



**CARIBBEAN COMMUNITY
CLIMATE CHANGE CENTRE**

Building Resilience. Securing Our Future.

Climate Actions for Building Resilience in Coastal Communities in the Caribbean (CABRIC Caribbean)

Annex 2: Feasibility Study

Prepared by E Co.

This report has been prepared for the Caribbean Community Climate Change Centre as part of work to prepare the funding proposal and annexes required to be submitted to the GCF regarding “Climate Actions for Building Resilience in Coastal Communities in the Caribbean (CABRIC Caribbean)”

Published by: E Co.

QA: Anne Gander

Team leader: Ellie La Trobe-Hogan, E Co. ellie@ecoltdgroup.com

Authors: Ellie La Trobe-Hogan, Hollie Moffett, Malki Rodrigo, Nathalie Suarez, Laura Castro, Federico Riet, and Remus Bandacu.

Last edited: 16 June 2026

Status: Version 4-4

Disclaimer: This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties. This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it. The views expressed in this report are those of E Co. staff and associates and they are not necessarily those of the commissioning party or anyone else.

Contents

Contents	2
Tables	5
Figures	8
Abbreviations	13
1. Introduction	19
1.1 Objective of Study	19
1.2 Methodology	20
2. Background and Context	22
2.1 Caribbean regional context for CABRIC	22
2.2 Bahamas	26
2.3 Belize	32
2.4 Grenada	38
2.5 Jamaica	43
2.6 St. Lucia	51
3. Current Climate and Climate Change Projections	57
3.1 Regional Summary	57
3.2 Bahamas	77
3.3 Belize	85
3.4 Grenada	95
3.5 Jamaica	105
3.6 Saint Lucia	113
4. Sectoral Vulnerabilities and Potential Impacts	120
4.1 Vulnerability across CABRIC countries	120
4.2 Bahamas	121
4.3 Belize	125
4.4 Grenada	130
4.5 Jamaica	135

4.6	Saint Lucia	139
4.7	Summary of vulnerabilities and climate impacts in the wider Caribbean and CABRIC Countries	143
5.	<u>Stakeholder landscape & capacity</u>	156
5.1	State Agencies	156
5.2	CSO, NGO and LA landscape	160
5.3	CANARI	175
5.4	CSO and NGO Capacity Assessments	176
5.5	GEF Small Grants Programme & other Trust Funds	178
6.	<u>Stakeholder needs</u>	189
6.1	History of Stakeholder Development for CABRIC	189
6.2	NDA engagement	189
6.3	Country CSOs, NGOs and LAs engagement	192
6.4	CANARI partnership	194
6.5	Grant Administration	195
6.6	Country validation	195
7.	<u>Policy Context</u>	198
7.1	Regional policy, institutional and capacity readiness frameworks	198
7.2	Climate Change-Related Policy and Regulatory Environment	199
8.	<u>Projects and programmes in CABRIC countries</u>	215
8.1	Climate Finance Needs and Receipts for Adaptation and Resilience	215
8.2	Country level climate finance need for adaptation	217
8.3	Climate Finance adaptation project and programme gaps	242
9.	<u>Barriers to be address</u>	245
10.	<u>CABRIC Caribbean programme</u>	251
10.1	Theory of Change	251
10.2	Thematic areas and indicative interventions	252
10.3	Project Design	257
10.4	CABRIC facility structure	268
11.	<u>Implementation Arrangements</u>	271
	National ownership	275

11.1	275	
12.	Risk mitigation	280
12.1	Technical and Operational Risk Mitigation	280
12.2	Prohibited Practices Risk Mitigation	281
12.3	Political and Reputational Risk Mitigation	281
13.	GCF Investment Performance	283
13.1	Impact Potential	283
13.2	Paradigm shift	284
13.3	Sustainable development	285
13.4	Needs of recipients	287
13.5	Country ownership	287
14.	Efficiency and Effectiveness	289
14.1	Justification of concessionality	289
14.2	Economic and financial analysis	290
14.3	Analysis of alternative financial instruments	290
14.4	Options analysis	293
Reference		306

Tables

<i>Table 1: Geography, government and administrative structure and surface area.</i>	23
Table 2: Population parameters (2022) ^{and} of the seven CARICOM countries participating in the EDA programme	24
<i>Table 3 Socioeconomic indicators by country</i>	24
Table 4 - Employment and GDP Contributions by Sector	25
<i>Table 5 Economic Summary table of the Bahamas</i>	29
Table 6: Economic indicators in Belize 2016 - 2024	35
<i>Table 7 Grenada's economic situation</i>	40
Table 8: Jamaica Economy Overview	48
<i>Table 9 Economic impact in Saint Lucia</i>	54
Table 10: Regional summary of historical and projected climate changes - color coded for statistical confidence of increase and decrease. Dark green = high confidence. Light green = medium confidence. Yellow = no statistical assessment. Grey = no trend / statistical assessment	57
Table 11: Risk of Climate hazards by CABRIC country	59
Table 12 Named storms within the region from 1980 to 2016 and	72
Table 13: Bahamas historic and projected climate	78
Table 14 Summary Effects of Hurricane Dorian in USD. Source: IDB	84
Table 15: Climate hazards risk in the Bahamas (source: WB Think Hazard)	85
Table 16: Belize historic and projected climate	86
Table 17 - Summary Effects of Hurricane Lisa in BZ\$.	94
Table 18: Climate hazards risk in Belize (source: WB Think Hazard)	95
Table 19: Grenada historic and projected climate	95
Table 20 - Summary Effects of Hurricane Beryl in Million XCD. Source: GOG, 2024	105
Table 21: Climate hazards risk in Grenada (source: WB Think Hazard)	105
Table 22: Jamaica historic and projected climate	106
Table 23 Climate hazards risk in Jamaica (source: WB Think Hazard)	112
Table 24: St Lucia historic and projected climate	113
Table 25 - Summary Effects of Flood in US\$ Million. Source: GFDRR, 2013	118
Table 26: Climate hazards risk in St Lucia (source: WB Think Hazard)	119

Table 27 Sectoral vulnerability rankings by country	120
Table 28 ND Gain Index scores for food and water security related indicators.	121
Table 29 Bahamas health care data by Islands	122
Table 30 ND Gain Index - Health Indicators	123
Table 31 ND GAIN Index - Ecosystem Scores	124
Table 32 ND GAIN Index - Food and Water related scores	126
Table 33 Health Care sector snapshot - Belize	128
Table 34 Health sector indicators - ND GAIN Index	129
Table 35 ND GAIN Index scores for ecosystem services	129
Table 36 ND GAIN INDEX Scores - Grenada	132
Table 37 Health sector indicators - ND GAIN Index	134
Table 38 Ecosystem Services Indicator scores according to ND GAIN Index	134
Table 39 ND GAIN Scores for Agriculture and water security scores	136
Table 40 Public Health Centers count Jamaica in different parishes	138
Table 41 ND GAIN Index Scores for Health sector in Jamaica	138
Table 42 ND GAIN Scores for Jamaica	139
Table 43 ND GAIN Scores for Food and Water sectors in St Lucia.	140
Table 44 ND GAIN Index Scores - Health sector	142
Table 45 ND GAIN INDEX Scores for Ecosystem Services	143
Table 46 observed and predicted impacts for agriculture sector	143
Table 47 Observed and Future impact on tourism due to Climate Change	146
Table 48 observed and predicted impacts for fisheries sector	149
Table 49 Observed and Predicted Health sector impacts on Caribbean	150
Table 50 Observed and Predicted GEDSI Impacts in the Caribbean	153
Table 51 NGOs, CSOs and LAs in The Bahamas	161
Table 52 NGOS, CSOs and LAs in Belize	163
Table 53 CSOs, NGOs and LAs in Grenada	166
Table 54 CSOs ,NGOs, LAs in Jamaica	169
Table 55 CSOs, NGOs and LAs in Saint Lucia	172
Table 56 Summary of SPG project focus and financing	178
<i>Table 57: Attendance for the CABRIC validation session</i>	195

Table 58 Country Climate Finance Needs and Challenges	217
Table 59 Climate Finance Received and Projected Needs (2024-2030)	217
Table 60: Climate finance adaptation projects and programmes in the Bahamas	219
Table 61: Climate finance projects and programmes in the Belize	221
Table 62: Climate finance projects and programmes in Grenada	224
Table 63: Climate finance projects and programmes in Jamaica	226
Table 64: Climate finance projects and programmes in St Lucia	231
Table 65 Climate finance adaptation projects and programmes in CCCCC pipeline	236
Table 66 Project and Programme Gaps	242
Table 67: Barriers CABRIC will address	245
<i>Table 68 Roles of CABRIC on granting facility</i>	268
Table 69 National Designated Authority (NDA) or Focal Point for the GCF	277
<i>Table 70 Technical and Operational Risk Mitigation</i>	280
Table 71 Prohibited Practices Risk Mitigation	281
Table 72 Political and Reputational Risk Mitigation	281
Table 73 Alternative Instruments justification - summary	291

Figures

Figure 1: Map of the study areas and countries.	22
Figure 2: Exclusive Economic Zone of Bahamas.	27
Figure 3: Bahamas land use	28
<i>Figure 4 : Fisheries production export and imports of Bahamas reported for 2022 (FAO 2024).</i>	31
Figure 5 : Exclusive Economic Zone of Belize.	32
Figure 6: Main Townships and Parishes, and land use of Belize	34
Figure 7: Fisheries production export and imports of Belize reported for 2022 (FAO 2024).	37
Figure 8: Exclusive Economic Zone of Grenada.	38
Figure 9: Grenada landcover map	39
Figure 10: Fisheries production export and imports of Grenada reported for 2022 (FAO 2024).	43
Figure 11: Map of Jamaica	44
Figure 12: Jamaica landcover map	47
Figure 13: Fisheries production export and imports of Jamaica reported for 2022 (FAO 2024).	51
Figure 14: Map of St Lucia and EEZ	52
Figure 15: St Lucia landcover map	53
Figure 16: Fisheries production export and imports of St. Lucia reported for 2022 (FAO 2024).	56
Figure 17: Rainfall and Air Temperature Climatologies for each of the six defined zones (averaging period: 1980-2014).	59
Figure 18 (Left) Mean annual temperature climatology (1991-2020) based on CMIP6 historical simulations.	60
Figure 19: (Right) CMIP6 - Mean temperature Change 1860 - 2020	60
Figure 20 Air-Temperature Time Series Decomposition Numbers	60
Figure 21 (Left) Projected Temperature Change for the Caribbean Region (Land) from 2021 to 2040 under SSP 2-4.5 scenario.	61
Figure 22 (Right) Projected temperature changes for the region during near-term and long-term periods under SSP 2- 4.5 and scenarios.	61
Figure 23 (Left) Rainfall and Air Temperature Climatologies for each of the six defined zones (averaging period: 1980-2014).	62

Figure 24 (Right) Azores Anticyclone in a fortified state shown covering a vast expanse of the North Atlantic	62
Figure 25 Mean daily Precipitation climatology (1991- 2020) based on CMIP6 historical simulations	62
Figure 26 Mean Daily Precipitation 1991-2020 CMIP6	62
Figure 27 Regional Precipitation Climatology Comparison 1930 - 2014	63
Figure 28 (Left) Mean of daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 historical data for the period 1991-2020 (annual) ^{and}	63
Figure 29 (Right) Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the near term (2021-2040) under the SSP2-4.5 scenario (annual)	63
Figure 30 (Left): Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the long term (2081-2100) under the SSP5-8.5 scenario (annual)	64
Figure 31 (Right): Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the long term (2081-2100) under the SSP5-8.5 scenario for the wet season months (June-July-August).	64
Figure 32 (Centre): Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the long term (2081-2100) under the SSP5-8.5 scenario (Seasonal)	64
Figure 33: Mean Sea Surface Temperature - ERA5 Change Rel to 1961 - 1990 Historical 1991 - 2020 Annual	65
Figure 34: Mean Sea surface temperature (°C) for the Caribbean based on CMIP6 climatology (1991-2020), representing annual averages from historical simulations (1850-2020).	66
Figure 35 Projected mean sea surface temperature (SST) change (°C) for the Caribbean under the SSP5-8.5 high-emission scenario, relative to the 1850-1900 baseline, for the near term (2021-2040) and longer-term periods.	66
Figure 36 Projected mean sea surface temperature (SST) change (°C) for the Caribbean under the SSP2-4.5 scenario, relative to the 1850-1900 baseline, for the near term (2021-2040) and longer-term periods.	66
Figure 37 Total Sea level change from 1993- 2024	67
Figure 38: Projected mean sea level rise (meters) in the Caribbean for SSP2-4.5 and SSP5-8.5 scenarios across different time periods: near term (2021-2040), medium term (2041-2060), and long term (2081-2100).	68
Figure 39 Projected mean wind speed 2021-2040 Near term	69
Figure 40 Mean wind speed ERA5 Relative change relation to 1961 - 1990 in 1991- 2020	69
Figure 41 Monthly frequency of UTCI (Universal Thermal Climate Index) categories for the Caribbean region (a), the Greater Antilles (b) and the Lesser Antilles (c). The frequency refers to the percentage of days when daily minima, maxima and means fall in indicated UTCI categories over the 1980-2019 historical period.	70

Figure 42 Yearly (a), seasonal (b), and monthly (c) UTCI climatology for the 1980-2019 historical period. Background colors refer to the UTCI stress category scale at the top of the figure	70
Figure 43: Occurrences of extreme events across the Caribbean	71
Figure 44 Seasonal Frequency of Atlantic Hurricanes and Tropical Storms.	71
Figure 45 Comparison of observed (left) and modelled (right) linear trends of tropical cyclone occurrence (1980-2018)	72
Figure 46 Flood events 1900 - 2016	73
Figure 47: Regional incidence of drought 1974 - 2016	75
Figure 48: CariCOF October 2024 to March 2025 Experimental Heat Outlook. According to CARICOF experts, extreme temperature warnings were issued during the summer across multiple regions. Coastal Guianas experienced 8-14 heatwave days, while the ABC Islands, Lesser Antilles, and Puerto Rico recorded 3-8 heatwave days, with no more than three days elsewhere. The forecast shows a strong increase in the number of heatwaves is expected in Barbados, coastal Guianas, Trinidad & Tobago, and the Windward Islands.	76
Figure 49 2023 Caribbean Maximum DHW map, the product of excess temperature and duration. The entire region was severely affected by coral reef bleaching, with the longest duration of excessively high temperatures around Jamaica, stretching to Nicaragua in the west and Haiti in the east. Figure from NOAA.	77
Figure 50 Bahamas Monthly Climatology	78
Figure 51 Bahamas Mean temperature change Historical - Spatially 1991 to 2020 change	79
Figure 52 Mean temperature change Bahamas	79
Figure 53 Observed and Projected Precipitation for Bahamas	80
Figure 54 Observed Precipitation Spatially - Bahamas 1991 - 2020 change	80
Figure 55 SST relative change Bahamas in 1991 -2020 in relation to 1995-2004	81
Figure 56 Sea Level Rise Change 1992 - 2024 Bahamas (Observed)	82
Figure 57 Relative exposure to coastal hazards predicted	82
Figure 58 Historical Hurricane Tracks - Bahamas	82
Figure 59 Simulated frequency of cyclone types for Bahamas	82
Figure 60 (left): Average Annual Hazard Occurrence	83
Figure 61 (right): Key natural hazards statistics	83
Figure 62 Hurricane impacts in the Bahamas	83
Figure 63: Belize Monthly Climatology	88
Figure 64 Belize Projected and Observed Temperature	88
Figure 65 Observed and Projected Precipitation Belize	88

Figure 66 Sea Level Change - Belize EEZ	89
Figure 67 SST - Belize Observed change from 1991-2020 based on 1961-1990	90
Figure 68 Predicted SST under SSP 4.5 near term	90
Figure 69 - Simulated relative frequency of cyclone types for Belize (Historical & Projected)	90
Figure 70 (Left) Average Annual Hazard Occurrence	91
Figure 71 (Right) Hazard statistics	91
<i>Figure 72 Hazard Exposure Indicators - Belize</i>	92
Figure 73 Cumulative Hazard Exposure Map	93
Figure 74 Monthly Climatology - Grenada	97
Figure 75 Observed and Projected Temperature - Grenada	98
Figure 76 Observed and Predicted Precipitation - Grenada	99
Figure 77 Sea Level rise changes in Grenada	100
Figure 78 - Simulated relative frequency of cyclone types for Grenada (Historical & Projected)	100
Figure 79 (left): Grenada average annual hazard occurrence	101
Figure 80 (right): Grenada hazard statistics	101
Figure 81 Exposure to different hazards - Grenada	102
<i>Figure 82 Cumulative hazard exposure map</i>	103
Figure 83 Monthly Climatology Jamaica	107
Figure 84 Mean temperature change - Jamaica	108
Figure 85 Mean Projected Precipitation change - Jamaica	109
Figure 86 Sea Level Change - 1993- 2024	110
Figure 87 Mean SST 1991 - 2020 Jamaica	110
Figure 88 Mean SST SSP2-4.5 Near Term	110
Figure 89 - Simulated relative frequency of cyclone types for Jamaica (Historical & Projected)	111
Figure 90 Jamaica hazard Occurrence	112
Figure 91 Jamaica Key Hazard Statistics	112
Figure 92 Monthly Climatology - St Lucia	114
Figure 93 Projected Temperature	115
Figure 94 Projected Precipitation	115
Figure 95 Sea Level Change	116

Figure 96 - Simulated relative frequency of cyclone types for Saint Lucia (Historical & Projected)	117
Figure 97 Climate vulnerability	125
Figure 98 Climate Risk (Right)	130
Figure 99 Cumulative Vulnerability - Belize (Left)	130
Figure 100 Vulnerability Indicators for Grenada	131
Figure 101 - Number of dengue cases in Grenada from 2014 to April 2024	133
Figure 102 (Left) Composite map of vulnerability indicators	135
Figure 103 (Right) Climate Risk map	135
Figure 104 Dengue Vulnerability in Jamaica	137
Figure 105 Key elements of CANARI's strategic response	176
Figure 106 Governance structure of SLUNCT	186
Figure 107 CABRIC timeline and history	189
Figure 108: Strategic elements of the Regional Framework	199
<i>Figure 109 Indicative Reporting lines for the EDA Programme</i>	268
<i>Figure 110: reporting arrangements</i>	270
Figure 111 Implementation Arrangements	Error! Bookmark not defined.

Abbreviations

ACCC	Adaptation to Climate Change in the Caribbean
AML	Anti-money laundering
AOSIS	Alliance of Small Island States
ART	Agency for Rural Transformation
AWIC	Agri Women Initiative Coronie
BAU	Business-as-usual
BBRRS	Belize Barrier Reef Reserve System
BFREE	Belize Foundation for Research and Environmental Education
BMMRO	Bahamas Marine Mammal Research Organisation
BNT	Bahamas National Trust
BPAF	Bahamas Protected Area Fund
BREEF	Bahamas Reef Environment Educational Foundation
BSI	Belize Sugar Industry
BSIF	Belize Societal Investment Fund
C-CAM	Caribbean Coastal Area Management Foundation
CABRIC	Citrus Growers Association
CANARI	Caribbean Natural Resources Institute
CARDI	Caribbean Agricultural Research and Development Institute
CARE	Centre For Adolescent Renewal Empowerment
CARICOM	Caribbean Community
CARIWET	The Regional Initiative for the Conservation and Wise Use of Caribbean Wetlands
CARPHA	Caribbean Public Health Agency
CASE	College of Agricultural Science and Education
CATCH	Choiseul Association of Craft and Heritage Tourism
CBD	Convention on Biological Diversity
CBF	Caribbean Biodiversity Fund
CC	Climate Change
CCCCC	Caribbean Community Climate Change Centre
CCD	Climate Compatible Development
CDB	Caribbean Development Bank
CDD	Consecutive Dry Days
CEO	Chief Executive Officer
CEPF	Critical Ecosystem Partnership Fund

CFPs	Calls for Proposals
CGA	Citrus Growers Association
CGA	Citrus Growers Association
CIMH	Caribbean Institute for Meteorology and Hydrology
CIS	Conservation International Surinam
CIVWW	Cosu Imkers Vereniging Wroko was' Wasi"
CNFO	Caribbean Network of Fisherfolk Organisations
CPACC	Caribbean Planning for Adaptation to Climate Change
CPTED	Crime Prevention through Environmental Design
CREI	Citrus Research & Education Institute
CRFM	Caribbean Regional Fisheries Mechanism
CRFM	Caribbean Regional Fisheries Mechanism
CSAT	Collaborative Social Accountability Team
CSOs	Civil Society Organisations
CTCN	Climate Technology Center and Network
CTO	Caribbean Tourism Organization
CWELPA	Charitable Organisation of Welfare, Education Liberation, Poverty Alleviation Inc
CYEN Genada	Caribbean Youth Environment Network
CZM	Coastal Zone Management
CZMAC	Coastal Zone Management Advisory Committee
DAWE	Department of Agriculture, Water and the Environment
DEDTCA	Department of Economic Development, Transport and Civil Aviation
DMVDF	Dennerly/ Mabouya Valley Development Foundation
DoE	Department of the Environment
DPMR	Ministry of Disaster Preparedness, Management and Reconstruction
DRA	Disaster Reconstruction Authority
EAG	Environmental Awareness Group
EbA	Ecosystem-based Adaptation
EDA	Enhancing Direct Access
EDRMS	Electronic Document and Records Management System
EEZ	Exclusive Economic Zone
EIAs	Environmental Impact Assessments
ESMP	Environmental and Social Management Plan
EU	European Union
EWS	Early Warning Systems
EXIM Bank	National Export-Import Bank of Jamaica
FADs	Fish aggregation devices

FAO	Food and Agriculture Organization
FCPF	Forest Carbon Partnership Facility
FD	Forest Department
FHA	Forest Heights Academy
FiD	Fisheries Department
FRIENDS	Friends of the Environment
GAP	Grants Awards Program
GCCA	Global Climate Change Alliance
GCCSAP	Gender and Climate Change Strategy and Action Plan
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFC	Grenada Fund for Conservation
GHG	Greenhouse Gas
GIS	Geographic Information System
GOB	Government of Belize
GoJ	Government of Jamaica
GPU	Geology and Petroleum Unit
GRENCODA	Grenada Community Development Agency
GSA	Government Strategic Allocation
GSDS	Growth and Sustainable Development Strategy
GSDTF	Grenada Sustainable Development Trust Fund
Ha	Hectares
HOPE	Housing, Opportunity, Production, Employmen
HRRACC	Hazard Risk Reduction and Adaptation to Climate Change
HUML	Hofstra University Marine Laboratory
IAF	Inter-American Foundation
ICI	International Climate Initiative
ICRC	International Committee of the Red Cross
ICT	Information, Communication, Technology
ICZM	Integrated Coastal Zone Management
IDMC	Internal Displacement Monitoring Centre
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contribution
INRM	Integrated Natural Resource Management
IPCC	Intergovernmental Panel on Climate Change
ITDRC	IT Disaster Resource Center

ITDRC	IT Disaster Relief Centre
JAMPRO	Jamaica Trade and Invest
JMB	Jamaica Mortgage Bank
LAMP	Land Administration and Management Programme
LA	Local Authorities
LBB	National Forest Service
LBDC	Jamaica Business Development Center
LEDs	Low Emission Development Strategy
LIFE	Local Initiative Facility for the Environment
LUA	Land Utilization Authority
M&E	Monitoring and Evaluation
MACC	Mainstreaming Adaptation to Climate Change
MAMR	Ministry of Agriculture and Marine Resources
MARFund	Belize Mesoamerican Reef Fund
MBEDRM	Ministry of Blue Economy and Disaster Risk Management
MCCA	Marine Conservation and Climate Adaptation
MCCAP	Marine Conservation Climate Adaptation project
MEGJC	Ministry of Economic, Growth and Job Creation
MENR	Ministry of Environment and Natural Resources
MESTP	Medium-Term Economic Strategy Paper
MFFSD	Ministry of Forestry, Fisheries, and Sustainable Development
MHPSS	Mental Health and Psychosocial Support
MIDA	Micro Investment Development Agency
MSD	Mid-summer Drought
NAMA	Nationally Appropriate Mitigation Action
NAP	National Adaptation Plan
NCCPSAP	National Climate Change Policy, Strategy and Action Plan
NCSA	National Capacity Self-Assessment
NCTF	National Conservation Trust Funds
NCTFJ	National Conservation Trust Fund of Jamaica
NDA	National Designated Authority
NEP	National Energy Policy
NESDP	National Economic and Social Development Plan
NETS	National Energy Transition Strategy
NGOs	Non-Governmental Organisations
NIWRA	National Integrated Water Resources Authority
NROCC	National Road Operating and Construction Company

NSC	National Steering Committee
NSC	National Steering Committee
NVQ	National vocational qualification
NWC	National Water Commission
OECS	Organization of Eastern Caribbean States
PACT Belize	Protected Areas Conservation Trust Belize
PAJ	Port Authority of Jamaica
PAS	Pater Ahlbrinck Foundation
PIOJ	Planning Institute of Jamaica
PISCES	Powering Innovations in Civil Society and Enterprises for Sustainability in the Caribbean
PPCR	Pilot Programme for Climate Resilience
PPCR/RDVRRP	Pilot Program for Climate Resilience/ Disaster Vulnerability and Climate Risk Reduction
PSC	Project Steering Committee
PSC	Project Steering Committee
R	Rural
R-PP	Readiness Preparation Proposal
R2R	Ridge to Reef
REASAPs	Resilient Ecosystems Adaptation Strategy and Action Plan
REDD+	Reducing emissions from deforestation and forest degradation in developing countries
RIA	Rapid Integrated Assessment
RMF	Road Maintenance Fund
ROM	Ministry of Spatial Planning and Environment
RRACC	Region to Adapt to Climate Change
RWSL	Rural Water Supply Limited
SADO	St. Andrew's Dev. Org.
SAMOA	SIDS Accelerated Modalities of Action
SASAPs	Sectoral Adaptation Strategy and Action Plan
SATIIM	Sarstoon Temash Institute for Indigenous Management
SBB	Forest Management and Supervision Foundation
SCTLD	Stony Coral Tissue Loss Disease
SDGs	Sustainable Development Goals
SEA	Southern Environmental Association
SIDS	Small Island Developing State
SLISABA	St. Lucia Industrial and Small Business Association
SLM	sustainable land management
SLR	Sea-level rise
SLUNCF	Saint Lucia National Conservation Fund

SNC	Second National Communication
SPCR	Strategic Programme for Climate Resilience
SPECTO	St. Patrick's Environmental & Community Tourism Org.
SPYO	St. Patrick's Youth Organisation
SST	Sea Surface Temperature
STATIN	Statistical Institute of Jamaica
STOCPA	Stuurgroep Ontwikkeling Cassave Sector Para
SUSGren	Sustainable Grenadines Inc
SWOT	Strengths, Weaknesses, Opportunities and Threats
SWRO	Seawater Reverse Osmosis
TEF	Tourism Enhancement Fund
TNC	The Nature Conservancy
U	Urban
UDC	Urban Development Corporation
UNDG	United Nations Development Group
UNDP	UN Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Agency for Children
USAID	United States Agency for International Development
USD	United States Dollar
UWI	University of the West Indies
VIIRS	Visible Infrared Imaging Radiometer Suite
WASH	water, sanitation and hygiene
WHO	World Health Organisation
WKB	Waterkeepers Bahamas
WRA	Water Resources Authority
YASIP	Youth Agriculture Science Internship Programme
YEAC	Youth Emergency Action Committee

1. Introduction

1.1 Objective of Study

The purpose of this feasibility study is to provide the technical basis to support the GCF Funding Proposal document, ‘Climate Actions for Building Resilience in Coastal Communities in the Caribbean’, (CABRIC Caribbean) for submission to the Green Climate Fund (GCF). This is a programme proposed by CCCCC, and designed for the CARICOM countries of Bahamas, Belize, Grenada, Jamaica, and St Lucia. The purpose of the EDA programme is to address the deficit of finance for adaptation measures in the coastal zones of these countries, and support resilience of coastal livelihoods, through building capacity with grassroots local actors to develop, implement, adaptively manage and monitor coastal resilience projects that build a path forward to long term sustainability.

