren led an ecosystem-based intervention in Union Island, Saint Vincent and the Grenadines focused on restoration of the degraded Ashton Lagoon ecosystem to reverse ecological damage caused by a failed marina project in the 1990s.

Ashton Lagoon is an area of conservation importance. It is designated an Important Birding Area and a Marine Conservation Area, and protected under the Fisheries Act of 1986 due to its rich biological diversity and ecological importance for the entire coast of Union Island. However, the marina project caused significant ecological and socio-economic impacts with both long-term and short-term consequences for the community of Ashton. Blocked circulation in the bay, increased sedimentation and turbidity and pollution resulted in harm to the mangrove, coral reefs and seagrasses in the area and impacted fisheries habitats and



Figure 93: Mangrove planting in Ashton Lagoon. Photo: SusGren



Figure 94: Excavation of marina pier at Ashton Lagoon. Photo: SusGren

resources. This affected local livelihoods and resulted in decline in interest by fisherfolk and other locals in using the area. The impacted coastal and marine ecosystems also meant their ability to provide coastal protection for the community, particularly from storm surges, coastal flooding and coastal erosion, was reduced.

SusGren's project therefore aimed to revive critical ecosystem functions and enhance economic and other community benefits inherently linked to such a dynamic and complex system. Given concerns over climate change and Union Island's vulnerability to coastal flooding, erosion, and storm surge, the project was seen as a key opportunity to increase coastal resilience to these hazards through ecosystem-based adaptation.

### 6.9.3 Project methodology

Due to the nature of the problem, a hybrid approach was utilised to restore the area. Physical works were undertaken to start to improve water circulation and ecosystem functions, coupled with active replanting of mangrove in affected areas, and creation and maintenance of additional areas, including mangrove islands and critical habitat for birds, fish, and other marine organisms.

Strategic breaching of seven areas in the marina pier structure was completed to allow for the circulation of water in and out of the lagoon, improve water quality and benefit avian and marine life. To further revive ecosystem functions and assist with exchange of oxygenated water in and out of the mangrove forest, a swale system was installed. Excavated material was used to create additional bird habitat. These physical works were complemented by active replanting of red mangroves in 'die-back' areas in the mangrove forest. This involved establishment and maintenance of a mangrove nursery for that period and out-planting with community engagement. All of these activities continue to be supported by comprehensive bio-physical monitoring by SusGren's Community Researchers Program of trained youths.



The project placed significant emphasis on community engagement and ensuring the community could benefit through increased socio-economic opportunities and livelihood diversification. Community members were employed where possible in restoration activities. In addition, development of nature-based small and micro-enterprises has been encouraged and supported e.g. those focused on sustainable tourism, seamoss farming and apiculture. A Climate Change Interpretive Centre was constructed to support education and community outreach as well as diversification of livelihood opportunities in the lagoon area.

Another key aspect of the project approach also included advocacy to key stakeholders, particularly government, for their support of the project. In particular, this advocacy focused on the expected economic benefits of the restoration and was instrumental for buy-in for the work to be completed successfully.

#### 6.9.4 Key results

The project resulted in not just environmental quality and habitat improvements, but also notable benefits to the community surrounding Ashton Lagoon, including through increased environmental education and awareness, economic opportunities, recreation and coastal protection. Healthy mangroves and lagoon help reduce exposure and sensitivity to storm surges, coastal erosion and coastal flooding. Adaptive capacity of the community has also been enhanced through increased nature-based economic opportunities and livelihood diversification. These opportunities include development of sustainable tourism activities, such as kayaking, kitesurfing and eco-tours, community-owned apiculture and honey production enterprises, and seamoss farming.



Figure 95: A healthier Ashton Lagoon after restoration work. Photo: SusGren



Figure 96: Tourist kayaking in the Ashton Lagoon area after restoration. Photo: SusGren

### 6.9.5 Lessons learnt

Key lessons from the project include the following:

- Ecosystem-based and engineered solutions can be effectively combined – The hybrid approach combining ecosystem-based solutions and physical infrastructure works was highly effective and provided a low-regret and cost-effective way to restore the Ashton Lagoon.
- Technical expertise – It was critical to have the necessary technical expertise to support the restoration process, particularly to assess needs and provide technical inputs on the best way to implement a workable solution. This included technical experts such as engineers and an architect that understood the local environment and context and had experience conducting similar work in a coastal environment, as well as a competent project manager and coordinator.
- Funding and resources – Significant funding and human resource capacity was necessary to implement a project of this scale. It was important to ensure adequate funding was secured and the necessary tools and equipment were available e.g. turbidity barriers, excavators, trucks, hand-tools etc. It is also critical to note that continuous funding is important to maintain progress made.
- Community engagement – Sustaining community engagement throughout the process was key, particularly for buy-in and ownership. Directly engaging residents in the planned works as well as integrating livelihood opportunities assisted with this.
- Advocacy and relationships with authorities – Effective communication and advocacy to government, which focused on highlighting economic benefits, was a key element to ensure permissions, approval of designs, and smooth oversight and monitoring.