This work builds upon over 8 years of work in development. The original Concept Note was approved in 2016 and entitled, ‘Enhancing Coastal Resilience Against Climate Change’. At that point a different selection of countries was involved in the EDA; Antigua and Barbuda, Barbados, Belize, Grenada, Guyana, Jamaica, Saint Lucia, and St. Vincent and the Grenadines. Although the full Funding Proposal was submitted in 2019, with a different set of CARICOM countries, Barbados, Belize, Guyana, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines. This Full Funding Proposal suffered the GCF and CCCCC’s managers leaving simultaneously and unfortunately no feedback was received. Although the programme was revised again in 2022, bringing in Caribbean Natural Resources Institute (CANARI) as programme partner, focusing on coastal ecosystem based adaptation and capacity building of NGOs and CSOs, and focused on the four countries of Belize, Jamaica, Saint Lucia, and Saint Vincent and the Grenadines. This 2024 brings all the work of previous iterations together in the current climate and has re-engaged with CARICOM members to develop this EDA with the 5 countries of Bahamas, Belize, Grenada, Jamaica, and St Lucia.

It is important that the updated Funding Proposal reflects the current climate finance landscape and needs of the countries. Additional consultation was conducted at regional level with regional partners being present at regular development meetings (October 2025 - March 2025), country NDAs were extensively involved (November 2024 - March 2025), and national CSOs, NGOs and LAs were consulted (January and February 2025). This document reviews the present need and proposes the niche that CABRIC will occupy.



**CARIBBEAN COMMUNITY
CLIMATE CHANGE CENTRE**

Building Resilience. Securing Our Future.

1.2 Methodology

This document reviews and presents baseline and business as usual projections of the coastal areas of the countries of the Bahamas, Belize, Grenada, Jamaica, and St Lucia, whilst evaluating the solutions that the EDA and its enabling environment on the rationale, along with the programme design and the operational structures for implementation.

Section A: The climate problem and unmet needs

This first section of the study examines the coastal climate problems and the non-climate drivers that are contributing to vulnerability. As there are seven countries, a summary executive statement is made at the start of each chapter for ease of use. Part of this section's feasibility assessment is to ascertain the focus of the thematic areas through a review of what is the problem, what is present, what is planned and what do the beneficiaries need.

1. Baseline ecosystems, economy and livelihoods
2. Current and projected climate and climate hazards
3. Sectoral vulnerabilities and potential impacts
4. Adaptation actions options
5. Stakeholder landscape and capacity
6. Stakeholder needs
7. Past and ongoing projects and programmes
8. Policies
9. Conclusion and priority adaptation actions

Section B: The solution for paradigm shifting coastal climate resilience

The second section of the study draws from the conclusion of the first section to develop the CABRIC EDA programme; the programme of work, the operation of the EDA facility, implementation arrangements and contributions to GCF investment performance.

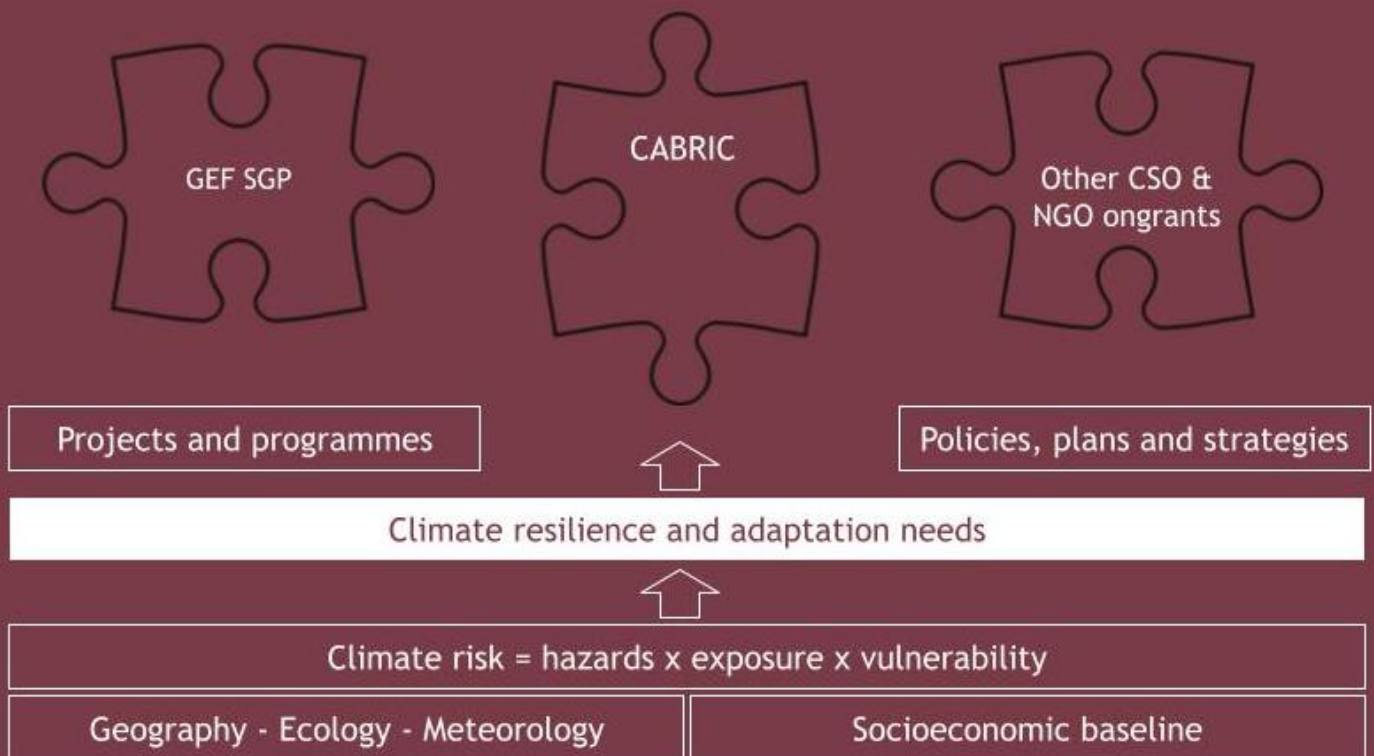
1. Gaps and barriers
2. EDA programme design
3. EDA programme operations
4. Implementation arrangements
5. GCF Investment Performance

Section C: References

The final section documents all the references used to develop the feasibility study.

Section A:

The climate problem and niche of the CABRIC EDA programme



2. Background and Context

2.1 Caribbean regional context for CABRIC

A broad diversity of countries to ensure an effective long term CARICOM climate resilience financing facility: The countries involved in the CABRIC EDA programme spread the length and breadth of the Caribbean region. Despite their diverse geographies and socio-economic situations, the CABRIC countries share a need for greater access to climate finance at the grassroots level, supported by capacity building, technical knowledge transfer and data. This diversity ensures the piloting of a financing facility across the region, that is fit for purpose within that diversity. This supports the long-term strategy of the programme for a Phase 2 of the programme that all CARICOM member states could join for a wider range of financing products, from grant to loan, and for a wider range of recipients, from Local Authorities to SMES, inclusive of the CSOs, NGOs and LAsthat this piloting EDA will focus on.



Figure 1: Map of the study areas and countries.

2.1.1 Geography

The Caribbean region is centred around the Caribbean Sea and the chain of islands marking the boundary to the Atlantic Ocean: The Caribbean spans approximately 2.75 million km² (landmass and maritime waters) and consists of over 7,000 islands, islets, reefs, and cays, grouped into the Greater Antilles, Lesser Antilles, and the Lucayan Archipelago (

Figure 1). The region is a vibrant geographical area that includes volcanic islands, coral reefs, and coastal plains, formed by a mix of island nations, mainland territories, and dependencies. *Table 1* summarises the geography, government and administrative structure in each of the countries.

Table 1: Geography, government and administrative structure and surface area¹.

Country	Geography	Surface area km ² :	Coastline km:	EEZ area km ² :	Government & Administrative Structure
Bahamas	Archipelago of 700 islands and 2,400 cays, located in the Lucayan Archipelago north of the Greater Antilles	10,010	3,542	628,026	A parliamentary democracy under a constitutional monarchy, with the British monarch as the head of state. The country divided into 32 districts
Belize	Situated on the northeastern coast of Central America, bordered by Mexico, Guatemala, and the Caribbean Sea.	22,806	386	36,182	A parliamentary democracy and constitutional monarchy. The country is divided into six districts.
Grenada	An island situated in the southeastern Caribbean, part of the Lesser Antilles.	344	121	26,133	A parliamentary democracy and constitutional monarchy. The country divided into six parishes.
Jamaica	Located south of Cuba and west of Hispaniola.	10,991	1,022	244,827	A parliamentary democracy and constitutional monarchy. The country is divided into 14 parishes.
St. Lucia	A volcanic island in the Lesser Antilles, located south of Martinique and north of St. Vincent and The Grenadines.	617	154	15,453	A parliamentary democracy and constitutional monarchy, with 11 quarters as administrative divisions

2.1.2 Population

The total population of the Caribbean is approximately 44.8 to 45 million people, which represents around 0.54% of the global population: The Caribbean includes 13 independent countries and several territories spread across the Caribbean Sea, with the largest populations in Haiti (12 million), the Dominican Republic (11.5 million), and Cuba (11.2 million), followed by less populated islands such as Jamaica and Bahamas (see Table 2). The average annual population growth for Latin America and the Caribbean² is 0.7%, while the countries with the highest annual growth are Venezuela 1.9%, Honduras 1.5% and Nicaragua and Belize 1.4%. Bahamas, Grenada have lower population growth whereas the population of Jamaica (-0.1%) are declining (Table 2).

The Caribbean has a rich cultural heritage due to its diverse ethnic groups composed by the Afro-Caribbean, Indo-Caribbean, white-Caribbean, Asian-Caribbean, indigenous-Caribbean such as Taino and Kalinago communities; and mixed heritage groups (a blend of the above-mentioned ethnic groups). According to the Food and Agriculture Organization and World Bank population estimates, the average population density for Latin America and the Caribbean was 33 people per km² of land area, far lower

than the world average of 61 people/km² (data from 2021). Within the Caribbean region, Barbados (656 people/km²), Haiti (427 people/km²) and Puerto Rico, Grenada and El Salvador (in the range of 305 to 365 people/km²) are the most populated countries. Grenada, Jamaica and St. Lucia have reported high population density values in the Caribbean, whereas Bahamas, and Belize have the lowest population density per km² land area (see Table 2). In the 2023, people living in urban areas reached 81% of the total population Latin America and the Caribbean³ while the average for the world is 57%. Within the Caribbean region, Puerto Rico (94%), Cayman Island (100%), Virgin Islands US (96%), Dominican Republic (85%) and Bahamas (84%) has most of its population living in urban areas. In the lower range are St. Lucia and Grenada (Table 2).

Table 2: Population parameters (2022)^{4 and 5} of the seven CARICOM countries participating in the EDA programme

Indicator	Bahamas	Belize	Grenada	Jamaica	St. Lucia
Total population	393,248	410,825	126,183	2,825,544	180,251
Population growth (annual %)	0.60	1.4	0.6	-0.1	0.2
Population density (people per sq. km of land area)	41	18	366	261	295
Urban population growth (annual %)	0.80	1.8	1.1	0.58	0.86
Urban population (% of total population - 2023)	84	47	37	57	19

2.1.3 Socioeconomic Context

The seven Caribbean nations present distinct socioeconomic characteristics that highlight both shared and country-specific vulnerabilities. These differences necessitate tailored strategies for effective climate resilience interventions across the region.

Table 3 Socioeconomic indicators by country⁶

	Bahamas	Belize	Grenada	Jamaica	St. Lucia
GDP/Capita 2023 (US\$)	\$34,750	\$5,078	\$11,574	\$9,060	\$8,250
Debt per capita 2023 (%)	90%	74.7%	65%	82.1%	74.1%
Total expenditure on health as % GDP (2020)	6.5	5.4	7.2	6	6.5
Energy access rate %	100%	98.5%	98.9%	99%	99%
Female	9.9	13.4	24.2	6.2	20.8
Male	9.2	11.8	14.7	4.5	15.2
Total	9.5	12.5	19.2	5.4	16.5
Female	77.4	76.5	75.9	77.2	79.3

Male	72.3	72.0	71.6	71.1	74.6
Total	74.8	74.3	73.8	74.2	77.0

a) Economic Indicators

The economies of these countries exhibit significant disparities in development, as reflected by their GDP per capita: The Bahamas, with a GDP per capita of \$34,750, stands out as the wealthiest among the seven, primarily driven by its robust tourism and financial services sectors. However, debt for the Bahamas is at 90%, the second highest of these countries. In contrast, Belize (\$5,078) have much lower GDP per capita, indicating smaller, less diversified economies more vulnerable to economic and environmental shocks.

High levels of public debt further constrain economic resilience in several of these nations. The the Bahamas (90%) and Jamaica (82.1%), also grapple with heavy debt burdens, which hinder their ability to invest in long-term climate adaptation initiatives. Saint Lucia and Grenada exhibit more moderate debt levels (62% and 69.5%, respectively), yet still face fiscal challenges. On the lower end, Belize has a debt-to-GDP ratio of 58.5%, but its lower economic base limits its resilience.

b) Employment and Social Dynamics

Agriculture, tourism, and fishery sectors are crucial to the livelihood of the majority of the population in these countries. Consequently, these sectors account for a significant portion of GDP, with agriculture, tourism and fishery particularly dominant in all nations.

Table 4 - Employment and GDP Contributions by Sector

Country	Agriculture Employment	Agriculture GDP	Tourism Employment	Tourism GDP	Fishery Employment	Fishery GDP
Bahamas	3.04% ⁷	Less than 2% ⁸	47.3% ⁹ 54% ¹⁰	Over 60% ¹¹	15% ¹²	0.33% ¹³
Belize	25% ¹⁴	16% ¹⁵	40% ¹⁶	40% ¹⁷ 11.8% ¹⁸	2.13% ¹⁹ (fishery employment / total employment) %	1.1% ²¹
Grenada	20% ²²	8% ²³	21.1% ²⁴	21.5% ²⁵	9.11% ²⁶ (fishery employment / total employment) %	1.76% ²⁸ 1.5% ²⁹
Jamaica	17% ³⁰	10% ³¹	25% ³²	30% ³³	2.07% ³⁴ (fishery employment / total employment) %	0.71% ³⁶ 0.29% ³⁷
Saint Lucia	10% ³⁸	6% ³⁹	40% ⁴⁰	60% ⁴¹	4.01% ⁴² (fishery employment / total employment) %	0.42% ⁴⁴

Unemployment rates vary significantly across these countries, reflecting differences in economic activity and structural labour market challenges: Grenada, with an unemployment rate of 19.2%, struggles with job creation, and its female unemployment rate is alarmingly higher at 24.2%, signalling pronounced gender disparities in economic participation. Conversely, Jamaica has a relatively low unemployment rate of 5.4%, which may reflect more dynamic labour market conditions. The Bahamas

(8.9%) and Saint Lucia (8.6%) fall between these extremes, though these figures may mask underlying issues such as underemployment or informal economic activity, common in small island economies.

Life expectancy provides insight into social well-being and access to healthcare. Across the seven nations, life expectancy for Saint Lucia, for example is 77.0 years: While relatively consistent, these figures reflect moderate differences in health outcomes and living conditions. Notably, the gender gap in life expectancy remains narrow, with women typically living 4-6 years longer than men, indicating systemic patterns in health and lifestyle risks.

c) Health and Infrastructure

Healthcare expenditure, as a percentage of GDP, such as 5.4% in Belize: These modest levels of spending suggest challenges in maintaining and expanding health system resilience to climate-related impacts. Countries with lower expenditure, like Belize, may face greater difficulties in addressing climate-induced health risks, such as increased vector-borne diseases or disaster-related injuries.

Energy access is a bright spot in the region, with most countries achieving near-universal coverage: Saint Lucia and Jamaica report 99% access, indicating strong energy infrastructure.

Overall, the socioeconomic context of the CABRIC countries reveals both shared challenges and distinct vulnerabilities. High debt levels, varied employment conditions, and gaps in health and energy infrastructure underline the need for adaptive, country-specific solutions to climate resilience. Tailoring strategies to these nuances will ensure the programme effectively addresses the unique socioeconomic realities of each nation.

2.2 Bahamas

The Bahamas is located in the northwestern Caribbean region, spanning between latitude 20°N to 27°N and longitudes 72°W to 79°W; extending into the Atlantic Ocean, and positioned southeast of the Florida coast, U.S.; and northeast of Cuba. The Bahamas is an archipelagic consisting of approximately 700 islands and over 2,400 cays, many of which are uninhabited. The terrain in the Bahamas is generally flat, with the highest point being Mount Alvernia on Cat Island rises 63 meters above sea level. The coastline is extensive and stretches for approximately 3,542 kilometres with coral reefs, sandy beaches, and mangroves. The majority of the population resides near the coasts, in particular two-thirds live in Nassau on New Providence Island and Freeport on Grand Bahama.⁴⁵ Regarding the urban population, as of 2023, 83.6% resides in urban areas. The Bahamas has a surface land area of 13,878 km² whereas it has a significantly extensive Exclusive Economic Zone (EEZ) of approximately 654,715 km², Figure 2, which is characterized by vibrant marine offshore and coastal ecosystems.

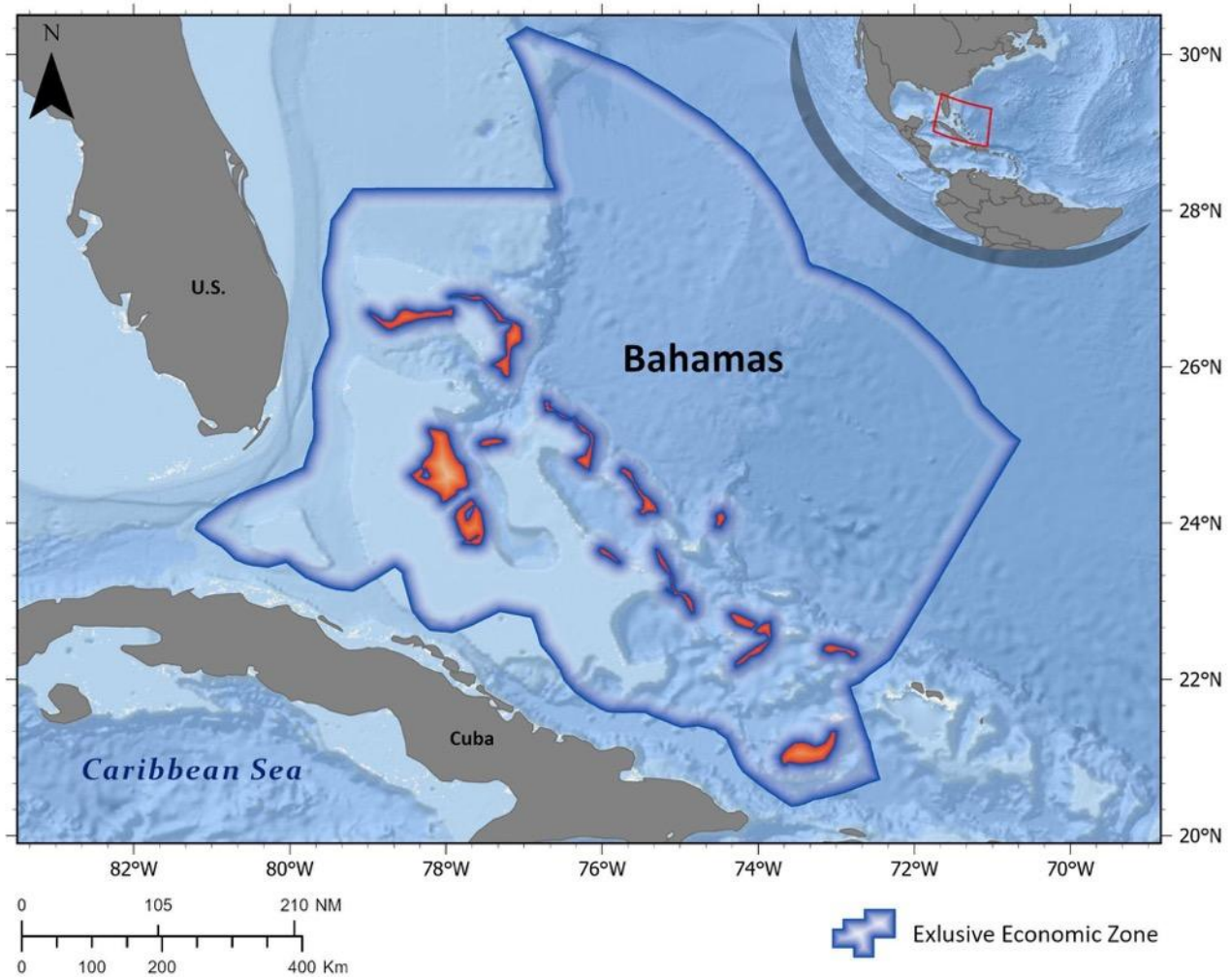


Figure 2: Exclusive Economic Zone of Bahamas.

2.2.1 Ecosystems and Services

The main ecosystems present in the Bahamas' coastal zones are; coral reefs, seagrass beds, mangrove forests, coastal dunes and coastal forests. They are all interdependent on one another and each play a vital role in the coastal zones' health and hydrodynamic balance. See Figure 3 for land cover.

Coral reefs: These vibrant underwater cities are home to a vast array of marine life, providing habitat, food, and protection for countless species. They also play a vital role in protecting coastlines from erosion and storm surges. The Bahamas boasts extensive coral reefs, covering approximately **1,832 square kilometres** of the Great Bahama Bank and **324 square kilometres** of the Little Bahama Bank⁴⁶.

Sea grass beds: These underwater meadows provide a vital habitat for a wide range of marine organisms, including juvenile fish, sea turtles, and invertebrates. They also play a crucial role in stabilizing sediments, improving water quality, and storing carbon. Seagrass beds are found throughout the Bahamas, occupying a significant portion of the shallow coastal waters.

Mangrove forests: These unique coastal forests provide a vital nursery habitat for many marine species, including fish, shrimp, and crabs. They also play a crucial role in protecting coastlines from erosion and storm surges, as well as filtering pollutants from the water. The Bahamas has approximately **4,286 square**

kilometres⁴⁷ of mangrove forests, primarily concentrated along the southern and eastern coasts of the islands.

Coastal dunes: These sandy formations act as natural barriers, protecting the coastline from erosion and storm surges. They also provide habitat for a variety of plants and animals adapted to the harsh coastal environment. Coastal dunes are found throughout the Bahamas, particularly on the barrier islands and along the exposed shorelines.

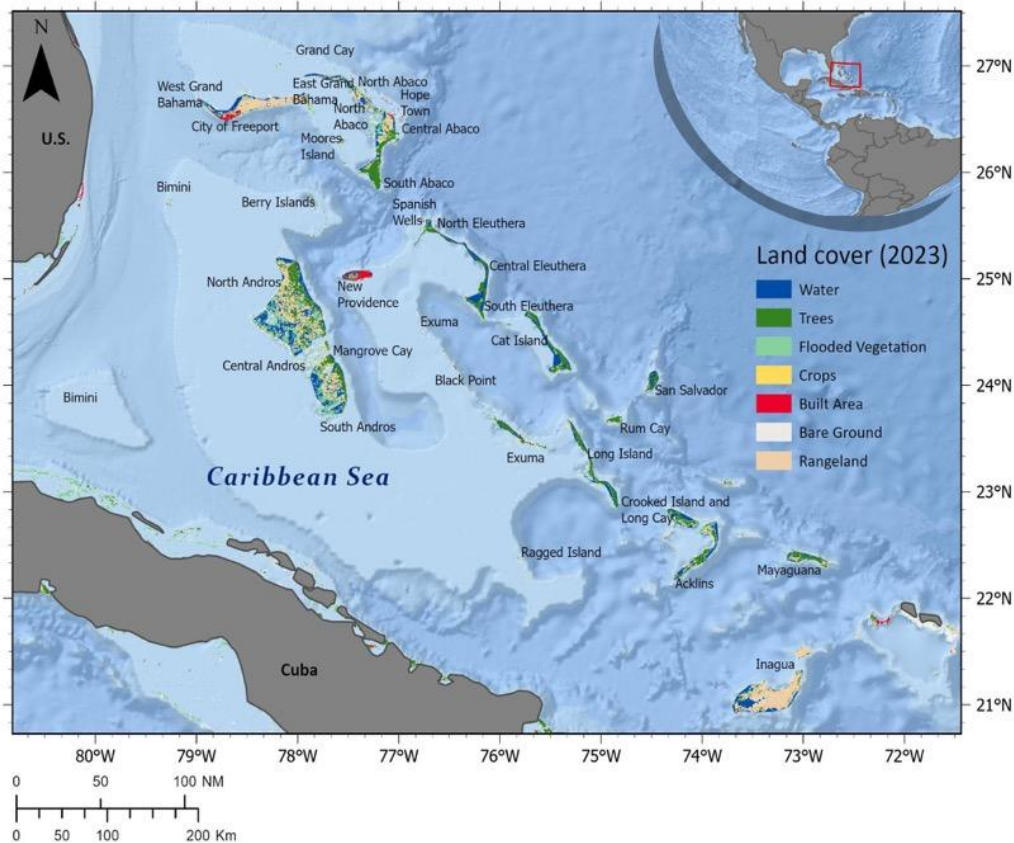


Figure 3: Bahamas land use

2.2.2 Economy

The economy of The Bahamas is predominantly service-oriented, with the services sector contributing approximately 85% of the GDP in 2022 (World Bank, 2022) but relies on a high level of imports: Tourism and financial services are the primary drivers of economic activity, supported by the country's proximity to the United States and a favourable tax environment. The financial services sector remains a vital pillar of the Bahamian economy, with offshore banking and insurance as key components. However, global scrutiny over tax transparency and compliance with anti-money laundering (AML) standards has led to regulatory reforms that slightly reduced competitiveness. Despite this, the sector still attracts significant foreign investment.⁴⁸ Tourism alone accounted for 60% of GDP and directly or indirectly employed more than half of the labour force before the COVID-19 pandemic (IMF, 2023). The Bahamas is classified as a high-income country, but it faces structural challenges, including a high reliance on imports, limited natural resources for domestic production, and vulnerability to external economic shocks. Inflation surged to 7.9% in 2022, driven by the global rise in energy and food prices, increasing the cost of living.⁴⁹ The unemployment rate hovered around 10% in 2022, though this figure varied significantly across islands, with New Providence and Grand Bahama showing lower rates due to greater economic activity (World Bank, 2022).

Natural disasters like hurricanes also pose significant economic threats and have contributed to huge national debt: Hurricane Dorian in 2019 caused damages equivalent to 25% of the GDP, leaving a lasting economic impact on the islands of Abaco and Grand Bahama. Recovery efforts have been slow due to limited fiscal capacity, though donor assistance has helped alleviate immediate challenges. Addressing climate risks has become a critical policy priority, and investments in renewable energy and disaster-resilient infrastructure are underway to enhance economic sustainability (World Bank, 2022). The Bahamas' general government gross debt a pressing concern, standing currently at 78.7% in 2024. The government has pursued fiscal consolidation measures, including tax reforms and expenditure rationalization, to bring debt levels under control (IMF, 2023). Diversifying the economy through renewable energy, the blue economy, and technology-driven industries is viewed as crucial for achieving long-term growth.

Table 5 Economic Summary table of the Bahamas

Bahamas	2016	2017	2018	2019	2020	2021	2022	2023	2024
Real GDP growth (%)	-1	2.8	2.6	-1.4	-21.4	15.4	10.8	2.6	1.9 ⁵⁰
Average inflation (%)	-0.3	1.5	2.3	2.5	0.04	2.9	5.6	3.1	1.1 ⁵¹
Unemployment (%)	12.7	9.8	10	10	12.8	11.7	9.9	9.2 ⁵²	N.D.A*
Current account balance (% of GDP)	-12.5	-13.5	-9.5	-2.2	-22.9	-21.4	-9.1	-7.7	-7.9 ⁵³
General government gross debt (% of GDP)	51.8	55.4	62.5	61.4	74.6	99.7	88.6	81.5	78.7 ⁵⁴

*N.D.A- no data available

2.2.3 Livelihoods

a) Agriculture Sector

Agriculture plays a relatively small role in the Bahamian economy, contributing less than 2% of GDP, however, it remains vital for food security and rural livelihoods: The sector is primarily focused on small-scale farming, with major crops including citrus fruits (oranges, grapefruits), bananas, pineapples, and vegetables such as peppers and tomatoes (FAO, 2022). Livestock farming is concentrated on poultry, pigs, and goats, with most meat and dairy products being imported (FAO, 2022). In 2022, total agricultural production was valued at approximately \$64 million, with citrus and vegetables accounting for the largest shares. However, agriculture employs only about 3% of the labour force, with women representing a higher proportion in small-scale farming, particularly in horticulture (FAO, 2022). Access to modern farming equipment and credit remains a challenge, particularly for female farmers who face additional barriers to financing and land ownership (World Bank, 2022).

The value chain for agriculture in The Bahamas is underdeveloped: Most agricultural products are consumed domestically, while exports are minimal. Citrus and marine products such as spiny lobster represent the few exceptions. For instance, lobster exports were valued at \$87 million in 2022, making it the country's second-largest export after tourism-related services (FAO, 2022). Limited processing facilities and cold storage infrastructure constrain the sector's growth potential. Additionally, most food consumed in The Bahamas—nearly 90%—is imported, highlighting the country's reliance on global supply chains (World Bank, 2022).

Climate change poses significant risks to agricultural production, with rising sea levels, saltwater intrusion, and increased hurricane activity threatening both crop yields and livestock: Hurricane Dorian caused widespread destruction of farmland and disrupted food production in 2019, exacerbating the country's dependency on imports (FAO, 2022). To mitigate these risks, the government has implemented programs aimed at climate-resilient agriculture, including the promotion of hydroponics and aquaponics systems (World Bank, 2022).

b) Tourism Sector

Tourism is the backbone of The Bahamas' economy, accounting for over 60% of GDP and employing 54% of the labour force (World Bank, 2022): In 2022, the country welcomed 7.5 million visitors, marking a full recovery from the COVID-19 pandemic. This includes 1.5 million overnight visitors and 6 million cruise ship passengers, underscoring the importance of both luxury tourism and mass tourism (IMF, 2023). The Bahamas offers a diverse range of tourism experiences, including luxury resorts, eco-tourism, cultural heritage sites, and marine tourism. Nassau and Paradise Island are renowned for their upscale accommodations and casinos, while islands like Exuma and Eleuthera attract eco-conscious travelers seeking natural beauty and sustainable tourism experiences (World Bank, 2022). The Bahamas also hosts major annual events, such as Junkanoo, which draw significant international attention and contribute to cultural tourism (IMF, 2023). The economic value of tourism is substantial, generating approximately \$3.7 billion in 2022, including revenue from accommodation, dining, transportation, and related activities (World Bank, 2022). However, the sector is highly sensitive to external shocks, as evidenced by the COVID-19 pandemic, which caused a 75% drop in tourist arrivals in 2020. The government has since prioritized resilience strategies, including diversification of source markets and investments in infrastructure such as airports and marinas (IMF, 2023).

Climate change poses a long-term threat to The Bahamas' tourism sector: Rising sea levels, coral bleaching, and the increased frequency of hurricanes threaten coastal infrastructure and natural attractions. For example, Hurricane Dorian caused widespread damage to resorts and marine ecosystems, leading to millions of dollars in losses (World Bank, 2022). To address these challenges, the government has collaborated with international organizations to promote sustainable tourism practices and develop climate-resilient infrastructure (IMF, 2023).

c) Fisheries Sector

The fisheries sector in the Bahamas contributes to a small amount of GDP but is important for food security, livelihoods and foreign income: Although the fisheries sector contributes only 0.33% (2020)⁵⁵ to Bahamas GDP, the sector is important in the local economy in terms of food supply, employment and foreign currency. The sector employs around 10,000 (2019) commercial fishers and about 892 boats were registered⁵⁶.

The sector catches mainly Caribbean spiny lobster and queen conch, but also other resources such as snappers, Nassau grouper and mackerel species⁵⁷. Conch and fin-fishes are mostly consumed locally in restaurants, hotels and homes. Spiny lobster is the most important export product in the sector, representing 90% (Figure 4, data for 2022). For instance, in 2017, exports of fish and fishery products accounted for USD 87.7 million⁵⁸. The annual marine capture of fish production in 2020 was 1310 tonnes with an average of 1105 (period 2011 to 2020)⁵⁹.

Aquaculture in the Bahamas is still at early stages of development: in 2005 was the highest production (85 tons) of white leg shrimp, cobia and Florida pompano. Spiny Lobster (8 ton) and Tilapia (1 tons) were produced in 2014-2017 in the aquaculture sector⁶⁰.

The fisheries sector is very important in the Caribbean region as support socio-economic viability of coastal communities by supplying employment and livelihood, and food security: In particular in the Bahamas, exports high-value seafood species such as lobster. Extreme weather events such as hurricane are due to increment in intensity with global warming and increasing sea surface temperature^{61 62}. The extreme events damage critical marine habitat such as mangroves^{63 64}, seagrass beds⁶⁵; and coral reefs^{66 67}. The latter have the most impact on shallow reefs due to wave action. A significant decline in fish biomass in reef was reported in the Bahamas after extreme events⁶⁸.

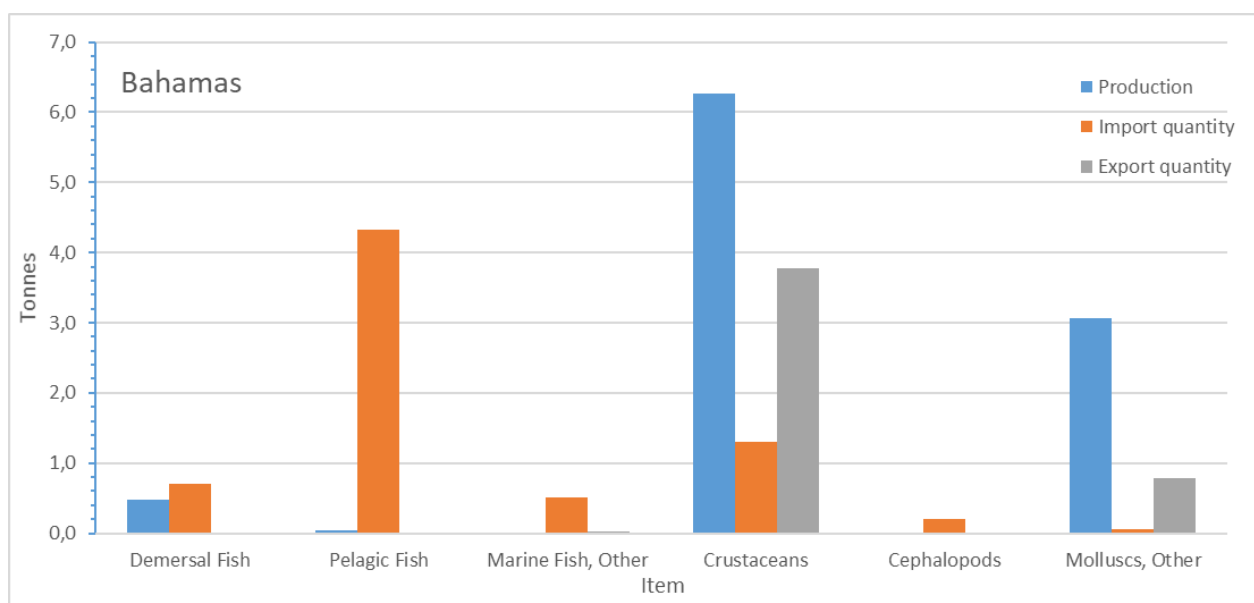


Figure 4 : Fisheries production export and imports of Bahamas reported for 2022 (FAO 2024).

2.3 Belize

Located in Central America, Belize lies between 15° 52'N and 18° 20'N and 87° 28'W and 89° 13'W and is bordered by Mexico in the north and west, Guatemala in the west and south, and the Caribbean Sea in the East⁶⁹: Belize has a total land coverage of approximately 22,963 km² including approximately 1,000 small islands known as cays (see

Figure 5). As a Small Island Developing State (SIDS) in the Caribbean hurricane belt, Belize is highly vulnerable to the impacts of climate change. While the most extreme and visible effect is an increased frequency and intensity of tropical storms and hurricanes, climate change also manifests itself through documented trends of increased droughts, flooding, and significant rainfall pattern variations.

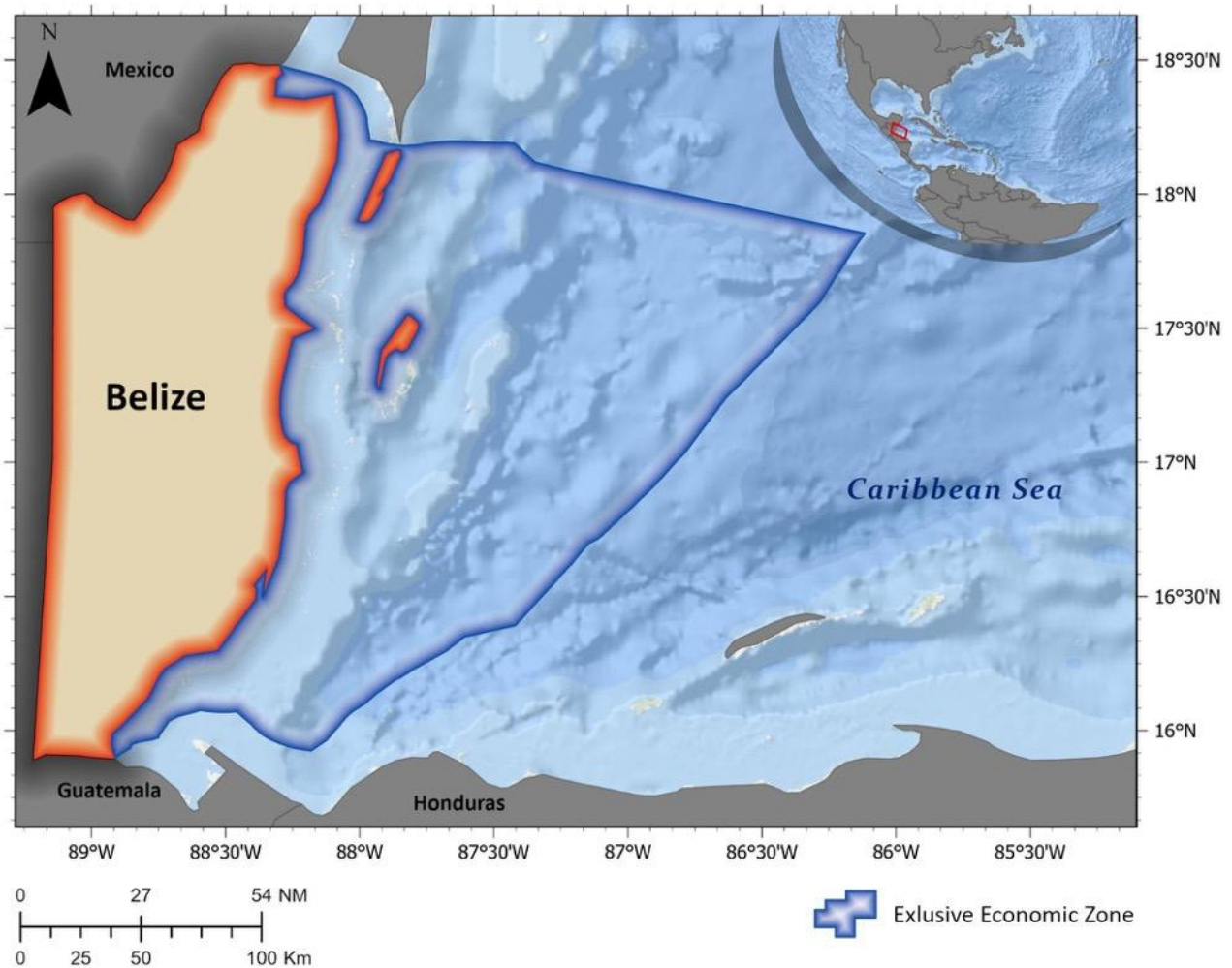


Figure 5 : Exclusive Economic Zone of Belize.

2.3.1 Ecosystems and Services

The main ecosystems present in Belize's coastal zones are; coral reefs, seagrass beds, mangrove forests, coastal lagoons and coastal forests. See

Figure 1 for Belize land use.

Coral reefs: The barrier reef system located off the coast of Belize, known as the Belize Barrier Reef Reserve System (BBRRS), **over 280km long**, is the largest in the Northern hemisphere and is inscribed as a United Nations Educational Scientific and Cultural Organisation (UNESCO) World Heritage Site. The

BBRRS has one of the highest levels of biodiversity in the Atlantic and is unique both in terms of size and the array of reef types within one relatively self-contained area.

Mangrove forests: These unique coastal forests provide a vital nursery habitat for many marine species, including fish, shrimp, and crabs. They also play a crucial role in protecting coastlines from erosion and storm surges, as well as filtering pollutants from the water. Belize has extensive mangrove forests, covering approximately 1,500 square kilometres.

Seagrass beds: These underwater meadows provide a vital habitat for a wide range of marine organisms, including juvenile fish, sea turtles, and invertebrates. They also play a crucial role in stabilizing sediments, improving water quality, and storing carbon. Seagrass beds are found throughout the Belizean coastal waters, occupying a significant portion of the shallow areas.

Coastal lagoons: These sheltered bodies of water provide important habitat for a variety of marine life, including fish, birds, and invertebrates. They also play a role in regulating water flow and nutrient exchange between the ocean and the land. Belize has several large coastal lagoons, including Chetumal Bay and the Turneffe Atoll lagoon.

Coastal forests: These diverse forests, including pine forests and coppice forests, provide habitat for a variety of terrestrial species and play a role in regulating the local climate. They also contribute to the aesthetic beauty of the Belizean landscape. Coastal forests are found on the mainland and on some of the cays, particularly in the north.

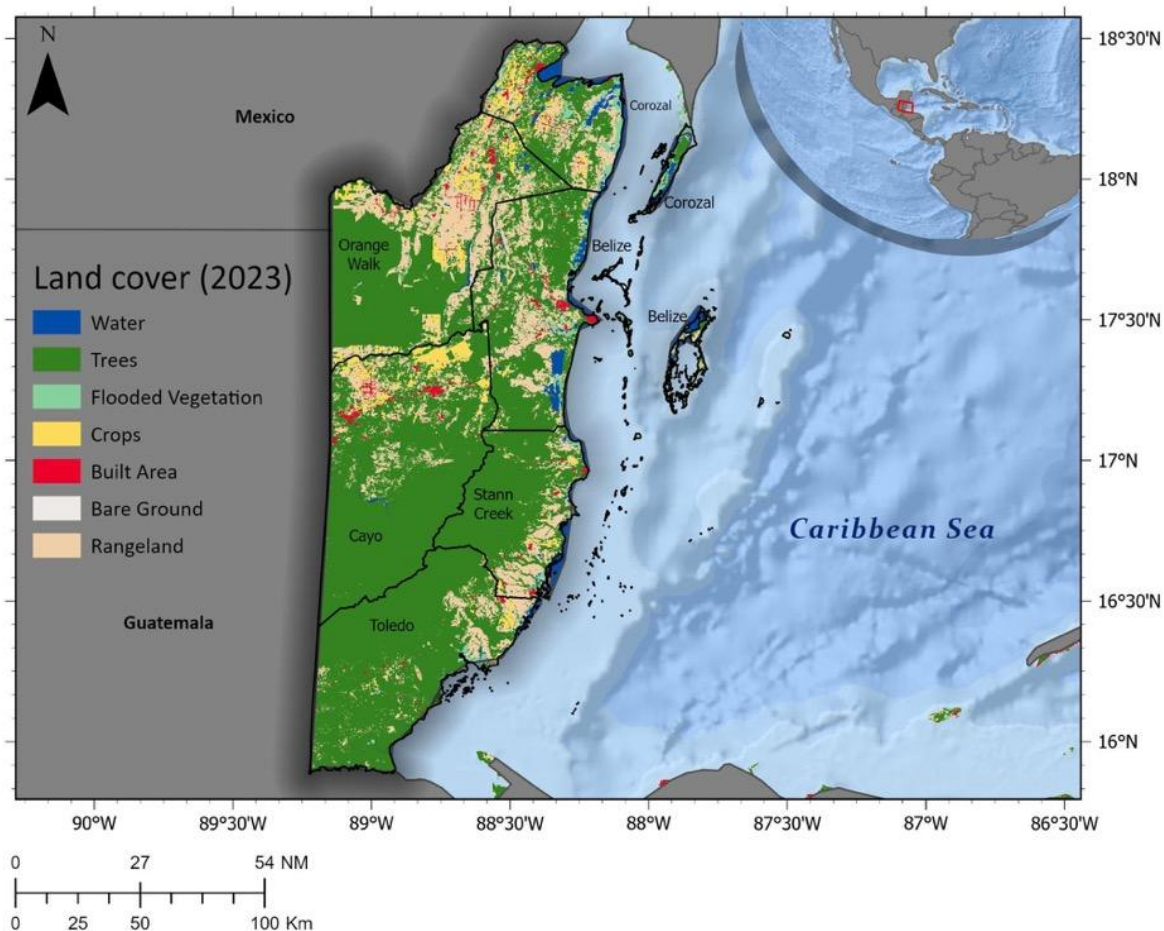


Figure 6: Main Townships and Parishes, and land use of Belize ⁷⁰

The barrier reef system located off the coast of Belize, known as the Belize Barrier Reef Reserve System (BBRRS) is the largest in the Northern hemisphere and is inscribed as a United Nations Educational Scientific and Cultural Organisation (UNESCO) World Heritage Site. The BBRRS has one of the highest levels of biodiversity in the Atlantic and is unique both in terms in size and the array of reef types within one relatively self-contained area⁷¹.

2.3.2 Economy⁷²

Belize is classified as a lower-middle-income country with a small, open economy that is highly dependent on exports, tourism, and remittances. In 2022, the country's GDP was valued at approximately \$2.2 billion, with the services sector accounting for nearly 60% of economic output, followed by agriculture and industry at 16% and 14%, respectively (World Bank, 2022). Key industries include agriculture, tourism, aquaculture, and oil production, with exports of sugar, bananas, citrus, seafood, and petroleum serving as major contributors to national income.

Belize's economy is characterized by its reliance on natural resources and vulnerability to external shocks, including global market fluctuations, natural disasters, and climate change impacts. The country experienced a significant contraction of -14.1% in 2020 due to the COVID-19 pandemic but saw a strong rebound in 2021-2022 with a growth rate of 12.5% in 2022, driven by a resurgence in tourism and agriculture (IMF, 2023).

Public debt remains a significant concern. In 2022, Belize's debt-to-GDP ratio stood at 75%, though this is a marked improvement from its 2020 level of 133% following debt restructuring agreements and an innovative "debt-for-nature" swap. The latter reduced Belize's debt burden by \$364 million while committing the country to marine conservation efforts, a unique example of linking fiscal sustainability with environmental resilience (World Bank, 2022).

Employment in Belize remains heavily tied to its productive sectors, with agriculture, forestry, and fisheries employing about 25% of the workforce, while tourism accounts for another 40% directly or indirectly (SIB, 2022). However, job opportunities are unequally distributed, with higher unemployment rates in rural areas and among women. Inflation in 2022 averaged 6.3%, driven primarily by rising food and fuel prices, exacerbating the cost of living for vulnerable populations (IMF, 2023).

Despite its challenges, Belize has significant economic potential in emerging sectors like renewable energy, blue economy initiatives, and ecotourism. Renewable energy development, particularly solar and wind, is gaining traction, with efforts underway to reduce the country's dependence on imported fossil fuels. The blue economy strategy, which focuses on sustainable marine resource use, aims to create new revenue streams and protect biodiversity (FAO, 2023).