## 6.10 Using a native plant to build climate resilience by diversifying the ecosystem in Harmonyville, Belize



Implemented by Belize Red Cross, as part of the Community Resilience Building Project funded by Global Affairs Canada

### 6.9.1. About the organisation

The Belize Red Cross (BRC) began operation in 1914, as a branch of the British Red Cross in Belize. In 1983, it became the Belize Red Cross, through an Act of Incorporation and is an auxiliary to the Government in all humanitarian fields, while still maintaining autonomy. Currently there are eight (8) branches countrywide, which enables the BRC to successfully achieve its vision of *“Striving through voluntary action for a world of empowered communities better able to address human suffering and crises with hope, respect for dignity and a concern for equity”*.

The BRC has many years of experience in disaster risk reduction, preparedness and response, and is considered an expert in the field. With a cadre of certified volunteers in several areas of DRR, which include, Damage Analysis and Needs Assessment, Enhanced Vulnerability and Capacity Assessments, Knowledge, Attitudes and Practices studies, First Aid, disaster preparedness, water and sanitation, public health, mental health and psychosocial support and cash transfers. Their contribution to preparedness and response in Belize is invaluable.

### 6.10.2 Project overview

The Community Resilience Building (CRB) Project is an initiative implemented by the Canadian Red Cross in partnership with the International Federation of Red Cross and Red Crescent Societies (IFRC) in three Caribbean countries, Belize, Suriname and Saint Vincent and the Grenadines. The aim of the project is to increase the resilience of 17 communities in the respective countries. The project fosters an ecosystem-based approach to community disaster risk management, ensuring that appropriate actions are taken to enhance climate change resilience which are also gender sensitive. It was conducted in three phases: 1) community needs assessment; 2) community training in disaster management and mitigation; and 3) implementation of community microprojects to build resilience to climate change and disasters.

The Harmonyville microproject utilises the Maya Nut (*Brosimum alicastrum*), an indigenous tree employed to restore, enhance, and diversify the ecosystem, making the area more resilient to climate change impacts.

Harmonyville is a rural community in the village of Cotton Tree. It lies alongside the Beaver Dam Creek which divides the villages of Cotton Tree and St. Matthew's. Harmonyville has 98 households, and a population of approximately 300 persons with a significant migrant community from El Salvador.

During the community needs assessment phase, villagers expressed concern about the deterioration of their community and the increasing dangers this posed. They indicated that historically, Beaver Dam Creek was once alive with good water, fish, game animals, and forest trees. However, the area was cleared for lumber and all the natural resources were affected – the flora and fauna disappeared and the creek started drying out during the dry season and overflowing its banks during the rainy season. As a result, the community decided to develop a microproject that would assist to restore the area, as best as possible, to its original state by planting Maya Nut trees in the degraded areas.

The Maya Nut (*Brosimum alicastrum*) is one of few tree species with the ability to adapt to predicted climate changes in tropical forests, as it can survive in temperatures between 18 to 32°C and precipitation levels of 600 to 4,000 mm per year. It can also access water stored in limestone bedrock, allowing the tree to remain green and leafy even during long dry seasons. This helps prevent erosion, stabilise riverbanks, and maintain flows from natural springs. The tree requires no agricultural inputs, and its abundant leaf litter improves soil fertility and reduces erosion of the soil cover. The Maya Nut plays a significant role in defining the resilience of the agro-ecosystem to climate change and extreme weather events as it grows to more than 50m and acts as a windbreak during storm events.

In addition to increasing the environmental resilience of the community, the trees will be used to enhance the economic resilience of the members of the community by providing alternatives for economic opportunities. The Breadnut or Maya Nut has gained attention in Central America and Mexico for its range of uses by several indigenous communities. The branches and leaves are often used for animal feed during the dry season, while the nuts are used to make flour or as a substitute for potatoes. Biscuits, as well as hot and cold drinks are made using the flour. Additionally, the nuts are rich in vitamins and are a very effective supply of folic acid to gestating mothers. A single tree, which matures in about three to five years, produces around 150 – 180 kgs of fruit and remains productive for around 120 – 150 years. The idea of growing this tree is a direct result of experiences of the people that settled the area.