According to the Belize Country Economic review, 2020, the COVID pandemic devastated the Belize economy, with a significant contraction in real GDP estimated at 14.1%, Stringent travel restrictions and health protocols, designed to reduce the impact of the virus, reduced tourism activity. Overnight arrivals and cruise ship arrivals fell by 71.2% and 70.7% respectively. Other industries were impacted. Manufacturing fell, as tourist consumption of alcohol and beverages collapsed. Only agriculture showed some marginal improvement (0.5%), as the sector was suffering the effects of a severe 2019 drought. Food imports declined. Reduction of transport, restaurants and accommodation services, meant that unemployment was high, and had declined 13.7% of the labour force, according to a redefined Labour Force Survey. Of the 38,909 persons without work in the period March to August 2020, one third worked in the tourism sector and about 65% were males. Even those persons employed suffered reduced wages.

Many persons who lost their jobs and were not looking for work, were not classified as unemployed in the Labour Force Survey. Note: According to the redefined Labour Force Survey, some subsistence farmers, unpaid trainees, interns, volunteer work and persons not looking for work are classified as unemployed. Using the old methodology, unemployment would have been about 29.6%, up from 10.4% in September 2019. To alleviate the fallout, public policy measures such as an expanded Food Pantry Programme and several cash transfers programmes assisted thousands of workers, self-employed persons and poor and vulnerable households. The collapse in economic activity, reduced revenue by 20% in 2020, compared to the previous calendar year 2019. Facing expenditure pressures to support the health sector and deal with the pandemic and to support households, government obtained support from funding partners and through borrowing from the Central bank of Belize. Capital expenditure increased the overall deficit to BZ\$356 million, three times the 2019 deficit.

As it stands the current general government gross debt is 62.3% of its GDP, reaching its peak in 2020 with 103% as seen in Table 6: Economic indicators in Belize.

Table 6: Economic indicators in Belize 2016 - 2024

Belize	2016	2017	2018	2019	2020 ^e	2021	2022	2023	2024
Real GDP growth (%)	0	1.8	2.9	1.8	-14.1	17.9	9.8	1.1	5.4 ⁷³
Average inflation (%)	0.7	1.2	0.3	0.2	0.1	3.2	6.3	4.4	3.3 ⁷⁴
Unemployment (%)	9.5	9.3	9.4	9	13.7	10.1	8.7	8.3	3.4 ⁷⁵
Current account balance (% of GDP)	-7.3	-7	-6.6	-7.7	-6.3	-6.5	-8.3	-0.6	-3 ⁷⁶
General government gross debt (% of GDP)	70.4	78.1	78.8	78.5	103	82.3	67.1	66.8	62.3 ⁷⁷

2.3.3 Livelihoods

a) Agriculture Sector⁷⁸

Agriculture is a cornerstone of Belize's economy, contributing approximately 16% of GDP in 2022 and employing about 25% of the workforce, with men representing 70% of agricultural workers and women comprising 30%, primarily in horticulture and Agri-processing (FAO, 2023). The sector is diverse, encompassing crops, livestock, and aquaculture. Major crops include sugarcane, bananas, citrus fruits, corn, rice, and beans. Sugarcane remains the dominant crop, accounting for over 50% of total agricultural exports. In 2022, sugar exports were valued at \$140 million, primarily to the European Union (EU) under preferential trade agreements (SIB, 2022). The banana industry is another vital contributor, generating \$74 million in export earnings in 2022 and employing approximately 4,000 workers, many of whom are seasonal migrants from neighbouring countries (FAO, 2023). Citrus production, particularly oranges and grapefruits, has declined in recent years due to the spread of citrus greening disease, although citrus juice exports remain significant. Rice and beans are primarily grown for domestic consumption, ensuring food security in rural communities.

Livestock farming includes cattle, pigs, and poultry, with beef exports showing steady growth. In 2022, Belize exported 18,000 heads of cattle to Mexico, generating \$25 million in revenue. Poultry farming dominates domestic meat production, with over 90% of chicken and eggs consumed locally. However, limited processing facilities and inconsistent cold storage infrastructure constrain the growth potential of the livestock value chain (FAO, 2023).

Agriculture in Belize is heavily impacted by climate change: Rising temperatures, unpredictable rainfall patterns, and more frequent extreme weather events, such as hurricanes and floods, threaten crop yields and livestock health. Hurricane Lisa in 2022 caused an estimated \$20 million in damages to farmland and

infrastructure (FAO, 2023). The government, with support from international organizations, has initiated programs to promote climate-resilient agriculture, including agroforestry, irrigation systems, and drought-resistant crop varieties.

b) Tourism Sector⁷⁹

Tourism is the largest contributor to Belize's economy, accounting for nearly 40% of GDP and directly or indirectly employing over 40% of the labour force (SIB, 2022): The country's unique blend of natural and cultural attractions, including the Belize Barrier Reef, Mayan ruins, and lush rainforests, attracts millions of visitors annually. In 2022, Belize welcomed 1.2 million tourists, a significant recovery from the pandemic-induced lows of 2020-2021 (BTB, 2022).

The types of tourism in Belize are diverse: Eco-tourism and adventure tourism are particularly popular, with activities such as snorkelling, scuba diving, and cave exploration drawing international visitors. The Belize Barrier Reef, a UNESCO World Heritage Site, is the country's most famous attraction, generating over \$150 million in annual tourism revenue (BTB, 2022). Cultural tourism, focused on the ancient Mayan sites of Caracol, Lamanai, and Xunantunich, also plays a vital role, attracting history enthusiasts. Cruise tourism represents a significant share of arrivals. In 2022, Belize hosted over 700,000 cruise passengers, though their economic contribution is smaller compared to overnight tourists, who spend more on accommodations, dining, and activities. Overnight tourism accounted for \$500 million in revenue in 2022, underscoring its importance to the economy (BTB, 2022).

Belize's tourism industry is not without challenges. Climate change poses a direct threat to its natural attractions, particularly coral reefs, which are vulnerable to rising sea temperatures and ocean acidification: The government has partnered with conservation organizations to implement marine protected areas and sustainable tourism practices, such as banning single-use plastics and promoting eco-friendly accommodations (World Bank, 2022). Furthermore, the sector's heavy reliance on North American visitors (approximately 70% of arrivals) makes it vulnerable to economic downturns in key markets. Efforts are underway to diversify source markets and develop tourism infrastructure, particularly in underdeveloped areas like southern Belize.

c) Fisheries Sector

The fishing industry, including aquaculture, is a significant part of Belize's economy and in 2015, the sector contributed 1.1% to the GDP⁸⁰: The Belize fishing sector is divided into commercial artisanal fishery and high seas fishery. Commercial artisanal fishery operates relatively shallow waters of the reef platform and employs in 2017 approximately 2716 fisher folks and 872 registered small fishing vessels⁸¹. High seas fishery count with 60 vessels targeting and capturing tuna in total catches ranging in 16900 to 24 000 tons in 2012 to 2016⁸².

Capture fisheries production in coastal waters mainly concentrates on two valuable resources: Spiny lobster (*Panulirus argus*) and Queen conch (*Strombus gigas*), but also snappers and groupers⁸³. The targeted finfish species for export include groupers and Mycteroperca; snappers of the genera *Lutjanus* and hogfish (*Lachnolaimus maximus*); king mackerel (*Scomberomorus cavalla*); great barracuda (*Syngnathus barracuda*); and jacks fish. Exports of fish and fishery products were USD 21.6 million in 2016 while imports were valued at USD 0.9 million⁸⁴. In 2022, the production of pelagic fish reached 200 ton of pelagic fish⁸⁵. The annual marine capture of fish production in 2020 was 5656 tonnes with an average of 5177 tonnes (period 2011 to 2020)⁸⁶.

The aquaculture sector in Belize contributes significantly to foreign exchange earnings, income generation, and employment, nutrition, and food security: Shrimp was the main cultured product in

the country but due to disease, the production decreased dramatically in 2016. There are small-scale tilapia farming that produces 1000 ton of tilapia⁸⁷.

Climate change impacts are increasingly affecting coral reef health in the Belize: The Caribbean Sea has warmed by approximately 1.5 °C over the last century⁸⁸. Extreme high sea surface temperatures (SSTs) have been reported across the entire Caribbean, consequently, several mass bleaching events have occurred (1993, 1998, 2005 and 2010) on the Mesoamerican barrier reef system of Belize, Honduras, and Guatemala⁸⁹. The most immediate impacts of coral mortality are loss of biodiversity and changes to coral-dependent fish community composition. The Department of Fisheries and Caribbean Regional Fisheries Mechanism (CRFM) were interviewed by the consultant team consecutively. The latter has a regional focus, the former a government department of Belize. CRFM is a 15-member country NGO based in Belize, who are all full members of CARICOM. This provides a mechanism for sharing information and operational performance throughout the member countries, merging the issues on climate change and impacts on the sector.

The typical fisheries of King Conch and Spiny lobster are suffering and there has been a notable shift in production^[74]. With Conch it has been noted that production decreases with temperature changes, however this is anecdotal and requires studying; observed only via fisher trends since catch reporting is minimal. There are trends in the Spiny lobster where immergence of parasites has allowed some information gathering. Lobster mortality has been linked to localised environmental stress, indicative of water quality problems and habitat degradation, temperature or high sedimentation. There are some principle issues the Belize Fisheries Department would like to address regarding lobster and conch, including better understanding experiences in neighbouring countries of Jamaica, Honduras and Dominican Republic.

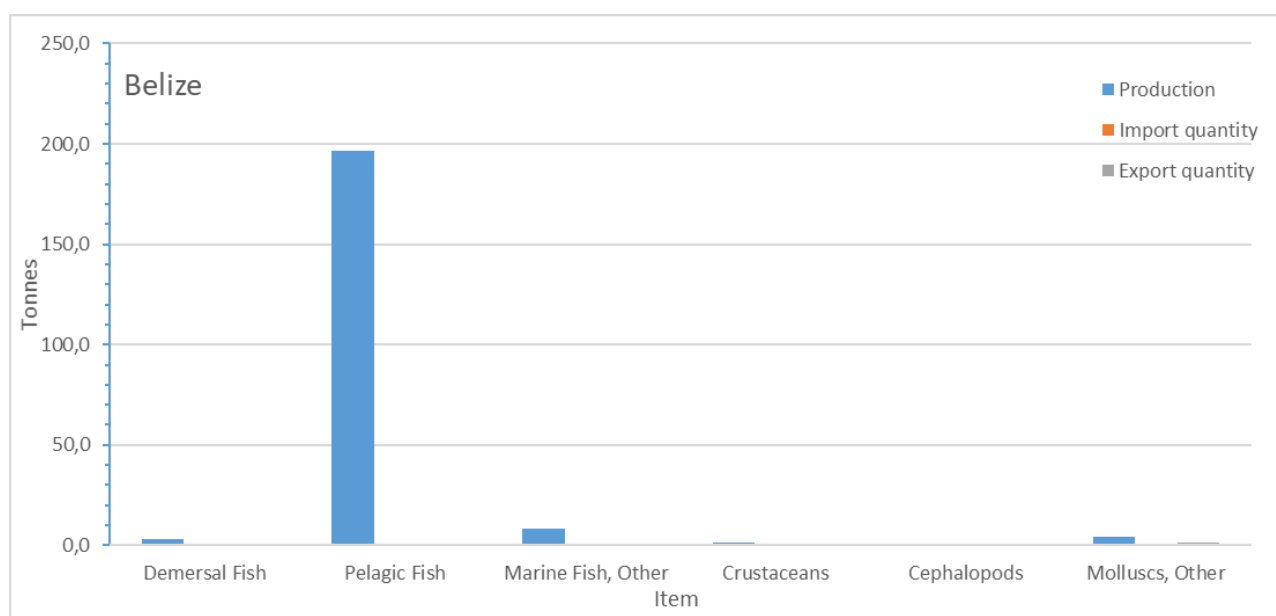


Figure 7: Fisheries production export and imports of Belize reported for 2022 (FAO 2024)⁹⁰.

Information is being gathered correlating hurricanes passage with trends in fisheries. The department needs funding for studies to understand the impact on mangroves, seagrasses and coral reefs, in addition to what the level of impact and recovery rates are on fisheries as declining patterns are observed in Conch productions but there are no desktop studies on fisheries relating to climate change and changes in precipitation and associated water quality (see also, The Third National Communication; a report which

can provide more on this issue). There are alternative fisheries that the department would like to now explore since the coastal fisheries are depleted or at risk under climate change. They are looking towards investing in the deep-water species, particularly the Caribbean Red and Yellow Eye Snapper (a full report on this project proposal is available). Wider ideas in this area include projects focused on FADs for pelagic fisheries, the new project will focus on more coastal habitats. A co-management draft concept note has also been developed that would fit well with the EDA process.

2.4 Grenada

Grenada is located in the southeastern Caribbean Sea and is part of the Lesser Antilles chain and lies at approximately 12.1°N latitude and 61.6°W longitude: The country comprises three main islands—Grenada, Carriacou, and Petite Martinique including 20 smaller islets and cays totalling a land area of 344 km² and a coastline of 121 kilometers. The island of Grenada is the largest of the three and rises to its highest point at Mount St. Catherine (840 meters above sea level)⁹¹. Most of Grenada's population resides near the coasts, particularly around the southwestern regions where the capital, St. George's, is located⁹². Grenada's EEZ covers approximately 26,000 km², Figure 8, supporting fisheries and great marine biodiversity.

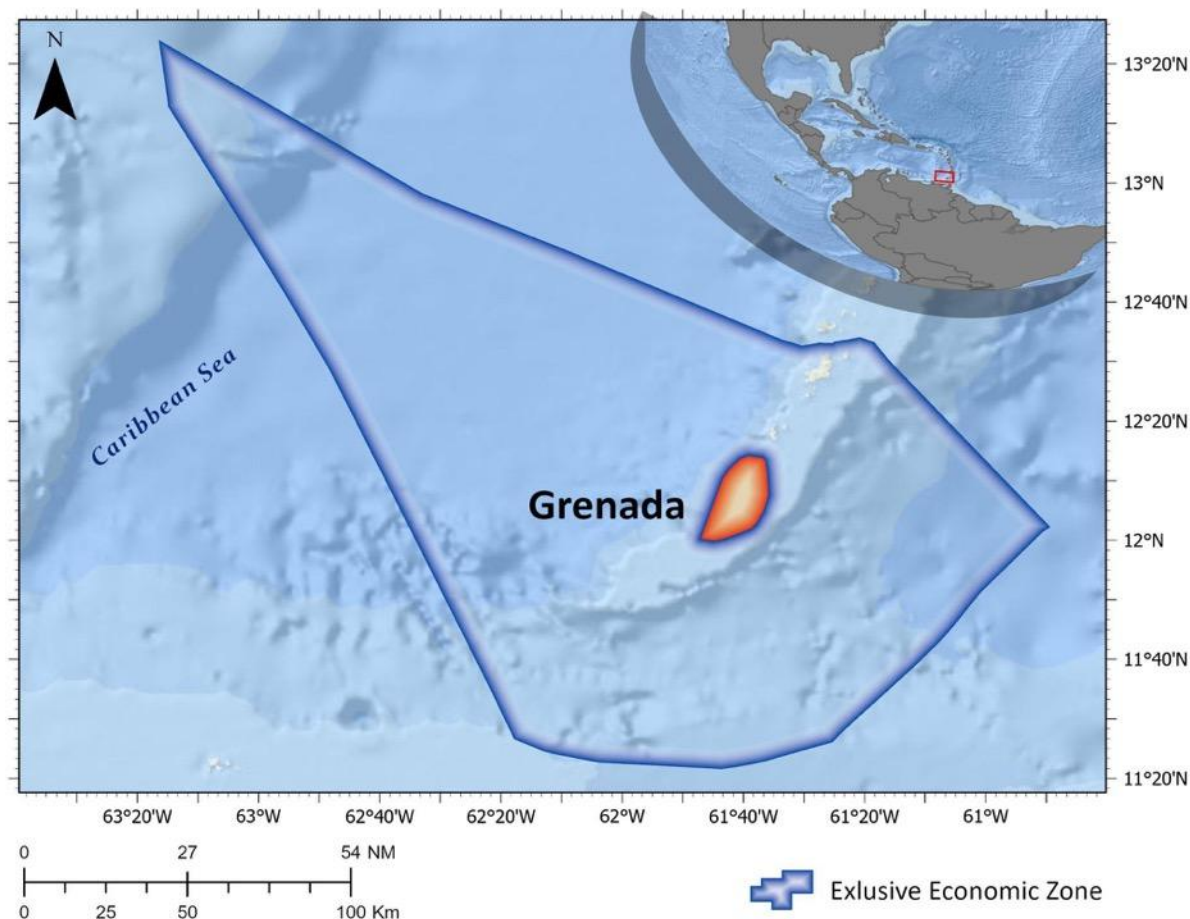


Figure 8: Exclusive Economic Zone of Grenada.

2.4.1 Ecosystems and Services

The main coastal ecosystems in Grenada are: Coral reefs, seagrass beds, mangrove forests, beaches, and coastal forests. See Figure 9 for land cover of Grenada.

Coral reefs: Home to a vast array of marine life, providing habitat, food, and protection for countless species. They also play a vital role in protecting coastlines from erosion and storm surges. Grenada has extensive coral reefs, covering approximately **50 square kilometers**.

Seagrass beds: These underwater meadows provide a vital habitat for a wide range of marine organisms, including juvenile fish, sea turtles, and invertebrates. They also play a crucial role in stabilizing sediments, improving water quality, and storing carbon. Seagrass beds are found throughout the Grenadian coastal waters, occupying a significant portion of the shallow areas.

Mangrove forests: Provide a vital nursery habitat for many marine species, including fish, shrimp, and crabs, and play a crucial role in protecting coastlines from erosion and storm surges, as well as filtering pollutants from the water. Grenada has approximately **50 square kilometers of mangrove forests**, primarily concentrated along the southern and eastern coasts of the islands⁹³.

Beaches: Provide important nesting sites for sea turtles and recreation areas for both locals and tourists. They also play a role in protecting the coastline from erosion. Grenada has numerous beautiful beaches, including Grand Anse Beach and Morne Rouge Beach.

Coastal forests: Including rainforests and dry forests, provide habitat for a variety of terrestrial species and play a role in regulating the local climate. They also contribute to the aesthetic beauty of the Grenadian landscape. Coastal forests are found on the mainland and on some of the smaller islands.

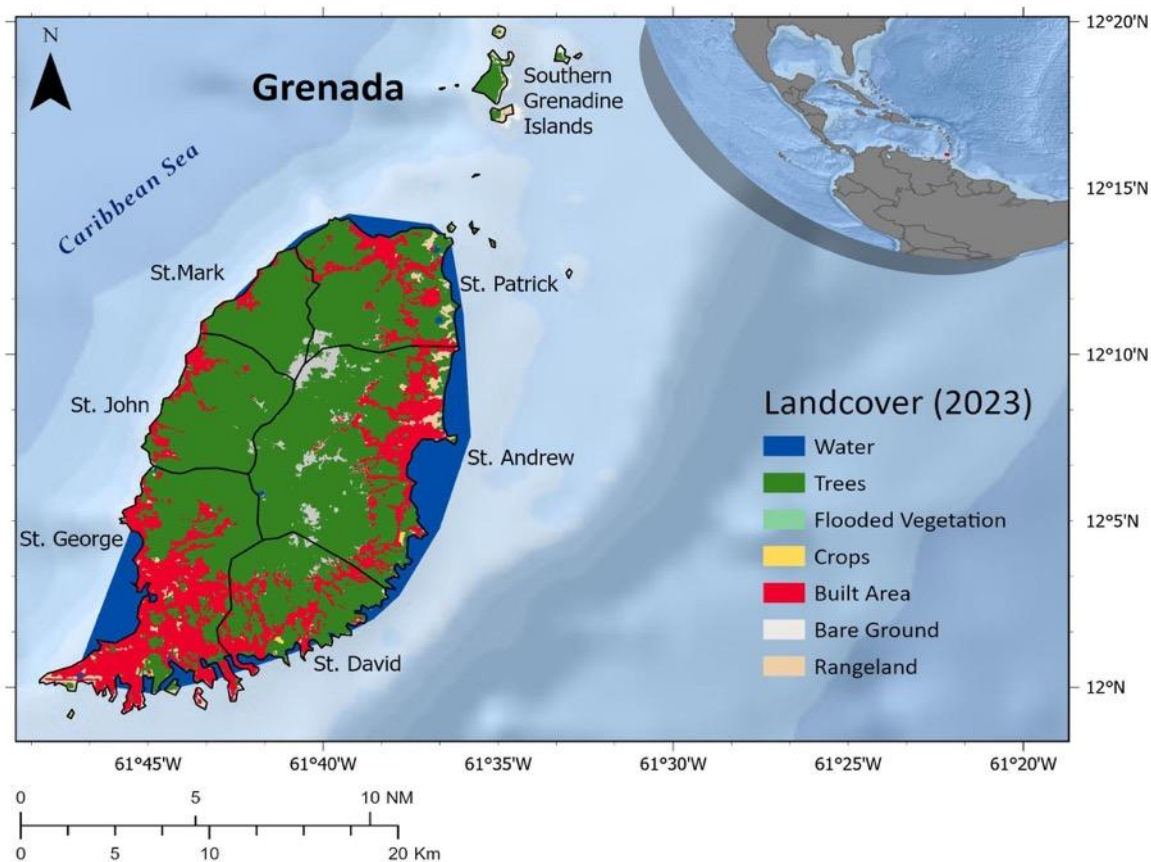


Figure 9: Grenada landcover map

2.4.2 Economy¹

Grenada, often referred to as the “Spice Isle,” is a small island developing state (SIDS) located in the Eastern Caribbean. Its economy is classified as upper-middle income and is heavily reliant on tourism, agriculture, and remittances. In 2022, Grenada’s GDP was estimated at \$1.35 billion, with tourism accounting for 40% of GDP, agriculture contributing 8%, and the remainder from sectors like manufacturing, construction, and financial services (World Bank, 2022).

The country’s economic structure underscores its vulnerability to external shocks such as natural disasters and global market fluctuations: The COVID-19 pandemic, for example, led to a 13.8% GDP contraction in 2020 due to a sharp decline in tourist arrivals. However, the economy rebounded strongly in 2022 with a growth rate of 4.7%, supported by the recovery of the tourism sector and increased public investment in infrastructure (IMF, 2023).

Grenada is renowned for its export of spices, particularly nutmeg and mace, which account for 38% of agricultural export earnings: Additionally, cocoa and bananas play significant roles in foreign trade. In 2022, Grenada’s export revenue amounted to \$45 million, while imports totalled \$410 million, resulting in a substantial trade deficit (FAO, 2023). This imbalance highlights the economy’s dependence on imported goods, including food and fuel.

Unemployment remains a persistent challenge, with a reported rate of 13% in 2022, disproportionately affecting youth and women: Grenada’s labour force is concentrated in agriculture, tourism, and services, with limited diversification into high-productivity industries. Inflation, primarily driven by rising food and energy costs, averaged 5.3% in 2022 (SIB, 2023).

Efforts to strengthen Grenada’s economic resilience include investments in renewable energy, particularly solar and wind power, and initiatives to boost the blue economy: The government has also prioritized sustainable development, as demonstrated by its involvement in regional initiatives like the Organization of Eastern Caribbean States’ (OECS) Green-Blue Economy Strategy.

The current general government gross debt (% of GDP) in Grenada is 75.3%, a 14.2% decrease from its highest value in 2020.

Table 7 Grenada’s economic situation

Grenada	2016	2017	2018	2019	2020 ^e	2021	2022	2023	2024
Real GDP growth (%)	3.7	4.4	4.4	0.7	-13.8	4.7	7.3	4.7	3 ⁹⁴
Average inflation (%)	1.7	0.9	0.8	0.6	-0.7	1.2	2.6	2.7 ⁹⁵	N.D.A*
Unemployment (%)	N.D.A*	N.D.A*	N.D.A*	N.D.A*	21.6	21	20.6	19.9 ⁹⁶	N.D.A*
Current account balance (% of GDP)	-8.8	-11.5	-12.8	-10.4	-16.1	-14.5	-11	-9.1	-11.3 ⁹⁷
General government gross debt (% of GDP)	81.6	70.4	68.5	62.7	89.5	86.6	78.8	75.2	75.3 ⁹⁸

*N.D.A- no data available

¹ International Monetary Fund. (2023). Grenada Economic Outlook 2022. Retrieved from [insert link].
World Bank. (2022). Grenada Development Indicators. Retrieved from [insert link].
Statistical Institute of Grenada. (2023). Labour Force and Economic Report. Retrieved from [insert link].

2.4.3 Livelihoods

a) Agriculture Sector⁹⁹

Grenada's agricultural sector is a cornerstone of rural livelihoods, contributing 8% of GDP in 2022 and employing 20% of the labour force, with men representing 60% of workers and women 40% (FAO, 2023): The sector is predominantly small-scale, with farmers growing diverse crops and raising livestock for domestic consumption and export. Nutmeg is the hallmark of Grenada's agricultural identity, making the country the world's second-largest producer. In 2022, nutmeg exports generated \$10 million, followed by cocoa exports valued at \$8 million. These high-value crops contribute significantly to rural incomes, although production has faced challenges from climate change and pests (FAO, 2023). Other crops include bananas, breadfruit, and root vegetables such as dasheen and sweet potatoes, which are vital for food security.

Livestock farming includes small ruminants (goats and sheep), poultry, and cattle, primarily for domestic markets. Grenada has limited processing facilities, which constrains the development of value chains in the livestock subsector: Most meat products are consumed locally, with imports supplementing demand.

Agricultural value chains remain underdeveloped. For example, the country has only two nutmeg processing facilities, limiting its ability to add value to raw products before export. Similarly, the absence of modern cocoa processing plants reduces the competitiveness of Grenadian cocoa on international markets, despite its recognition as a premium product.

Climate change poses significant threats to agriculture in Grenada: Rising temperatures, irregular rainfall patterns, and an increase in hurricanes are impacting crop yields and farming systems. Hurricane Ivan in 2004 devastated the nutmeg sector, causing losses estimated at 90% of production capacity. Subsequent hurricanes have further delayed recovery efforts, underscoring the vulnerability of Grenada's agriculture to extreme weather events.

The government and international partners are working to enhance the resilience of the agricultural sector: Initiatives include promoting climate-smart agriculture, expanding irrigation systems, and introducing drought-resistant crop varieties. For example, the Climate-Smart Agriculture Pilot Program, supported by the World Bank, aims to reduce greenhouse gas emissions while improving productivity (FAO, 2023).

b) Tourism Sector¹⁰⁰

Tourism is the lifeblood of Grenada's economy, contributing nearly 40% of GDP and employing approximately 30% of the labor force. In 2022, the island welcomed over 450,000 visitors, including 150,000 overnight tourists and 300,000 cruise ship passengers, marking a significant recovery from the pandemic (Grenada Tourism Authority, 2023). Grenada's tourism industry is diverse, with eco-tourism, cultural tourism, and luxury tourism forming the backbone of its offerings. The island is renowned for its pristine beaches, such as Grand Anse, and its underwater attractions, including the Molinere Underwater Sculpture Park. Adventure tourists are drawn to Grand Etang National Park and Levera National Park, while cultural enthusiasts explore historic sites like Fort George and Belmont Estate.

The value of tourism to Grenada's economy cannot be overstated. Overnight visitors spent an estimated \$200 million in 2022, contributing to local livelihoods and foreign exchange earnings. Cruise tourism, though significant in volume, generates less revenue, as passengers typically spend only a few

hours on the island. Nonetheless, it remains an important segment for local vendors and tour operators (Grenada Tourism Authority, 2023).

Grenada's tourism strategy focuses on sustainability and resilience. The Pure Grenada brand emphasizes eco-friendly practices and community-based tourism, with efforts to preserve coral reefs, mangroves, and marine biodiversity. For instance, the Grenada Coral Restoration Program, supported by international NGOs, has restored over 2,000 square meters of reef, enhancing both marine ecosystems and diving tourism.

Challenges facing the tourism sector include the high cost of air travel, limited accommodation options in rural areas, and the growing impact of climate change. Rising sea levels and coral bleaching threaten the island's coastal attractions, while hurricanes pose risks to infrastructure. The government is addressing these issues through investments in climate-resilient infrastructure and the diversification of tourism products to reduce dependency on traditional markets like the United States and the United Kingdom.

c) Fisheries Sector

In the last couple of decades, the fishing sector in Grenada has developed from artisanal to commercial fisheries and targeting multispecies stocks: This has included a mix of large pelagics, such as yellowfin tuna and billfish, and small pelagics and demersal species such as reef fish and deepwater snapper and parrotfish; and high value vulnerable fisheries like lobster and conch¹⁰¹. The production of pelagic fish reached 2.19 tonnes and exporting almost half of the production in 2022, while the total annual marine capture of fish production in 2020 was 2363 tonnes with an average of 2713 (period 2011 to 2020)¹⁰².

Exports from Grenada have fluctuated, from US\$5.6 million in 2012 to US\$7.5 million in 2011; however, it decreased to US\$5.2 million in 2017¹⁰³. The fisheries sector in Grenada contributed 1.5% of the national GDP in 2012 and the sector has become a contributor to food supply, and a foreign exchange earner, and a significant source of employment and income. In 2020, the fisheries sector recorded 872¹⁰⁴ fishing vessels and was employing 3500 people, and another 400 people employed indirectly¹⁰⁵. Aquaculture production is lacking, and there were some experiments with *Macrobrachium* farming in the past, but did not evolve.

Climate change has a direct impact on coastal infrastructure and fishing communities due to sea level rise and storm surges, but also on the fisheries sector in Grenada in general due to higher sea temperature on pelagic and reef fish. Increasing sea surface temperatures impact migration, spawning, distribution, larval survival and recruitment of oceanic pelagic species in the Caribbean, as this marine species may need to adjust to these conditions or to move away from unfavorable conditions to temperate latitudes¹⁰⁶. This is particularly relevant to Grenada's fishing sector; it is considered one of the largest offshore pelagic fisheries in the Caribbean region. In addition, the fisheries sector is being affected by the influxes of pelagic sargassum seaweed into the Caribbean Sea (since 2011), due to climate-induced changes to ocean currents and ocean warming^{107 108}. Large influxes of floating sargassum in the Caribbean, affect the fisheries operation by entanglement and/or damage to fishing gear, engines and vessels; and have impeded the movement and normal operation of vessels (clogged fishing harbours and mooring sites reducing access to fishing grounds and days of fishing)¹⁰⁹.

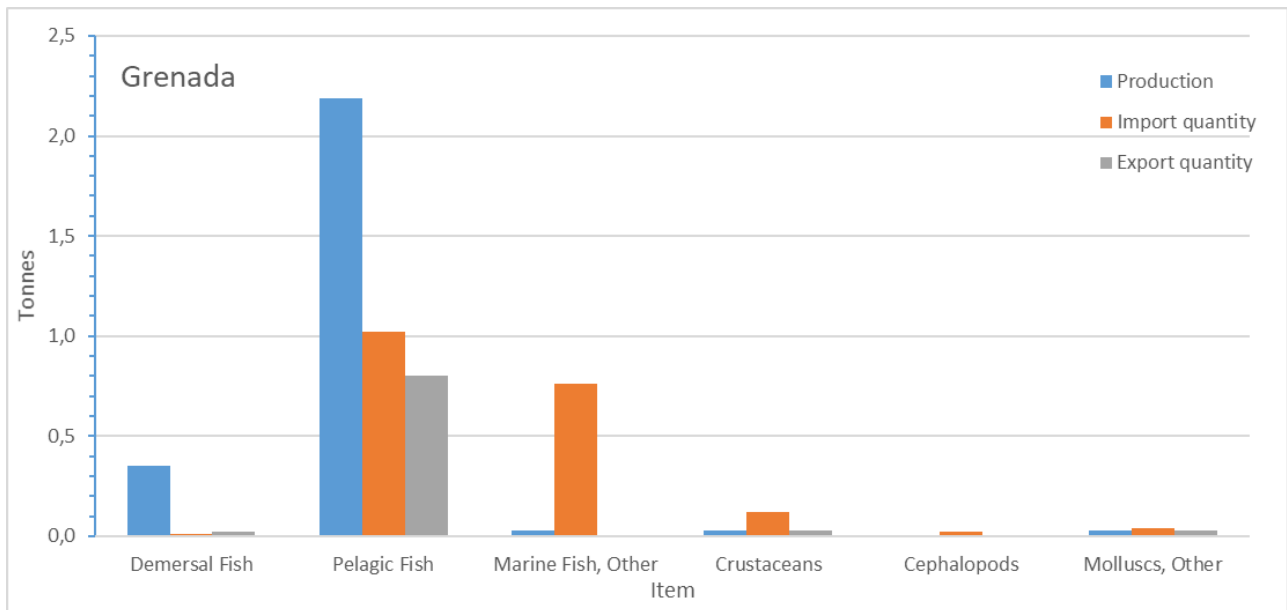


Figure 10: Fisheries production export and imports of Grenada reported for 2022 (FAO 2024)¹¹⁰.

2.5 Jamaica¹¹¹

The island of Jamaica (18o N, 17o W) is in the Caribbean Sea and is the third largest island of the Greater Antilles aside from Cuba and Hispaniola: The largest English-speaking country in the Caribbean, Jamaica has a land mass of approximately 11,000km² and a population of 2.827 million people in 2022¹¹².

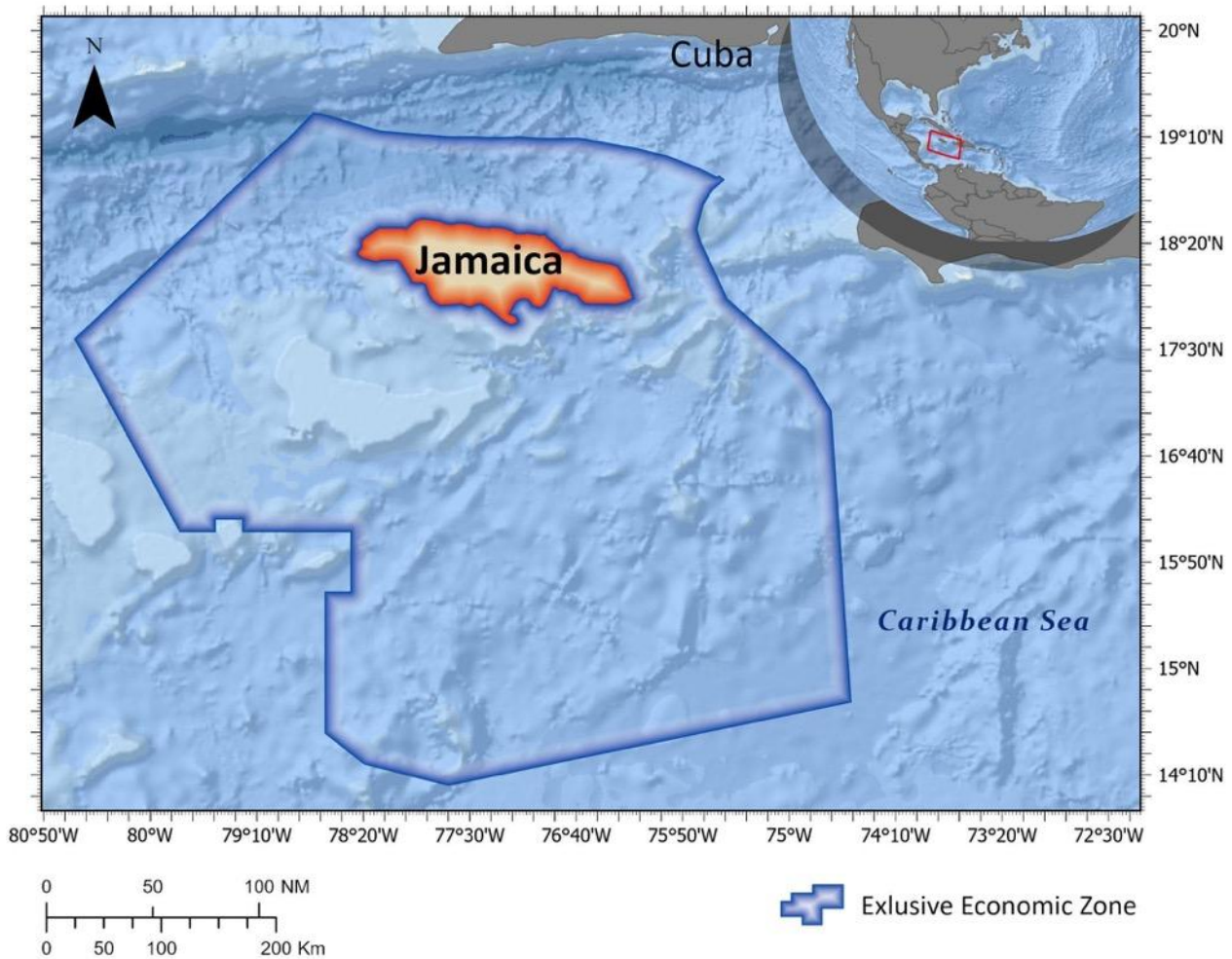


Figure 11: Map of Jamaica

The terrain of Jamaica is predominantly mountainous, with hills and valleys radiating from mountain chains, and coastal plains interspersed along the coastline: Over half of the island is 300m above sea level, and a central ridge of mountains runs east to west; the tallest of which are the Blue Mountains (2,250m) in Surrey and Middlesex Counties in the eastern regions. Known as the land of wood and water, the forested mountain ranges support a vast watershed network which feeds the river systems of Jamaica. The watershed is divided into 26 management units, the largest being Black River and Rio Bueno-White River watersheds. Jamaica has a rich diversity of terrestrial and marine habitats, and with high levels of biodiversity and endemism relative to the rest of the region.

70% of Jamaica's population lives in coastal settlements in a near 50:50 male:female ratio: The demographics of Jamaica include a population of 1.425 million females to 1.402 million males. The island is divided into the three counties Cornwall, Middlesex and Surrey; and the counties organized into the 14 parishes of Clarendon, Hanover, Kingston, Manchester, Portland, St. Andrew, St. Ann, St. Catherine, St. Elizabeth, St. James, St. Mary, St. Thomas, Trelawny and Westmoreland. The two most populated parishes are Kingston & St Andrew (670,312 residents) and St. Catherine (521,669 residents).

2.5.1 Ecosystems and Services

The main ecosystems in the coastal zone of Jamaica are; coral reefs, mangrove forests, seagrass beds, beaches and coastal forests.

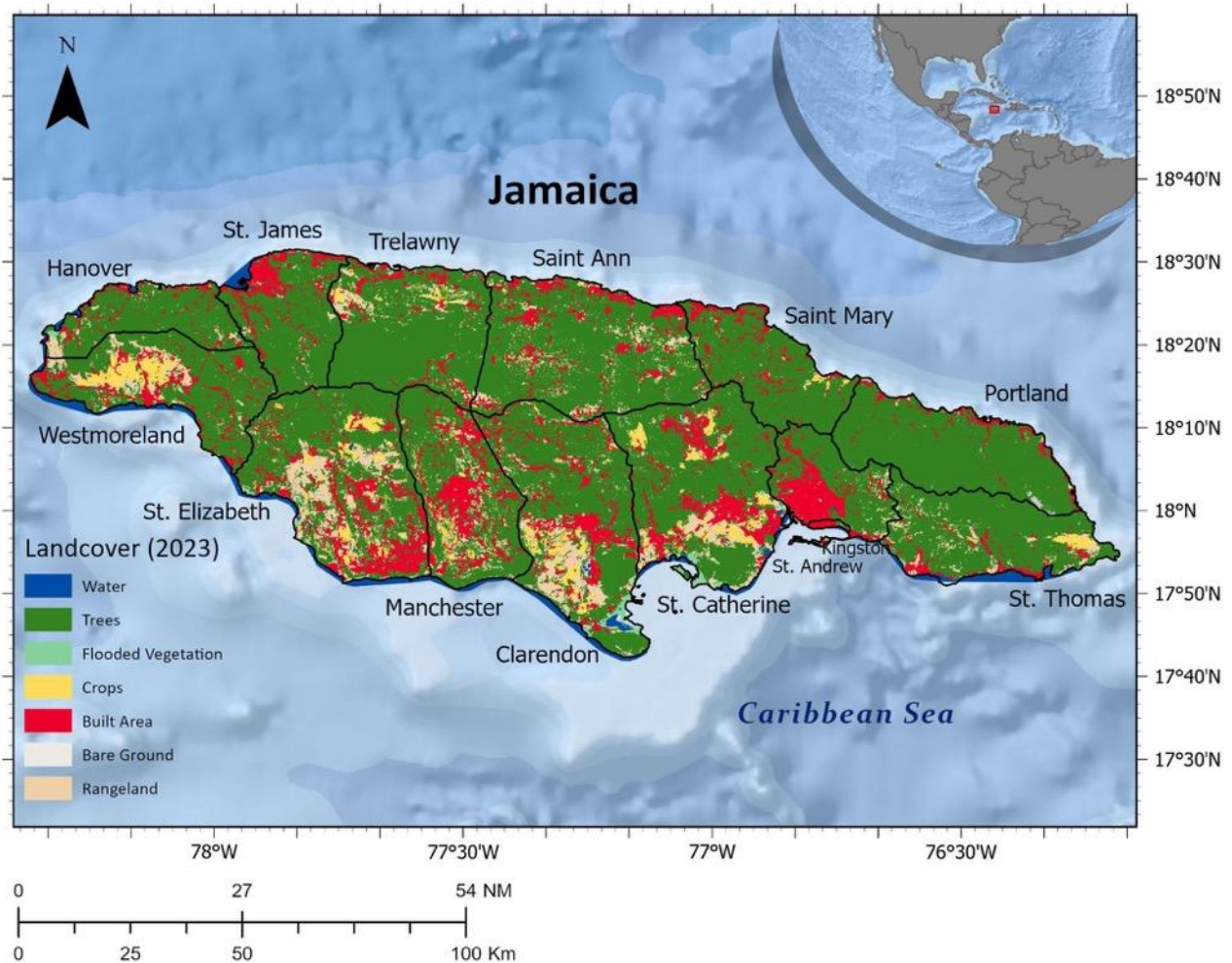


Figure 12 shows the land cover of Jamaica.

Coral reefs: covering approximately 1,240 square kilometers. These vibrant underwater cities are home to a vast array of marine life, providing habitat, food, and protection for countless species. They also play a crucial role in protecting coastlines from erosion and storm surges.

Mangrove forests: provide a vital nursery habitat for many marine species, including fish, shrimp, and crabs. They also play a crucial role in protecting coastlines from erosion and storm surges, as well as filtering pollutants from the water. Jamaica has approximately **100 square kilometers of mangrove forests**, primarily concentrated along the southern and western coasts of the islands.

Seagrass beds: Vital habitat for a wide range of marine organisms, including juvenile fish, sea turtles, and invertebrates. They also play a crucial role in stabilizing sediments, improving water quality, and storing carbon. Seagrass beds are found throughout the Jamaican coastal waters, occupying a significant portion of the shallow areas.

Beaches: sandy shores provide important nesting sites for sea turtles and recreation areas for both locals and tourists. They also play a role in protecting the coastline from erosion. Jamaica has numerous beautiful beaches, including Negril Beach and Seven Mile Beach.

Coastal forests: Provide habitat for a variety of terrestrial species and play a role in regulating the local climate. primarily found along the northern and eastern coasts of the island. These areas experience higher rainfall and humidity, creating suitable conditions for diverse vegetation. Some notable locations include: **John Crow Mountains and Blue Mountains:** These mountain ranges in eastern Jamaica support lush rainforests, which transition into coastal forests as they approach the shoreline. **Portland Bight Protected Area:** This large protected area on the south coast includes coastal forests alongside mangroves and other coastal ecosystems. **Negril Great Morass:** Located on the western coast, this wetland area features a mix of mangroves, swamp forests, and other coastal vegetation. It's important to note that the extent and condition of coastal forests in Jamaica have been impacted by human activities such as deforestation and development. Conservation efforts are underway to protect and restore these ecosystems.

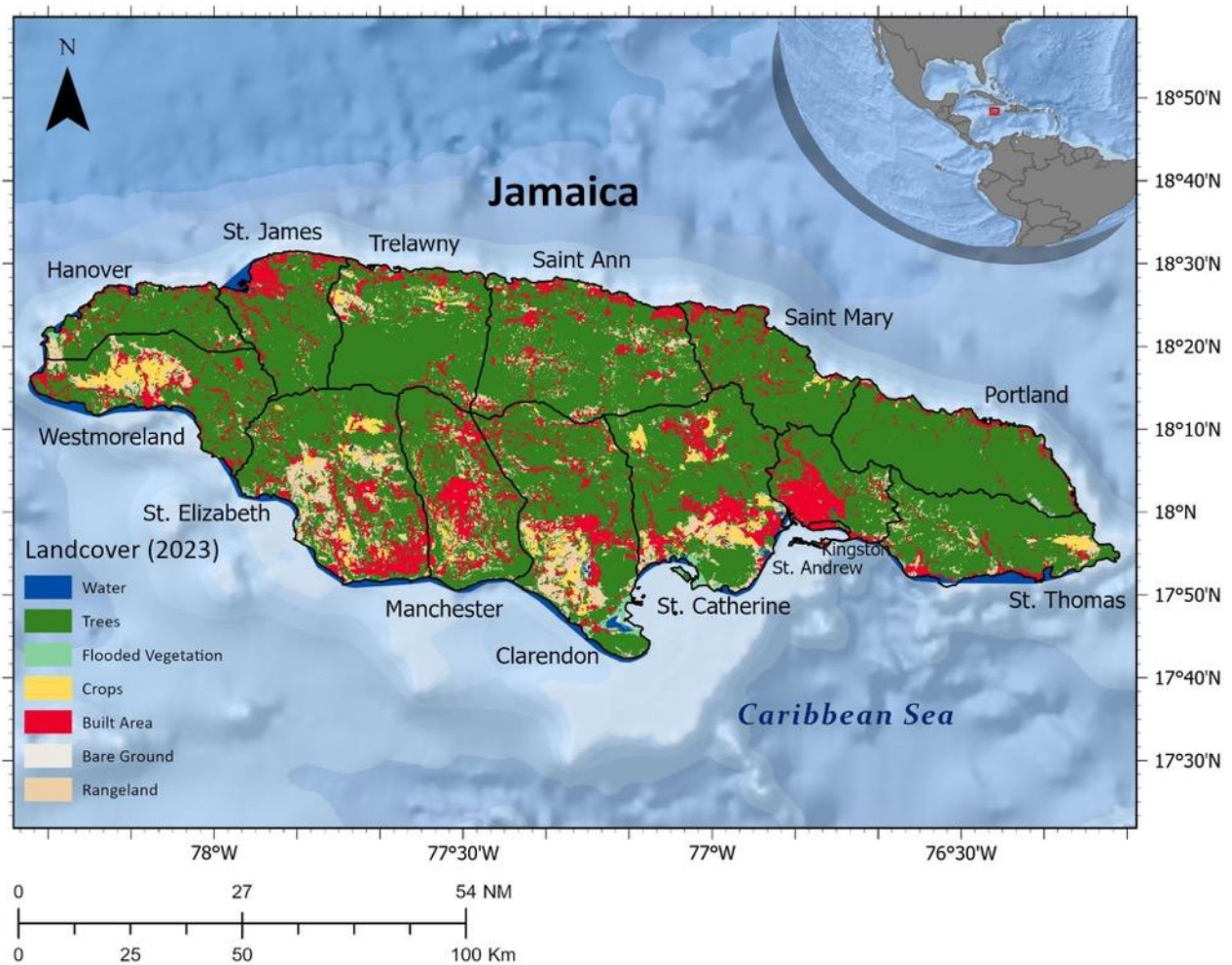


Figure 12: Jamaica landcover map

2.5.2 Economy

Jamaica is the third-largest island in the Caribbean, with a mixed economy that relies on tourism, agriculture, mining, and remittances. The services sector dominates, contributing approximately 70% to GDP in 2022, followed by industry (20%) and agriculture (10%) (World Bank, 2023). Tourism is the largest driver of economic activity, generating 30% of GDP and employing over 25% of the labour force. Other significant sectors include mining, particularly bauxite and alumina production, and agriculture.

Jamaica's GDP was valued at \$15.7 billion in 2022, with an annual growth rate of 3.4%, marking a robust recovery from the COVID-19 pandemic: This recovery has been driven by a resurgence in tourism, manufacturing, and remittances from the Jamaican diaspora, which contributes approximately 16% to GDP annually. The United States and Canada remain the primary sources of these inflows. Jamaica faces several economic challenges such as inflation, driven by rising global energy and food prices, averaged 5.8% in 2024, affecting consumer purchasing power and business operations (World Bank, 2023).

The government has been actively investing in renewable energy and digital transformation as part of its Vision 2030 Jamaica initiative, which aims to position the country as a developed economy by 2030: Renewable energy projects, particularly solar and wind, are expected to reduce Jamaica's dependence on imported fossil fuels, which account for over 90% of its energy needs (IEA, 2023).

Additionally, Jamaica has been expanding its logistics and port facilities, seeking to leverage its strategic location along major shipping routes.

Despite these advancements, unemployment, particularly among youth, remains a concern: The unemployment rate was at its highest in 2020 with 10.7. Moreover, climate change poses a significant threat to Jamaica's economy, with rising sea levels, hurricanes, and droughts impacting tourism, agriculture, and infrastructure.

Table 8: Jamaica Economy Overview

Jamaica	2016	2017	2018	2019	2020	2021	2022	2023	2024
Real GDP growth (%)	1.4	1	1.9	0.9	-10.4	4.6	5.2	2.6	1.3 ¹¹³
Average inflation (%)	2.3	4.4	3.7	3.9	5.2	5.8	10.4	6.5	5.8 ¹¹⁴
Unemployment (%)	13.2	11.7	9.1	7.7	10.7	5.19	4.1	4.4 ¹¹⁵	N.D.A*
Current account balance (% of GDP)	-0.3	-2.7	-1.5	-1.9	1.1	1	-0.8	2.9	1.6 ¹¹⁶
General government gross debt (% of GDP)	113.7	101.2	94.9	94.3	109.7	94.2	77	73.3	67.9 ¹¹⁷

*N.D.A- no data available

The COVID-19 pandemic increased as social mobility restrictions that caused economic activity to contract sharply, and inflation and unemployment: For the first time in five years, Real GDP growth contracted by -10.4%, reflecting a decline in tourism arrivals, in 2020. The shocks to tourism extended throughout manufacturing, transportation, although higher outputs in agriculture, forestry and fishing, and construction activity. Previously reduced unemployment rate had increased to 10.7% in October 2020. Females were more impacted as female unemployment rose 13.0%, compared to an 8.6% rise in male unemployment. Unemployment among youth (14-24 years) rose to 27.8%, compared with 21.2% in October, reflecting that the livelihoods of women and youth were disproportionately disrupted, as hotels, restaurants, personal services had a significant share of job losses. With regards to the general gross government debt, in 2024 this currently is sitting at 67.9 which is a 5.4% decrease from the following year.