### 6.10.3 Project methodology

The project is managed by a committee that began planting trees along the Beaver Dam Creek riparian area. This activity will also help to maintain water quality and quantity. The families involved plant not only along the riverside, but in their yards. This ensures that much of the land is restored to a natural state which provide protection from the expected impacts of climate change such as increased erosion, flooding and wind intensity.





Figure 97: Maya Nut Product. Photo: Belize Red Cross



Figure 98: Maya Nut seedlings. Photo: Belize Red Cross

The committee established a nursery for vegetables and fruit trees for the community to plant. All surpluses will be sold. These fruit trees will contribute to making the ecosystem more diverse and hence resilient, as well as protect against the “heat island” effect. The latter occurs when vegetation is removed resulting in the area heating up rapidly. A raised tank has been established to provide water from the nearby river: a water pump and hose have been brought to avoid farmers having to spend time carrying water from the creek to the nursery area. Community members cultivate their own nurseries and provide information to the committee on the availability of plants. The committee has explored opportunities to use awareness programmes on mainstream media and having trees for sale at certain advertised points.

The University of Belize provides technical advice to the community and plans to host awareness sessions in the local school to sensitise children of the environmental health. The project will also assist in socio-economic growth and lifestyle improvement within the community, since it will provide an alternative food source for the community, and the products of the tree can be sold to others to generate income.

It is envisaged that this initiative will motivate other small landowners to follow suit and plant trees that will contribute to their economic and social wellbeing. The long-term vision is to encourage visitors to the area for recreation and to develop alternative livelihoods such as tour guiding, bed and breakfasts and gift shops.

#### 6.10.4 Key results

The results of the project are highlighted below:

- The project included roles for all members of the community, children, men, women, in the various Maya Nut project activities; this type of inclusion was a great motivator for community participation.
- Country wide outreach via broadcasts on radio, television and other media and holding of “open/awareness” days have been done to sensitise the country to the project, the importance of the tree, and encourage the buying of seedlings, as part of its initial income from the project.
- An external northern market (to the US) was established, which the community will be aiming to become a part of, with the help of someone who is actively involved with its export and who has agreed to help farmers better understand how to prepare the different products from the tree for the market.
- A cooperative group has been formed within the community to manage the project and coordinate awareness and sensitisation. The intention is to plant about 5,000 trees in an area known as the “Mayan Corridor”; a mountainous forested region that passes through Belize which has been affected by deforestation. At present, there are about 4,000 plants in the nursery.
- The community also benefitted from the provision of a raised tank, water pump and water hoses to ensure water supply to the nursery during the dry season, was not envisaged at the start of the project; but included to ensure sustainability.

#### 6.10.5 Lessons learnt

The following are lessons learnt from the microproject in Harmonyville, Belize:

- The community participation that is facilitated by the in-country project team, allowing for easier interaction with the communities, which would have been more difficult if external facilitators were used.
- Identifying and using key persons as champions that are present in each community can help the project along and gain traction, even in the physical absence of the project team.
- The project began with listening to the various groups/community members to get an idea of what they considered were important to their community/wellbeing and then determining ways the project could address one or more of the needs identified. This helped further community cohesion, ensuring that as many persons/groups were represented, and that consensus is built around any activity decided by the community. This is key for the long-term project sustainability as well as developing community empowerment.

- Because the community is aware of its day-to-day living conditions, they are most able to design the project activities and maximum efficiency. In this regard, the community established a cooperative which never existed before, but helped to foster social cohesion within the community.
- The involvement of the University of Belize (to offer technical support) as well as forming linkages with the Maya Nut program already active in Central America, allowed the community to get additional support and guidance from like-minded individuals to avoid any missteps in the implementation of the project.
- The committee formed linkages with one of the persons involved with the Central American Initiative – the Maya Nut Institute, who assisted through the provision of technical support and knowledge about the processing and selling of the Maya Nut fruit. These linkages and partnerships ensure that the community is not isolated and can obtain readily available assistance to navigate any issues that may arise during the planting and the harvesting phases.
- Usually, building resilience to climate change is seen within a narrow context, and does not consider that adaptation can also be used as an opportunity for improving the quality of life of persons. In this instance, the project is a good example of how climate change projects can provide multi social benefits including sustainable livelihoods.





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## **Additional resources**

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### Caribbean Natural Resources Institute

The Caribbean Natural Resources Institute (CANARI) is a regional technical non-profit organisation which has been working across the Caribbean for over 30 years. We are registered in Trinidad and Tobago, Saint Lucia and the United States Virgin Islands, with charitable status in Trinidad and Tobago and 501(c)(3) status in the United States.

Our mission is to promote and facilitate stakeholder participation in the stewardship of natural resources in the Caribbean. Our work currently focuses on four themes: Biodiversity and Ecosystems, Equity, Resilience and Participatory Governance.

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