Lower tax revenues and higher government stimulus spending meant that Government debt, which had declined to 96.1% of GDP in FY 2019/2020, the lowest in 2 decades, but has rebounded since (CDB's Annual Report, 2022): The pandemic caused Government to revise its fiscal rules defer the timeline to achieve the 60% debt target, by 2 years, to FY 2027/2028. Public spending was financed through several sources, from delayed capital projects, less urgent programmes, drawing down on cash buffers built over the years to accessing international funding from the Rapid Financing Instrument of the IMF. GDP per capita has risen from low of 4897.26 USD to 5183.53 USD in 2021 and Debt-to-GDP has steadily declined to about 80% in 2022).

2.5.3 Livelihoods

a) Agriculture Sector¹¹⁸

Agriculture is a vital sector in Jamaica, contributing 10% to GDP and employing approximately 17% of the labor force, with men representing 68% and women 32% of agricultural workers (FAO, 2023): The sector is diverse, encompassing traditional crops such as sugarcane, coffee, bananas, and yams, as well as livestock farming and aquaculture. Sugarcane has historically been a cornerstone of Jamaica's agricultural economy, but its importance has diminished due to declining global prices and high production costs. In 2022, sugar exports generated \$60 million, a significant drop from previous decades (FAO, 2023). Coffee, particularly Blue Mountain Coffee, remains a premium export product, fetching high

prices in international markets. However, production has been constrained by pests and diseases, as well as climate variability. Bananas and yams are critical for both export and domestic consumption. In 2022, banana exports were valued at \$25 million, while yam exports, particularly to diaspora markets in the United States and the United Kingdom, earned \$40 million. Jamaica is also the largest exporter of yams globally (World Bank, 2023). Livestock farming includes poultry, cattle, and goats, with poultry being the dominant source of meat and eggs for local consumption. The country also produces tilapia and shrimp through small-scale aquaculture ventures.

The value chain for Jamaican agriculture is relatively underdeveloped, with limited agro-processing facilities and cold storage infrastructure: Most agricultural products are sold in raw form, limiting value addition and export competitiveness. Cocoa processing, for example, has significant untapped potential, as Jamaican cocoa is highly regarded for its quality.

Climate change is a pressing issue for the agricultural sector: Rising temperatures, prolonged droughts, and more frequent hurricanes have adversely affected crop yields and livestock health. Hurricane Gilbert in 1988 and Hurricane Ivan in 2004 caused widespread agricultural losses, while the drought of 2014 reduced yam and coffee production by 20%. In response, the government has promoted climate-smart agriculture, including the use of drought-resistant crops and improved irrigation systems (FAO, 2023).

b) Tourism Sector¹¹⁹

Tourism is Jamaica's largest foreign exchange earner, accounting for approximately 30% of GDP and directly employing 25% of the labour force: In 2022, the country welcomed over 4.3 million tourists, generating \$3.7 billion in revenue, marking a strong recovery from the pandemic-induced lows of 2020, when arrivals dropped by 68% (IMF, 2023). Jamaica's tourism industry is highly diverse, offering a wide range of experiences, from all-inclusive resorts to cultural and eco-tourism. The island's northern coast, particularly Montego Bay, Ocho Rios, and Negril, is known for luxury resorts and pristine beaches. Kingston, the capital, is a hub for cultural tourism, attracting visitors interested in reggae music, Rastafarian culture, and historical sites such as the Bob Marley Museum. Adventure tourism, including hiking in the Blue Mountains and river rafting on the Rio Grande, has also gained popularity. The cruise tourism segment is significant, with over 1.5 million cruise passengers visiting Jamaica in 2022. However, cruise tourists contribute less economically than overnight visitors, who spend an average of \$250 per day compared to \$50 per cruise passenger (Jamaica Tourist Board, 2022). Overnight tourism accounted for 75% of total tourism revenue in 2022, underscoring its importance to the economy.

Sustainability is a growing focus for Jamaica's tourism sector: The government has implemented green certification programs for hotels and invested in marine conservation projects to protect coral reefs and mangroves. The Jamaica Blue Economy Strategy aims to integrate sustainable marine tourism with environmental protection efforts, particularly in areas like Port Antonio and the Pedro Cays (IMF, 2023).

Despite its successes, Jamaica's tourism industry faces challenges, including high vulnerability to climate change. Rising sea levels, coral bleaching, and hurricane damage threaten coastal resorts and marine ecosystems. Hurricane Ivan in 2004 caused \$300 million in damages to tourism infrastructure, highlighting the sector's exposure to extreme weather events. More recently in Nov 2025, Jamaica was affected by Hurricane Melissa as it was recovering from the impact of Hurricane Beryl in 2024, the impact of Hurricane Melissa on Jamaica's economy was large, with losses projected to exceed **US\$20 billion**, It was most pronounced in **commercial properties and tourism sector**, which drove substantial private insurance losses due to wind damage and business interruption, compounded by systemic damage to critical **infrastructure** like roads and electricity networks¹²⁰.

To mitigate these risks, Jamaica has partnered with international organizations to develop climate-resilient infrastructure and diversify its tourism offerings beyond traditional markets (World Bank, 2023).

c) Fisheries Sector

Jamaica is the third largest island in the Caribbean with a population of nearly 2.9 million (2017), and coastline of 1022 km and an EEZ 15,452.75 km², the fisheries sector contributes to the economy (0.29% of GDP 2013) and development. The annual marine capture of fish production in 2020 was 11526 tonnes with an average of 15322 (period 2011 to 2020)¹²¹. Moreover, fisheries contribute directly and indirectly to the livelihoods of more than 100 000 people (5% total population). In 2017, there were 24469 fishers (6% were female) reported, and the fishing fleet consisted of 7663 fishing boats (95% small artisanal boats)^{122 123}. In Jamaica, there are five main types of fishing operations, industrial fisheries, for conch, lobster and pelagic fish; artisanal fisheries operate offshore at high sea, banks, and inshore; sport fishing for marlins and fishing trips with tourists and collection of sea weeds, land crabs, etc. The fisheries catch has been declining due to poor fishing practices, coastal pollution and habitat degradation.

Jamaica has one of the highest levels of fish consumption per capita in the Americas (25.8 kg/year in 2017): Local catches is sold at fresh fish market: however, this solely cannot fulfill local demand; and therefore import fish product needs to be imported into Jamaica (mackerel and sardines, cod, herring, shrimp, tilapia, pangasius), which accounted for about 79% of all fishery products consumed¹²⁴. In 2017, imports of fish and fishery products were valued at USD 116.6 million, and exports at USD 14.7 million, thus Jamaica has a negatively trade balance. Furthermore, in 2022, import of pelagic fish, marine fish and crustacean accounted for 6,56 tons, while export of fish product (mainly conch and lobster) were 1,51 tons¹²⁵.

The impact of climate change has had an important toll on Jamaica's economy and infrastructure, and fisheries sector: The sector was heavily affected by Hurricane Gustavo in 2008 causing fishing gear lost at sea, valued at 14 million USD¹²⁶. In particular, fishing communities are vulnerable to sea level rise and extreme-weather events as they occupy low-lying coastal lands¹²⁷ such is the case in Morant and Pedro Cays in Jamaica.

Increase in acidification in the oceans, including the Caribbean Sea, is caused by high concentration of CO₂ in the atmosphere, which dissolves in the water of the oceans and changes the chemistry of seawater¹²⁸, and has been affecting Jamaica's Conch fishery: The marine species that need to develop a shell (shellfish like conchs) and exoskeletons (lobster) are most affected by high water acidification¹²⁹. This is particularly relevant for the most important fishery resource in Jamaica, the Conch fishing industry, with exports of 500 metric tons per year, which translate to annual gross revenues of 3 to 4 million USD. Fisheries exports provide substantial foreign exchange for Jamaica (Kurien, 2005), and a decline in export of high value fish products, like conch, will cause severe impact on their economy.

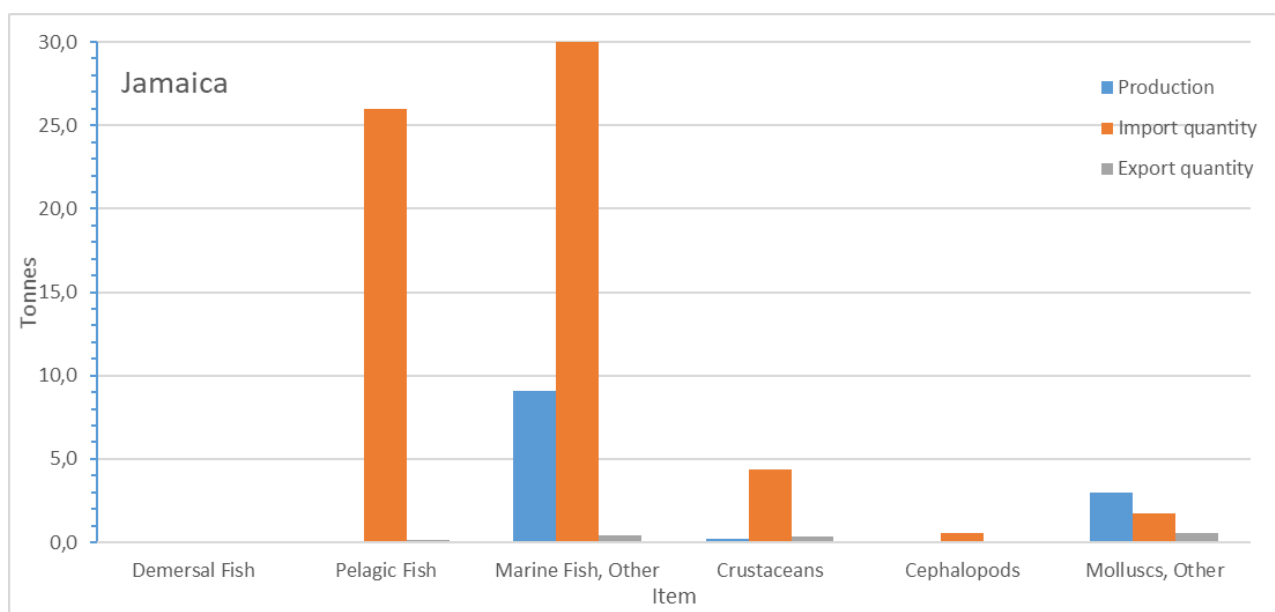


Figure 13: Fisheries production export and imports of Jamaica reported for 2022 (FAO 2024)¹³⁰.

Aquaculture farming was introduced into Jamaica in the late 70', and divided into food fish (red hybrid tilapia, marine and freshwater shrimp, mangrove oyster) and the ornamental fish for export: Since the 1980's and up to 2008 the aquaculture industry was growing and prospering; however, it has been a significant decline in aquaculture production of food fish due to lower price of fish food import such tilapia and pangasius¹³¹.

2.6 St. Lucia

Saint Lucia is a mountainous, rugged island located at 13°55' N and 60°59'W, lies within the archipelago of the Eastern Caribbean which stretches from Puerto Rico in the north to Trinidad and Tobago in the south. The island is situated approximately 21 miles south of Martinique and 25 miles north/northeast of St. Vincent and spans an area of 616km² in area (

Figure 14). It is grouped with the islands of Dominica, Martinique, SVG and Grenada to form the Windward Islands.

St Lucia has a total land area of 620km² and population of 179,857 in 2022, with its capital Castries, Gros Islet, Vieux Fort and Soufriere being the most densely populated areas. For the most part, settlements are near the flatter coastal regions with approximately 28% of the total population residing in these coastal towns.¹³² Approximately over 80% of its population is of African descent¹³³. Most of the rest are African-European. A small Carib population, known as the Kalinago, is mainly centred in the Choiseul region but lives also in other towns on the western coast. There is also a small number of Indo-Caribbean, Lebanese and Syrians¹³⁴. It is estimated that 80% of the country has slopes greater than 10 degrees, and nearly 8,000 hectares have slopes of over 30 degrees, making them suitable mainly for forested water catchment and wildlife habitat.

The executive power is in the hands of the prime minister and his cabinet: The prime minister is usually the head of the winning party of the 17 seat House of Assembly. The second chamber of

parliament, the Senate, has 11 appointed members. As a Commonwealth Realm, Saint Lucia recognizes the British Monarch as the Head of State represented on the island by a Governor-General¹³⁵.

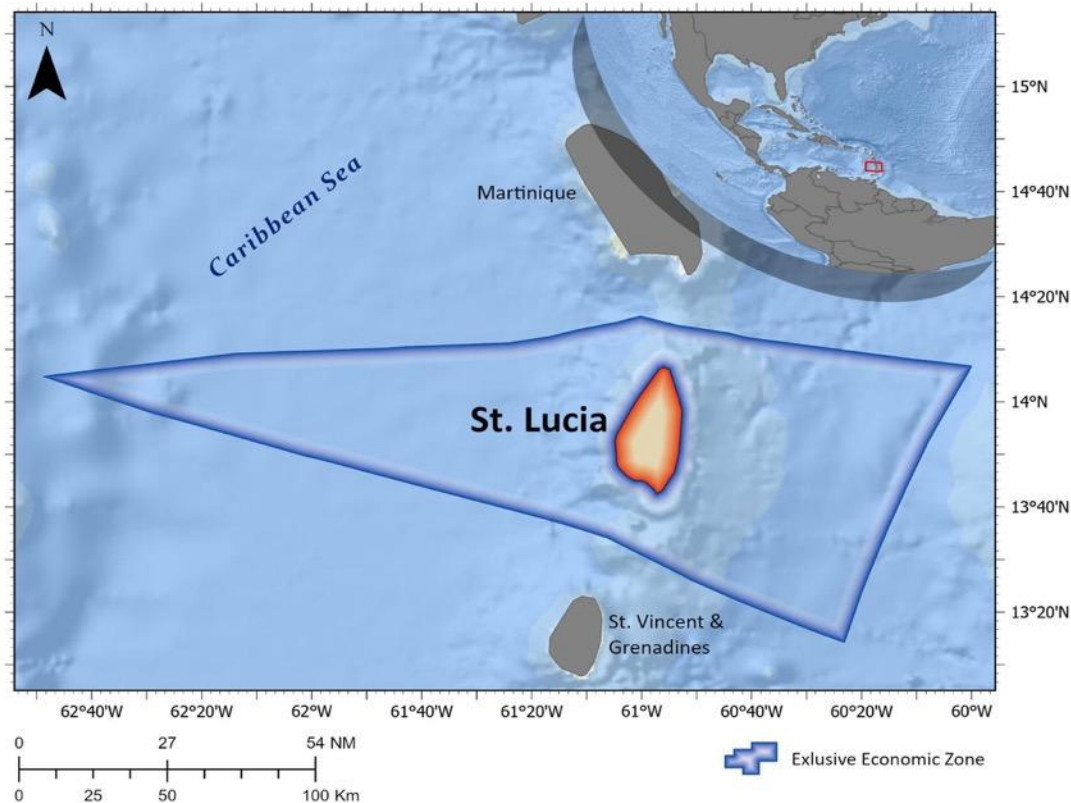


Figure 14: Map of St Lucia and EEZ

2.6.1 Ecosystems and Services

The coastal zone of St Lucia is a dynamic environment home to a diverse array of ecosystems; coral reefs, mangrove forests, seagrass beds, beaches and coastal forests. Figure 15 shows the land cover of St Lucia.

Coral reefs: Saint Lucia's coastline is coral reef dominant, with 44% of the area designated as protected areas. Anse Chastanet and Anse Mamin are particularly renowned for coral reef exploration.¹³⁶

Mangrove forests: Saint Lucia has approximately 1,500 hectares of mangrove forests, primarily concentrated along the southern and western coasts.

Seagrass beds: Found throughout Saint Lucia's coastal waters, contributing to the overall health of the marine ecosystem.

Beaches: Saint Lucia is renowned for its stunning beaches, which offer recreational opportunities for both locals and tourists. These sandy shores also provide important nesting sites for sea turtles and play a role in coastal protection.

Coastal forests: These diverse forests, ranging from rainforests to dry forests, provide habitat for terrestrial wildlife and contribute to the island's overall biodiversity and scenic beauty. Coastal forests are found in various locations around the island, often intermingling with other coastal ecosystems.

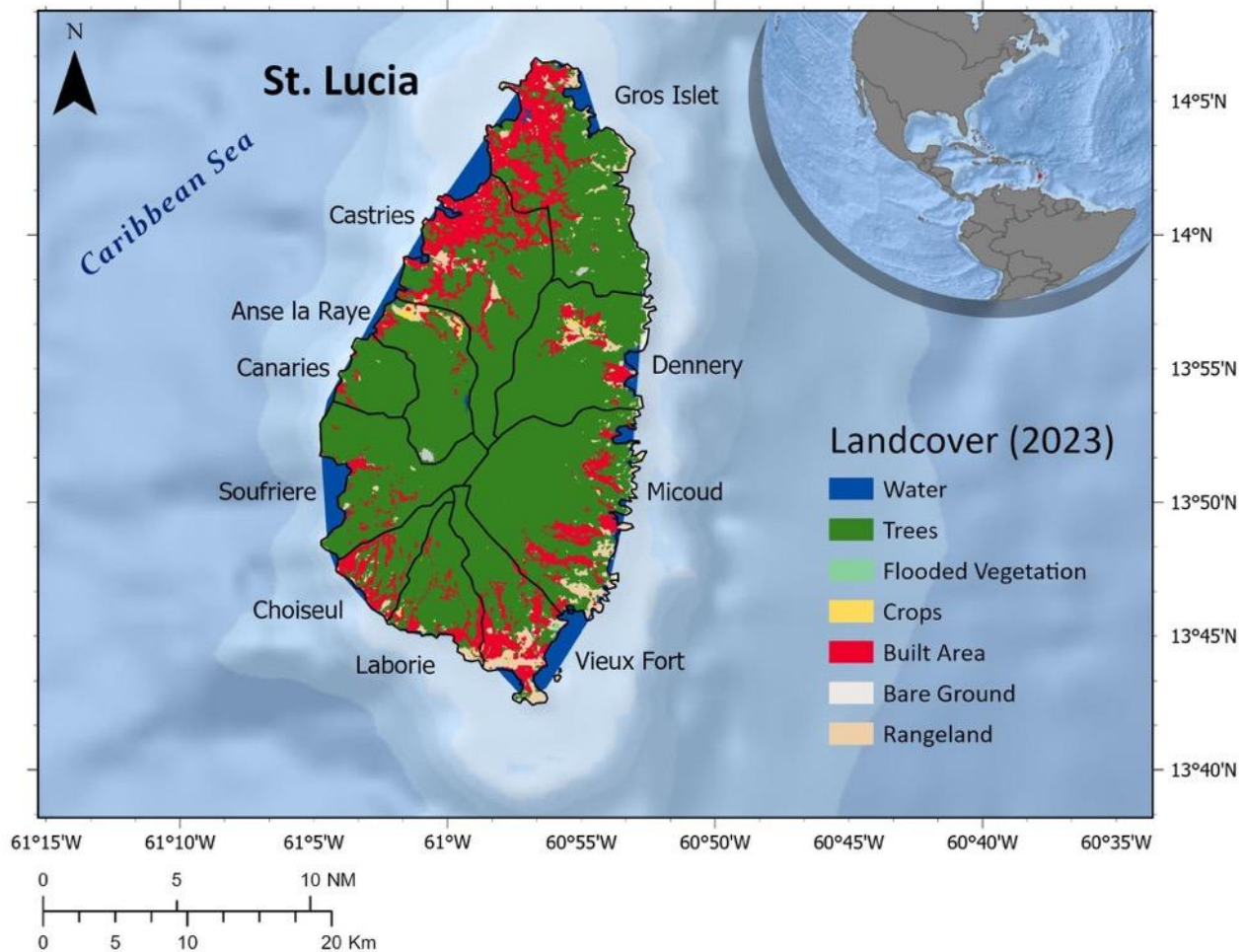


Figure 15: St Lucia landcover map

2.6.2 Economy

Saint Lucia is an upper-middle-income country with a mixed economy driven by tourism, agriculture, and small-scale manufacturing. The service sector dominates, contributing approximately 70% to GDP in 2022, with tourism serving as the backbone of economic activity (World Bank, 2022). Industry and agriculture account for 16% and 6% of GDP, respectively (IMF, 2023). The country's GDP was estimated at \$2.1 billion in 2022, with a growth rate of 3.9% as the economy rebounded from the pandemic-induced contraction of 24% in 2020 (World Bank, 2022). Tourism generates the majority of foreign exchange earnings, employing roughly 40% of the workforce directly or indirectly (Saint Lucia Tourism Authority, 2023). Beyond tourism, manufacturing contributes to exports through products like beverages, clothing, and electrical components. However, Saint Lucia's dependence on imports for food, fuel, and manufactured goods results in a persistent trade deficit. In 2022, exports totalled \$200 million, while imports were valued at \$850 million (World Bank, 2022).

Saint Lucia faces unique challenges as a small island developing state (SIDS), including vulnerability to climate change. Hurricanes, rising sea levels, and unpredictable rainfall patterns threaten infrastructure, agriculture, and livelihoods. Hurricane Tomas in 2010 and the December 2013 floods caused extensive damage, underscoring the need for resilient infrastructure. To address these challenges,

the government has launched initiatives to promote the blue economy, disaster-resilient infrastructure, and renewable energy projects such as geothermal power exploration (World Bank, 2022).

In 2020, Real GDP is estimated to have plummeted by 20.4%, due to major contraction in tourism, the key driver of economic activity. Stay-over tourist arrivals and cruise passenger arrivals plummeted by 65% and 62% respectively, year on year. Wholesale and retail declined by about 11%, transport and storage sector declined about 36.9%. Three sectors, construction, manufacturing and agriculture, livestock and forestry each recorded a 10% decline relative to the previous year. Unemployment has decreased from 21.7% to 11.1% in 2023. Like other countries, public measures to reduce the impact of COVID-19 severely constricted economic activity. In relation to Saint Lucia's general government gross debt it is currently 73.8.

Table 9 Economic impact in Saint Lucia

St. Lucia	2016	2017	2018	2019	2020	2021	2022	2023	2024
Real GDP growth (%)	3.9	3.3	1.1	1.1	-20.4	11.6	20.4	2.2	3.9 ¹³⁷
Average inflation (%)	-3.1	0.1	1.9	1.9	-1.8	2.41	6.4	4.1	1.3 ¹³⁸
Unemployment (%)	21.3	20.2	21.5	16.8	21.7	20.5	15.9	11.1 ¹³⁹	N.D.A*
Current account balance (% of GDP)	-6.5	-2	1.4	5.5	-18.9	-11.9	-2.9	-1.9	-1.5 ¹⁴⁰
General government gross debt (% of GDP)	60.2	59.9	60.3	62.1	95	81.9	73.4	74.5	73.8 ¹⁴¹

*N.D.A- no data available

2.6.3 Livelihoods

a) Agriculture Sector¹⁴²

Agriculture is a vital component of Saint Lucia's economy, contributing 6% of GDP and employing about 10% of the workforce in 2022, with women comprising 30% of the sector's labor force (FAO, 2023). The agricultural landscape is diverse, with a focus on crops, livestock, and fisheries, which support local consumption and exports. Bananas have historically been the most significant crop for Saint Lucia, accounting for 70% of agricultural exports. However, the sector has faced challenges such as declining export volumes due to reduced preferential access to European markets and competition from Latin America. In 2022, banana exports were valued at \$14 million, down from their peak of \$70 million in the 1990s (FAO, 2023). The country has diversified its crop production to include cocoa, root vegetables, and tropical fruits like mangoes and passionfruit. Cocoa exports have grown, generating \$4 million in 2022, with most exports destined for premium chocolate markets in Europe.

Livestock farming includes cattle, poultry, and goats, primarily for local consumption: The poultry sector is the most developed, producing over 80% of domestic demand for chicken and eggs. However, limited processing facilities and cold storage infrastructure constrain the development of livestock value chains. Fishing also plays an important role in food security, with annual landings of 1,500 metric tons in 2022. Tuna, snapper, and lobster are the main species harvested (FAO, 2023).

Agriculture in Saint Lucia is vulnerable to the impacts of climate change: Rising temperatures, prolonged droughts, and hurricanes have significantly affected productivity. For example, Hurricane Tomas in 2010 destroyed 80% of the banana crop, causing widespread economic losses (World Bank, 2022). The government, in partnership with international organizations, has promoted climate-smart agricultural practices, including agroforestry, soil conservation techniques, and the use of drought-resistant crops. Additionally, the Saint Lucia Agriculture Modernization Program has invested in irrigation systems, training for farmers, and improved access to markets.

b) Tourism Sector

Tourism is the cornerstone of Saint Lucia's economy, accounting for 60% of GDP and employing 40% of the labour force in 2022 (Saint Lucia Tourism Authority, 2023): The island welcomed over 1.2 million visitors in 2022, including 400,000 overnight tourists and 800,000 cruise ship passengers, marking a strong recovery from the pandemic (IMF, 2023). The island offers a diverse range of tourism experiences, from luxury beach resorts to eco-tourism and adventure activities. Iconic attractions include the Pitons, a UNESCO World Heritage Site, as well as Soufrière's volcanic hot springs and the Diamond Falls Botanical Gardens. Saint Lucia is also a popular destination for weddings and honeymoons, with tourism campaigns highlighting the island's romantic appeal. Cruise tourism accounts for most arrivals but contributes less economically compared to overnight stays. Overnight tourists, primarily from the United States and Europe, spend an average of \$250 per day, contributing approximately \$900 million to the economy in 2022. In contrast, cruise passengers spend about \$50 per visit, underscoring the importance of attracting longer-stay visitors (Saint Lucia Tourism Authority, 2023).

Sustainable tourism initiatives have become a priority for Saint Lucia: The island has implemented a Sustainable Tourism Strategy that includes eco-certifications for hotels and the promotion of community-based tourism. For example, the Fond Gens Libre Heritage Park offers visitors insights into the island's cultural history, benefiting local communities directly. Marine conservation efforts, such as the Soufrière Marine Management Area, protect coral reefs and mangroves, which are crucial for both biodiversity and tourism.

Despite its successes, the tourism sector faces challenges, including high vulnerability to climate change: Rising sea levels threaten coastal resorts, while coral bleaching damages marine ecosystems essential for diving and snorkelling. Hurricanes, such as Hurricane Tomas, have caused significant disruptions to infrastructure, highlighting the need for climate-resilient investments. The government, in collaboration with international donors, has initiated projects to protect beaches, strengthen coastal defences, and diversify tourism offerings to mitigate these risks (World Bank, 2022).

c) Fisheries Sector

The fisheries sector of St Lucia contributes to the country's economy (0.42% of GDP 2020)¹⁴³, but also, and small-scale fishery sector is a source of employment and contributes to poverty reduction and food security in the island. As a small island (617 km²) located in eastern Caribbean Sea with a population of nearly 180,000 people (2022), and coastline of 154 km but a considerable large EEZ 15,452.75 km². In 2019, a total 3,282 persons employed in marine capture fisheries while only a few (114 people) were employed in the aquaculture production. In the last decades, the fisheries in St Lucia evolved from artisanal to large-scale commercial fisheries. Many Saint Lucian fishers are still engaged in traditional fishing gear like trolling, netting and pots, using manually operated methods such as trolling gear and long lines, and they target multiple fisheries (GoSL 2013). In 2022, there were total of 482 fishing vessels. Catches within St. Lucia is based predominantly on large oceanic pelagic species (wahoo, blue marlin, tunas, flying fish, sailfish, sword fish, spearfish, white marlin and dolphinfish) totalled 70% of total landings registered between 1981 and 2022 (GoSL, 2022), while fisheries landing associated with reef and shallow shelf habitat. The annual marine capture of fish production in 2020 was 1,269 tons valued at USD 0.16 million, with an average of 1998 tons (period 2011 to 2020). Import of marine products in 2022 were larger (3.6 tons) than export (0.01 tons), and significantly larger than the total marine fish production (1.85 tons). The demands of food fish from locals and the tourism sectors cannot be fulfilled by the local catches alone.

Aquaculture in St. Lucia is still important, and in 2020, the sector produced 8.4 tons of tilapia value and 1 tons of shrimp with combined production value at 0,07 USD million. Moreover, sea moss production was 82.5 tone with value in 1,81 million USD.

Saint Lucia is vulnerable to climate change due to its small geographical area, which accounts for the fact that disasters take on country-wide proportions; and its location in one of the highest-risk areas of the planet¹⁴⁴: These risks include, high volcanic and seismic activity, being situated in the tropical cyclone belts, and direct exposure to the forces of the oceans; and its dependence on few sources of income (agriculture, fisheries and tourism sectors) for a substantial part of its GDP. These sources of income have been severely reduced for months on end by single climate-related disasters. Another critical indicator of Saint Lucia's vulnerability is its limited capacity to reactivate the development process after a devastating weather event¹⁴⁵.

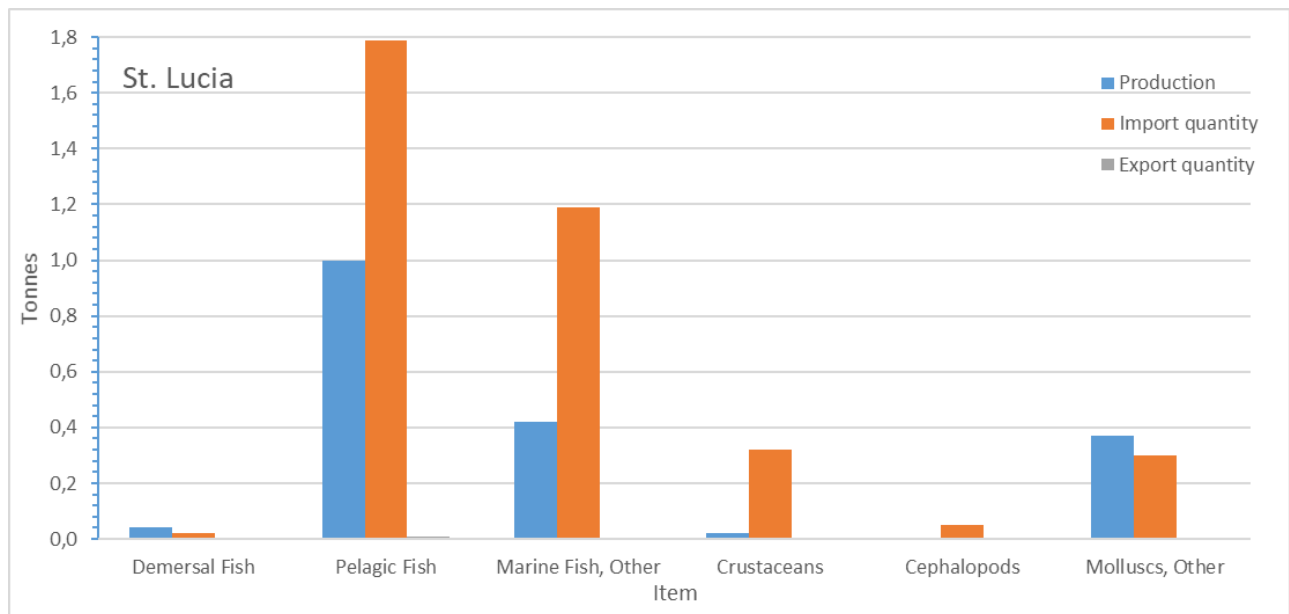


Figure 16: Fisheries production export and imports of St. Lucia reported for 2022 (FAO 2024)¹⁴⁶.

3. Current Climate and Climate Change Projections

3.1 Regional Summary

Caribbean island nations experience a tropical climate characterized by warm to hot temperatures year-round. The climate features distinct wet and dry seasons, with the wet season typically occurring from May or June to November or December, coinciding with the Atlantic hurricane season. The dry season occupies the remaining months, bringing relatively lower rainfall. The region is already experiencing the impacts of climate change, with rising temperatures and a rise in sea level, stronger hurricanes, longer dry seasons and shorter wet seasons. The Latin American and the Caribbean (LAC) region is largely influenced by the prevailing sea-surface temperatures (SSTs) and associated large-scale atmosphere-ocean coupling phenomena, such as the El Niño-Southern Oscillation (ENSO). The tropical Pacific and Atlantic are also essential influences on LAC's climate variability. Table 10 shows a summary of the regional trends, historic and projected.

Table 11 shows the level of risk of climate hazards by CABRIC country.

Table 10: Regional summary of historical and projected climate changes - color coded for statistical confidence of increase and decrease. Dark green = high confidence. Light green = medium confidence. Yellow = no statistical assessment. Grey = no trend / statistical assessment

CID	Historical trend ¹⁴⁷	Future Changes (SSP based 1850 - 1900 baseline) Near term (2021-2040), Long term (2081-2100) ¹⁴⁸
Mean surface temperature	Upward trend without attribution Warming trend of -0.09°C per decade 1850 -1900: $+26.37^{\circ}\text{C}$, 2025: $+27.42^{\circ}\text{C}$	High confidence of temperature increase SSP2-4.5: $1.2-1.8^{\circ}\text{C}$ (2050), $2.2-3.5^{\circ}\text{C}$ (2100) SSP5-8.5: $1.3-2.0^{\circ}\text{C}$ (2050), $3.6-5.9^{\circ}\text{C}$ (2100)
Extreme heat	High confidence of increase Days with bias adjusted maximum temperature above 35°C (days) 1850: 1900: 1.88+ days 2025: 24.16+ days	Upward trend with medium confidence of attribution SSP2-4.5: 8.0-67.1 days (2050), 12.9-92.1 days (2100) SSP5-8.5: 38.1-131.6 days (2100)
Mean precipitation	Caribbean has not gotten wetter or drier (no significant observed linear trend). Decadal variations account for 7% of the observed variability, while interannual variations account 91% of the observed rainfall patterns. The number of consecutive dry days is increasing, as well as the amount of rainfall during rainfall events.	High confidence of decrease under long term projections Near Term: 3.2-4.5 mm/day (SSP2-4.5 and SSP5-8.5) Long term: 2.9-4.3 mm/day (SSP5-8.5)
Aridity	Standardized Precipitation Index (SPI-6) $+0.51$ 1900 Standardized Precipitation Index (SPI-6) $+0.45$ 2025	Medium confidence of increase - Increasing aridity expected SSP 2-4.5 Standardized Precipitation Index (SPI-6) $+0.26$ fraction of unity 2050 $+0.17$ (2100)
Agricultural and ecological drought	Increasing drought trends are apparent , with the region-wide drought of 2013-16 being the most severe drought event recorded in the 66-year period between 1950 and 2016 ¹⁴⁹ .	Medium confidence of increase SSP scenario 2 indicate that a 1°C increase in temperature (from 1.7°C to 2.7°C) could result in a 60% increase in the number of people projected to experience severe water resources stress from 2043 to 2071.
Tropical cyclone	Significant increase in frequency and duration of Atlantic hurricanes since 1995 . Increase in category 4 and 5 hurricanes; rainfall intensity, associated peak wind intensities and mean rainfall for same period ¹⁵⁰ .	No change or slight decrease in frequency of hurricanes Towards the end of the century, a trend towards more potent storms could emerge, with potential increases in maximum wind speeds ranging from 2% to 11%. Over the next 80 years, the occurrence of the most intense Atlantic hurricanes (categories 4 and 5) could rise by about 80%, following the A1B scenario ¹⁵¹ .
Sea Surface Temperature	Preindustrial: $26.2-27.3^{\circ}\text{C}$ AR6: $26.8-27.9^{\circ}\text{C}$	SSP2-4.5: $27.4-28.6^{\circ}\text{C}$ (2050), $28.1-29.9^{\circ}\text{C}$ (2100) SSP5-8.5: $27.3-28.7^{\circ}\text{C}$ (2050), $29.0-31.6^{\circ}\text{C}$ (2100)
Relative sea level	Upward trend A regional rate of increase of 1.8 ± 0.1 mm/year between 1950 and 2009	High confidence of increase SSP2-4.5: 6-7 mm/year (2050), 8-9 mm/year (2100) SSP5-8.5: 7-8 mm/year (2050), 12-15 mm/year (2100)
Coastal flood	High impact due to hurricanes and sea-level rise	High confidence of increase Increased coastal flooding due to higher sea levels and more intense hurricanes
Coastal erosion	Mild to severe coastal erosion was observed in 13% of the Caribbean coast ¹⁵² .	High confidence of increase Increased erosion expected
Marine heatwave	Upward trend without attribution Upward trend observed	High confidence of increase Increasing frequency and severity expected
Ocean acidity	Upward trend without attribution Decreasing pH levels over the last 20 years, 3% decline in calcium carbonate saturation per decade	High confidence of increase Continued acidification impacting marine organisms

Table 11: Risk of Climate hazards by CABRIC country

Country	Cyclone	Coastal flood	Extreme heat	Landslide	Wildfire	Water scarcity	Urban flood	River flood
Bahamas	High	High	Medium	Low	Low	Low	Low	Low
Belize	High	Medium	High	Medium	High	Low	High	High
Grenada	Medium	Medium	Low	High	Low	NA	Low	Very low
Jamaica	High	High	Medium	High	High	Low	High	High
St Lucia	Medium	Medium	Medium	Medium	Low	Medium	Low	Low

3.1.1 Air Temperature

The average monthly air-temperature in the region generally ranges from approximately 22°C to 28°C throughout the course of the year. Coolest temperatures occur during the winter months for the Caribbean as a whole and across the region, while warmest temperatures generally occur in the summer months, peaking in August. There can be seen a slight zonal variation in the peak temperatures however where zones 1 and 6, however, have temperatures peaking in May and September respectively, likely reflecting the respective influences of the Pacific and Atlantic ITCZ. (SeeError! Reference source not found.Error! Reference source not found.)

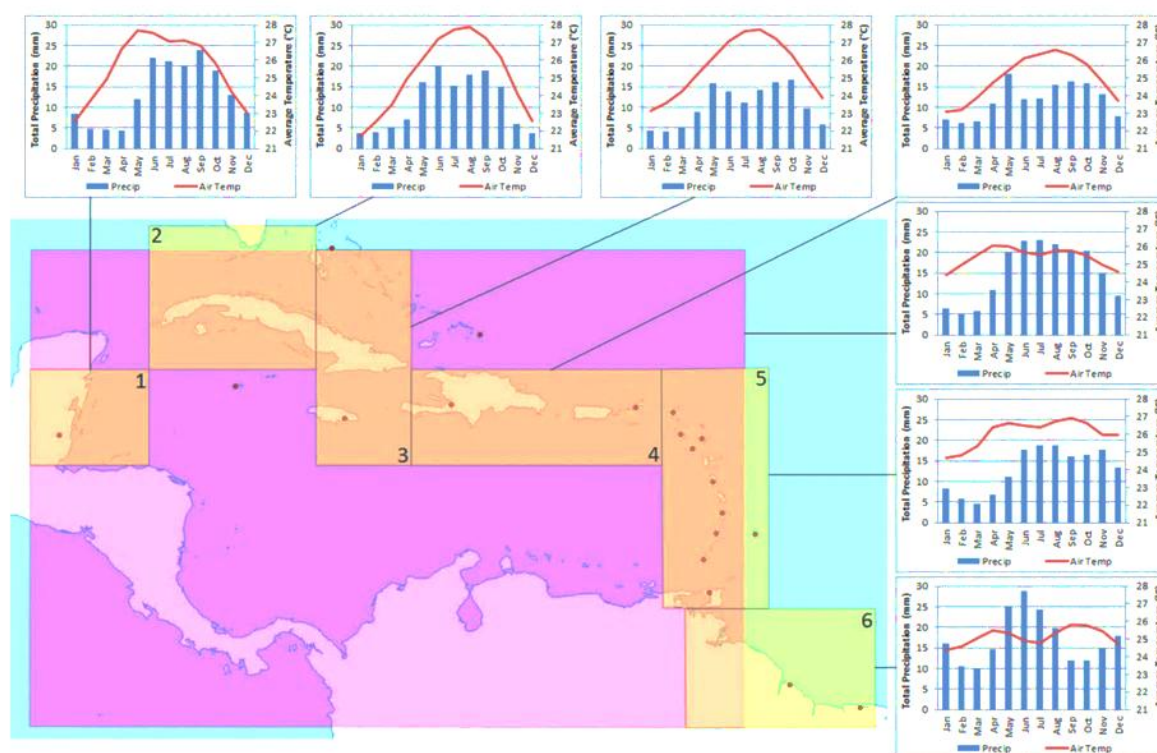


Figure 17: Rainfall and Air Temperature Climatologies for each of the six defined zones (averaging period: 1980-2014).

Air temperatures in the Caribbean region have experienced mean warming of over 0.58°C from the latter half of the last century to the present¹⁵³¹⁵⁴: Mean air temperature in the region ranges from 20°C - 30°C . Since 1960, average daytime temperatures have risen by approximately 0.19°C per decade while nighttime temperatures have increased by about 0.28°C per decade, highlighting a consistent warming trend¹⁵⁵.

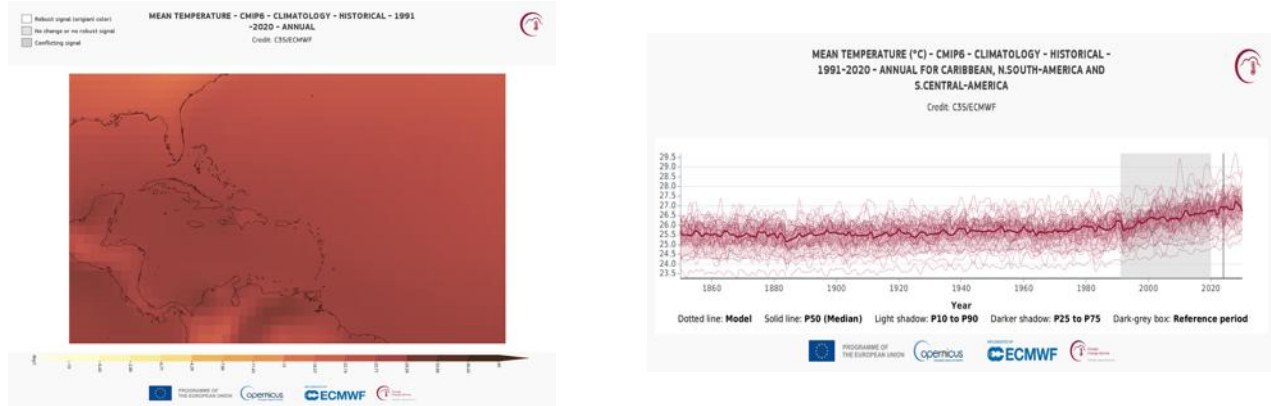


Figure 18 (Left) Mean annual temperature climatology (1991-2020) based on CMIP6 historical simulations¹⁵⁶.

Figure 19: (Right) CMIP6 - Mean temperature Change 1860 - 2020¹⁵⁷

Within the region, the mean daily minimum temperature ranges from 15°C to 26°C , with increases of up to 1°C compared to the preindustrial level: The entire Caribbean and North Latin America exhibit a clear warming trend; however, North Latin America is experiencing higher rates of warming compared to the Caribbean. Historical air temperature data show a statistically significant warming trend of approximately 0.09°C per decade, demonstrating a clear linear increase over time.

tre	CABRIC Country	Percentage of Temperature Variance	Trend	Decadal	Inter-Annual
Caribbean	Caribbean	65%	Significant at the 1% level	9%	24%
Zone 1	Belize	38%	Significant at the 1% level	18%	41%
Zone 2	Parts of Bahamas	17%	Significant at the 1% level	18%	56%
Zone 3	Jamaica, Parts of Bahamas	45%	Significant at the 1% level	12%	37%
Zone 4		46%	Significant at the 1% level	16%	33%
Zone 5	St Lucia, Grenada	62%	Significant at the 1% level	12%	22%

Figure 20 Air-Temperature Time Series Decomposition Numbers¹⁵⁸

According to the table, temperature variance across the Caribbean and its subregions is largely explained by climatic factors, with the Caribbean showing a 65% explained variance. However, some zones, such as Zone 2 (17%), exhibit lower explained variance, suggesting that other influences, such as localized ocean currents or extreme weather patterns, may contribute to temperature fluctuations. The statistically significant warming trend at the 1% level with the whole Caribbean confirms that rising temperatures in the region are not random but are part of a clear climatic shift. Additionally, the rate of temperature change per decade varies, indicating more rapid temperature changes over time. Meanwhile, inter-annual variance is highest in Zone 2 Bahamas (56%), suggesting that this region experiences the most year-to-year fluctuations in temperature more prominently than the long-term temperature changes. Overall, the data highlights significant regional differences in temperature variability.

This consistent trend highlights a dominant regional warming pattern, aligning with the global warming trajectory observed over the past century¹⁵⁹. It is warned that if average regional temperatures rise above 1.5°C then there will be considerable consequences for the region. Studies premised on the Shared Socio-economic Pathways (SSPs) suggest that the region's climate is likely to continue changing through the end of the current century¹⁶⁰.

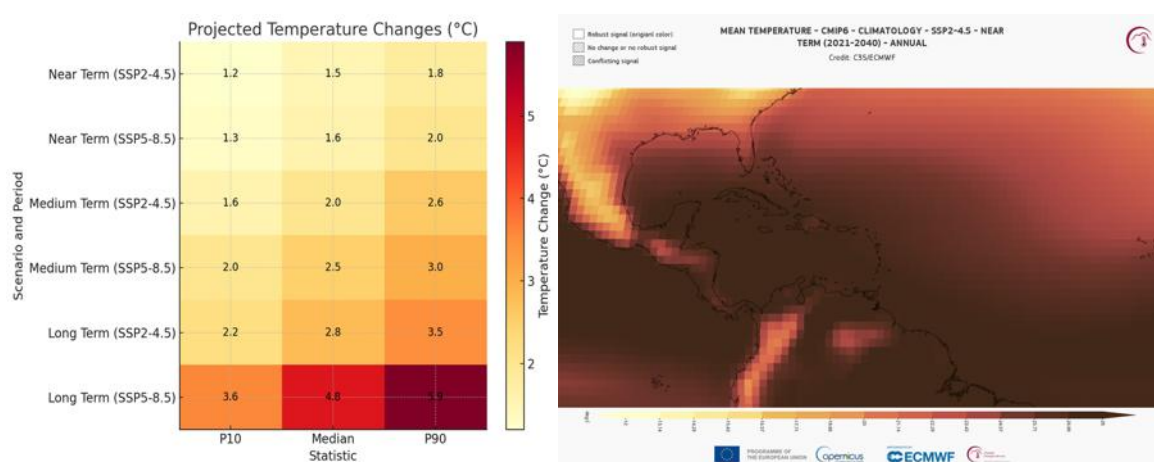


Figure 21 (Left) Projected Temperature Change for the Caribbean Region (Land) from 2021 to 2040 under SSP 2-4.5 scenario¹⁶¹.

Figure 22 (Right) Projected temperature changes for the region during near-term and long-term periods under SSP 2-4.5 and scenarios¹⁶².

Based on the Shared Socio-economic Pathways (SSPs), near-term projections (2021-2040) under the intermediate GHG emission scenario (SSP4.5) indicate greater magnitudes and frequencies of change compared to recent decades: By 2040, the region is projected to warm by 1.02 °C to 1.8 °C, with both land and ocean areas experiencing temperature increases. Under the higher emission scenario (SSP8.5), temperatures are expected to rise dramatically, reaching 3.6 °C to 5.9 °C by the end of the century (long-term: 2081-2100)¹⁶³. The most significant temperature rises are anticipated over larger land masses, such as the Greater Antilles. Alongside this warming, the frequency of temperature extremes will rise, with very hot days and nights becoming more common and very cold days and nights diminishing significantly. Prolonged periods of extreme heat, including consecutive hot days or warm spells, are also projected to increase.

3.1.2 Precipitation

The regions rainfall patterns are influenced by a mix of large-scale climatic systems and local factors. Key drivers include the North Atlantic Subtropical High (NASH), the Atlantic Warm Pool (AWP), and the Inter-Tropical Convergence Zone (ITCZ): The NASH strengthens trade winds and causes drier conditions during the dry season and mid-summer drought, while the AWP influences sea surface

temperatures, marking the wet season's onset. The ITCZ adds variability through its latitudinal shifts, particularly in the southern and western Caribbean. Regional mechanisms like the Caribbean Low-Level Jet (CLLJ), African Easterly Waves (linked to hurricanes), and North American cold fronts further refine rainfall patterns. Local factors, such as sea breezes and mountainous terrain, enhance rainfall in specific areas. Together, these systems shape the seasonal and regional variability of the Caribbean's precipitation.

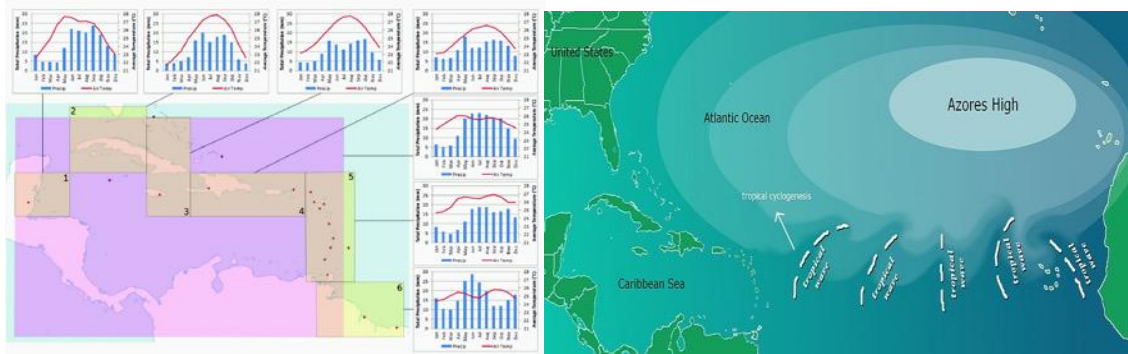


Figure 23 (Left) Rainfall and Air Temperature Climatologies for each of the six defined zones (averaging period: 1980-2014).

Figure 24 (Right) Azores Anticyclone in a fortified state shown covering a vast expanse of the North Atlantic¹⁶⁴

In terms of precipitation, the average annual precipitation throughout the region is approximately 2,200 mm or higher yet varies widely. The Caribbean region exhibits distinct wet and dry seasons, with the wet season running from May to November and the dry season spanning December to April. Across much of the region, the wet season displays a bimodal rainfall pattern, characterized by two peaks: one in May or June and another between September and December. These seasonal variations give rise to four well-defined rainfall periods commonly used to describe the Caribbean climate: the Early Dry Season (December-April), the Early Rainfall Season (May-June), the Mid-Summer Drought (MSD, July-August), and the Late Rainfall Season (September-November). These patterns are defining features of the region's climatology¹⁶⁵.

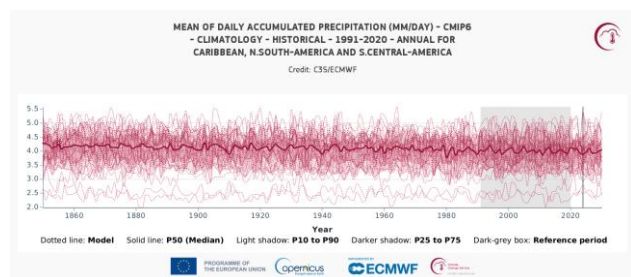
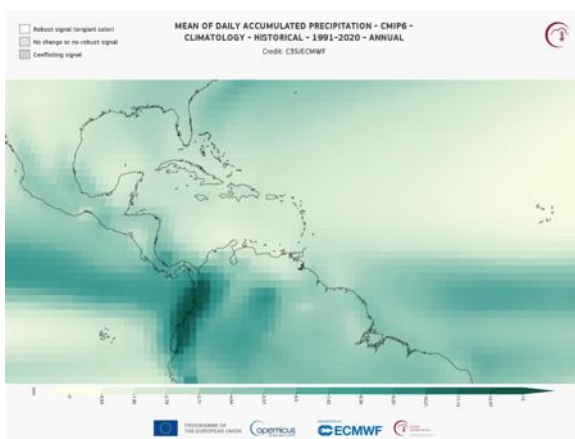


Figure 25 Mean daily Precipitation climatology (1991- 2020) based on CMIP6 historical simulations¹⁶⁶

Figure 26 Mean Daily Precipitation 1991-2020 CMIP6¹⁶⁷

A slight decrease in rainfall in the region was seen in the period 1860 - 2020 but not found to be statistically significant. However, the variability of precipitation is: The figure presents monthly rainfall data for the Caribbean region from 1860 to 2020. While there is a slight downward trend in rainfall over the period, it is not statistically significant. However, the data reveal notable decadal variability,

with periods of wetter years (e.g., the 1940s and 1950s) contrasting with drier years (e.g., the 1960s and 1970s). Additionally, the data exhibit even more pronounced interannual variability, highlighting substantial year-to-year fluctuations in rainfall.

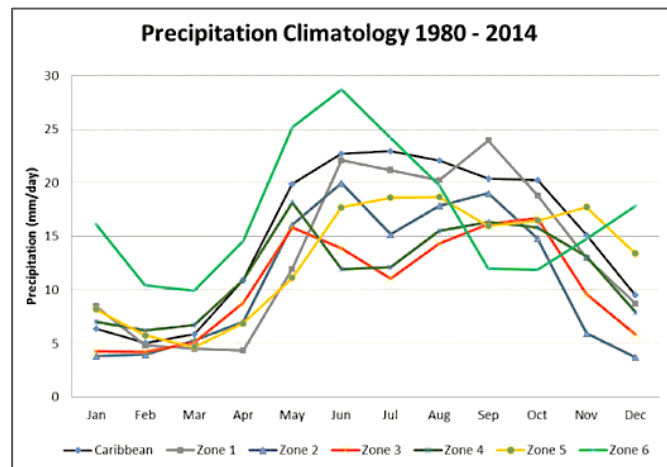


Figure 27 Regional Precipitation Climatology Comparison 1930 - 2014¹⁶⁸

Rainfall patterns in the Caribbean vary significantly across zones: Belize (Zone 1) display distinct bimodal patterns, with rainfall peaks in May/June and September/October. In contrast, the Bahamas (Zone 3) experiences lower rainfall totals (2-17 mm/month) with a pronounced dry season (December-April) and modest bimodality. The islands of Grenada, and St. Lucia (Zone 5) exhibit a unimodal rainfall pattern, steadily increasing to a peak in July/August without a prominent mid-summer drought. These will be discussed under each country in more depth in the coming section. This variability highlights the diverse rainfall regimes in the region¹⁶⁹.

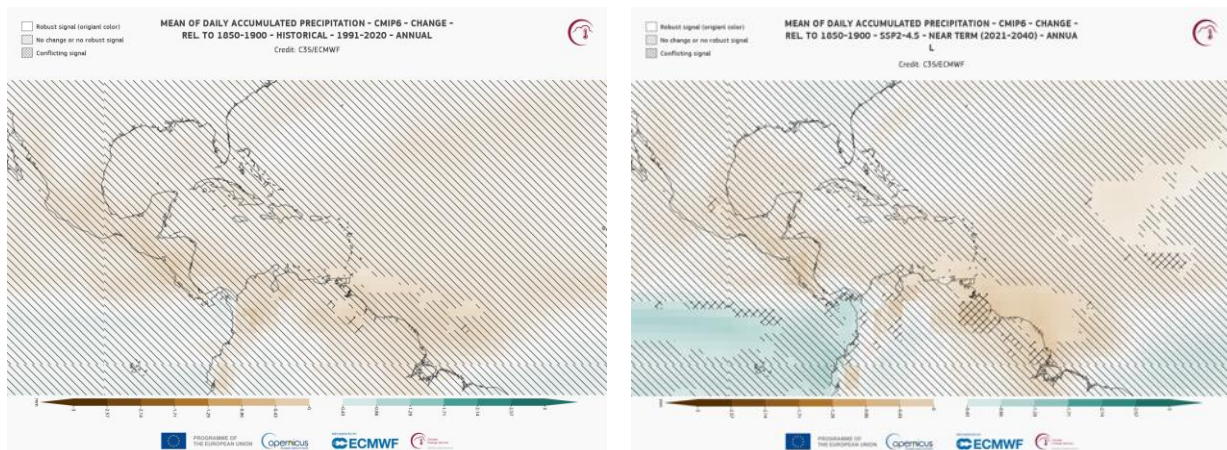


Figure 28 (Left) Mean of daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 historical data for the period 1991-2020 (annual)^{170 and 171}

Figure 29 (Right) Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the near term (2021-2040) under the SSP2-4.5 scenario (annual)¹⁷²

In the projected future scenario, the Caribbean and North Latin American regions under the SSP 4.5 near-term scenario do not exhibit significant changes, with only minor indications of drying or stabilization in rainfall patterns (Figure 28 & Figure 29). However, under higher emissions scenarios, the changes become more evident, particularly during the wet season, which shows more

pronounced drying (Figure 30 & Figure 31): Starting in the 2020s, signs of drying during the wet season emerge, with reduced rainfall during May-July (MJJ) and September-November (SON) across the Caribbean. Additionally, some areas experience drying during the dry season, particularly from November to January (NDJ). By the 2050s, average rainfall is projected to decrease by up to 6%, and by the end of the century, the region could experience a rainfall reduction of as much as 17% ¹⁷³.

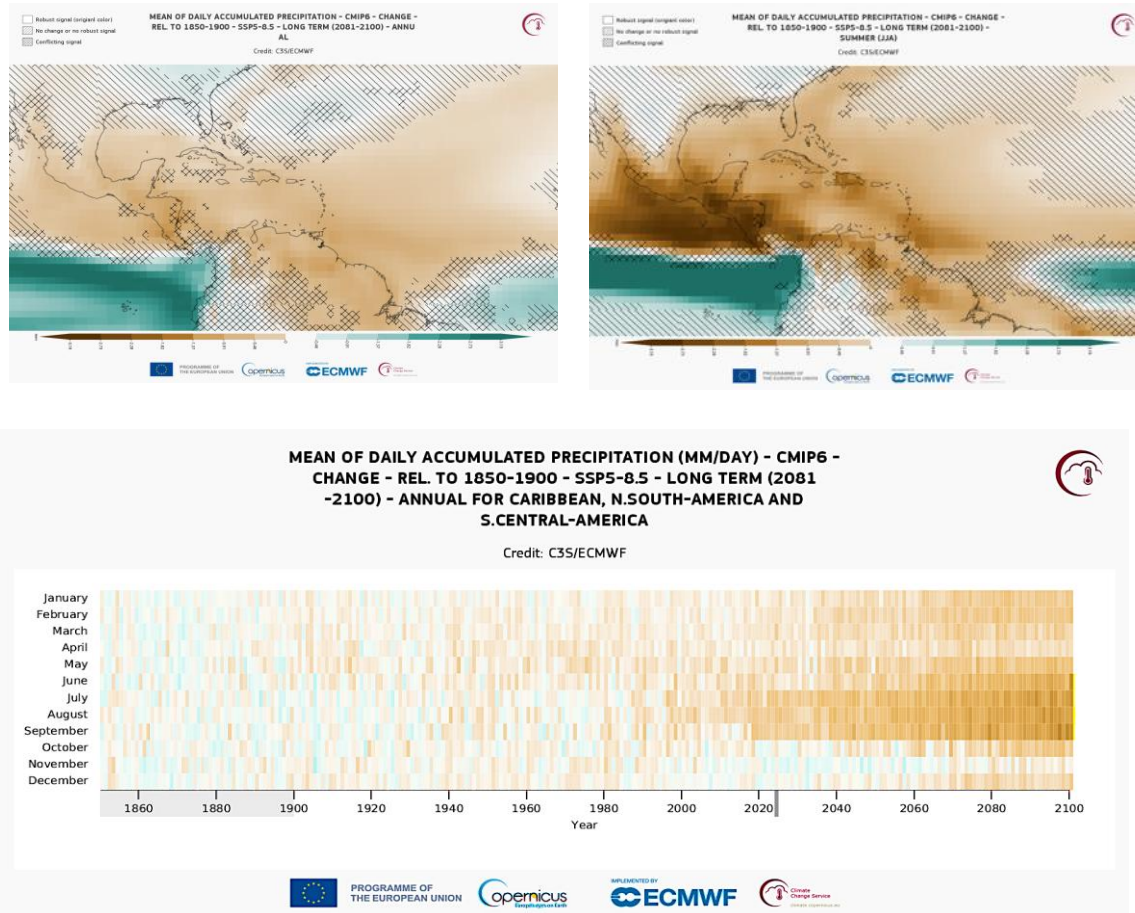


Figure 30 (Left): Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the long term (2081-2100) under the SSP5-8.5 scenario (annual)¹⁷⁴

Figure 31 (Right): Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the long term (2081-2100) under the SSP5-8.5 scenario for the wet season months (June-July-August)¹⁷⁵.

Figure 32 (Centre): Mean daily accumulated precipitation changes relative to the 1850-1900 baseline, based on CMIP6 projections for the long term (2081-2100) under the SSP5-8.5 scenario (Seasonal)¹⁷⁶

Projections for the Caribbean indicate significant changes in precipitation patterns, with the most severe drying expected during the wet season (May-September), under higher emission scenarios in the longer term (Figure 31): This seasonal drying is more pronounced compared to annual precipitation trends, highlighting the heightened vulnerability of the region's wet season to future climate changes. The dry season will also experience reduced rainfall, particularly under higher emission scenarios, though to a lesser extent than the wet season. Annual precipitation is projected to decline significantly under high emissions, with moderate reductions under lower emissions pathways. These changes, especially the pronounced drying during the late wet season, present critical challenges for water resource management in the region, emphasizing the need for adaptive strategies to address future water scarcity. The dry season experiences less pronounced drying compared to the late wet season, but reductions under high emissions scenarios could still exacerbate water scarcity during this period.

3.1.3 Sea Surface Temperature

Globally, in the late 1970s, the SST abruptly started to rise, and this warming continues affecting El Niño and La Niña patterns: Between the late 19th century (1880-1900) and the last five years (2019-2023), the average SST over the extrapolar ocean has increased by about 0.9°C . The increase from 1980 to 2023 has been around 0.6°C . Central and eastern Tropical Pacific SST conditions are especially crucial for identifying the onset of El Niño and La Niña and their influence on climate patterns and extremes, both worldwide and in particular in the LAC region. El Niño and La Niña together with the Southern Oscillation, defined as the atmospheric pressure difference between Tahiti and Darwin, comprise the El Niño Southern Oscillation (ENSO).

Sea Surface temperatures in the Caribbean have risen 0.5°C between 2000 and 2024: The Caribbean follows a similar pattern to global trends, the sea surface temperature (SST) change in 2020, relative to the 19th century, shows a similar trajectory of approximately 1°C . Compared to the year 2000, by 2024, the SST within the Caribbean Sea has increased by around 0.5°C , reflecting a significant warming trend over the past two decades.

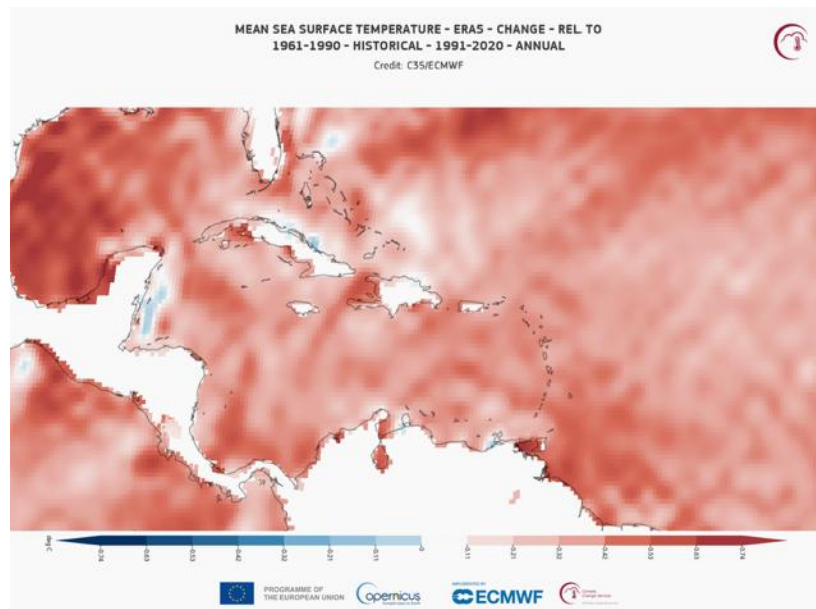


Figure 33: Mean Sea Surface Temperature - ERA5 Change Rel to 1961 - 1990 Historical 1991 - 2020 Annual

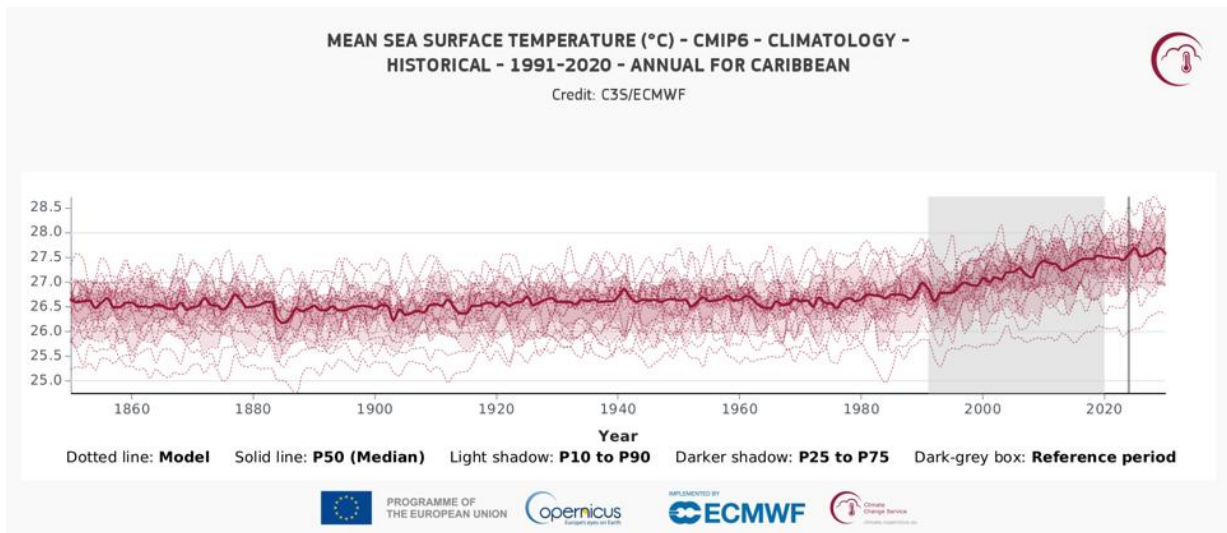


Figure 34: Mean Sea surface temperature (°C) for the Caribbean based on CMIP6 climatology (1991-2020), representing annual averages from historical simulations (1850-2020)¹⁷⁷.

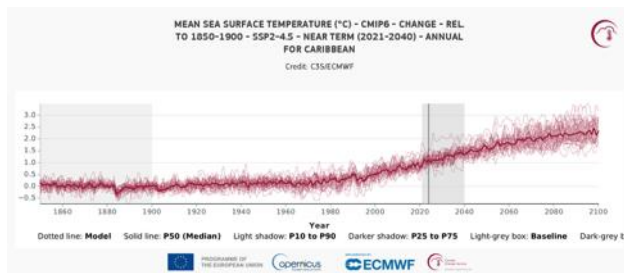


Figure 36 Projected mean sea surface temperature (SST) change (°C) for the Caribbean under the SSP2-4.5 scenario, relative to the 1850-1900 baseline, for the near term (2021-2040) and longer-term periods.

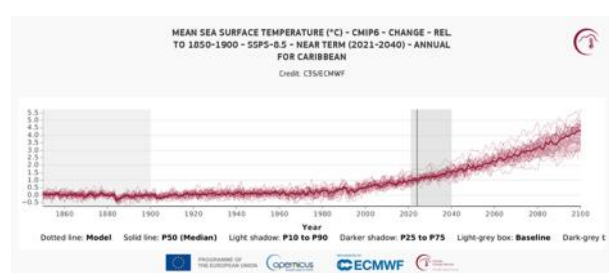


Figure 35 Projected mean sea surface temperature (SST) change (°C) for the Caribbean under the SSP5-8.5 high-emission scenario, relative to the 1850-1900 baseline, for the near term (2021-2040) and longer-term periods.

By 2050, SSTs are expected to increase by approximately 1.91 °C, and by 2100, they are projected to rise by 2.89 °C, reflecting moderate warming trends associated with this intermediate-emission pathway: The first figure illustrates projected sea surface temperature (SST) changes for the Caribbean under the SSP2-4.5 scenario, relative to the 1850-1900 baseline. In contrast, the second figure depicts SST projections for the SSP5-8.5 high-emission scenario, where warming is more pronounced. By 2050, SSTs are projected to increase by 2.25 °C, and by 2100, the increase could reach up to 4.83 °C. These figures highlight the significant acceleration of warming under both emission scenarios, emphasizing the potential impact of emissions trajectories on the Caribbean's sea surface temperatures.

3.1.4 Sea Level Rise

Globally, sea levels rose at an average rate of 1.7 ± 0.2 mm/year during the 20th century, based on tide gauge records¹⁷⁸: This rate represents the fastest increase in sea levels over the last 28 centuries¹⁷⁹. However, satellite altimeter data reveal that the rate of sea level rise accelerated to 3.2 ± 0.4 mm/year by the late 20th and early 21st centuries suggesting an ongoing acceleration linked to global warming¹⁸⁰.

The decadal average rate of sea-level rise has more than doubled since the start of the satellite record, increasing from 2.13 mm per year between 1993 and 2002 to 4.77 mm per year between

2014 and 2023¹⁸¹: In the Latin America and Caribbean (LAC) region, studies of historical sea level trends are less comprehensive due to limited long-term records. However, the available research suggests that the Caribbean Sea level trends closely mirror global trends. For example, one study calculated a mean sea level rise of 1.8 ± 0.1 mm/year for the period 1950-2009¹⁸². While another study estimated a rate of 1.7 ± 1.3 mm/year for 1993-2010¹⁸³, both comparable to the global rate of 1.7 ± 0.2 mm/year. When adjusted for Global Isostatic Adjustment (GIA), the Caribbean Sea level trend measured by satellite altimetry is approximately 2.5 ± 0.4 mm/year.

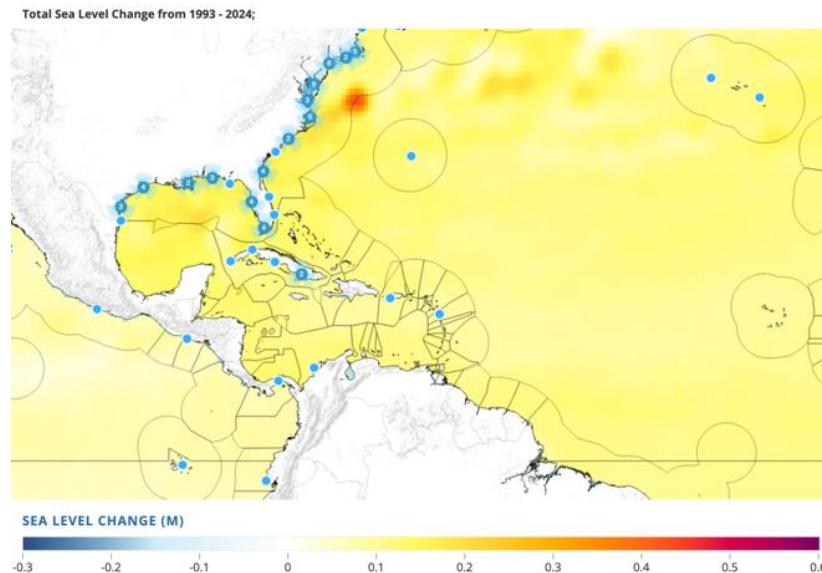


Figure 37 Total Sea level change from 1993- 2024¹⁸⁴

Despite aligning with global trends, sea level rise in the Caribbean shows notable regional variation:

The Mean Reconstruction Sea Level (MRESL) dataset highlights that the northern and southern Caribbean, particularly near the South American coastline and Mexico, experiences some of the highest rates of sea level rise at $3.56 \text{ mm} \pm 0.10 \text{ mm per year}$, significantly exceeding the rates observed on the Pacific side of the Atlantic¹⁸⁵.

In addition to spatial variability, Caribbean Sea levels exhibit decadal and interannual fluctuations:

Interannual variability is particularly correlated with the El Niño-Southern Oscillation (ENSO). Since the mid-1980s, stronger El Niño events have been associated with larger increases in Caribbean Sea levels, reaching as high as 11.3 cm above the mean during the 2015 El Niño¹⁸⁶¹⁸⁷. Similarly, interannual sea level variability has shown a significant correlation with hurricane activity, especially after 2000, as increased hurricane intensity has coincided with rising sea levels¹⁸⁸.

Mean Sea Level Rise projected scenarios SSP 2- 4.5 and SSP 5- 8.5



Period	Scenario	P10	Median	P90
Near Term (2021-2040)	SSP2-4.5	0.10	0.10	0.20
Near Term (2021-2040)	SSP5-8.5	0.10	0.10	0.20
Medium Term (2041-2060)	SSP2-4.5	0.10	0.30	0.40
Medium Term (2041-2060)	SSP5-8.5	0.20	0.30	0.40
Long Term (2081-2100)	SSP2-4.5	0.30	0.60	0.90
Long Term (2081-2100)	SSP5-8.5	0.50	0.70	1.10

Created with Datawrapper

Figure 38: Projected mean sea level rise (meters) in the Caribbean for SSP2-4.5 and SSP5-8.5 scenarios across different time periods: near term (2021-2040), medium term (2041-2060), and long term (2081-2100).

Data indicates higher sea level rise impacts under SSP5-8.5, with up to 1.1 meters of rise by 2100, (0.7m under a median or 0.5m lower bound): Figure 38 presents P10 (lower bound), Median (central estimate), and P90 (upper bound) projections, highlighting the significant differences between moderate (SSP2-4.5) and high-emissions (SSP5-8.5) scenarios.

By the end of the century, global mean sea level is projected to rise by at least one foot (0.3 meters) above 2000 levels¹⁸⁹: In the Caribbean, projections under the moderate emissions scenario (SSP2-4.5) indicate a regional sea level rise of 0.1 meters in the medium term and 0.2 meters by the end of the century. However, under the high-emissions scenario (SSP5-8.5), the Caribbean is expected to experience significantly greater impacts, with sea levels rising by 0.3 meters in the medium term and up to 0.7 meters by the end of the century—more than double the global mean sea level rise under the same scenario. This highlights the heightened vulnerability of the Caribbean to rising sea levels¹⁹⁰.

Sea level rise in the Caribbean is exacerbating saltwater intrusion into low-lying areas, leading to increased salinization of soils and reducing agricultural productivity. The region has experienced a rise of approximately 20 cm between 1901 and 2010, with recent rates accelerating to 3.1 mm annually. This growing threat impacts the availability of freshwater, the viability of crops, and the overall resilience of coastal ecosystems¹⁹¹.

3.1.5 Surface Wind

Wind hazards are an important concern for the Caribbean, especially as global climate patterns shift due to climate change: Globally, wind speeds over oceans have been increasing by 0.25-0.5% per year¹⁹². In the Caribbean region specifically, wind speeds have shown an upward trend of 0.01-0.02 m/s per year between 1985 and 2018¹⁹³.

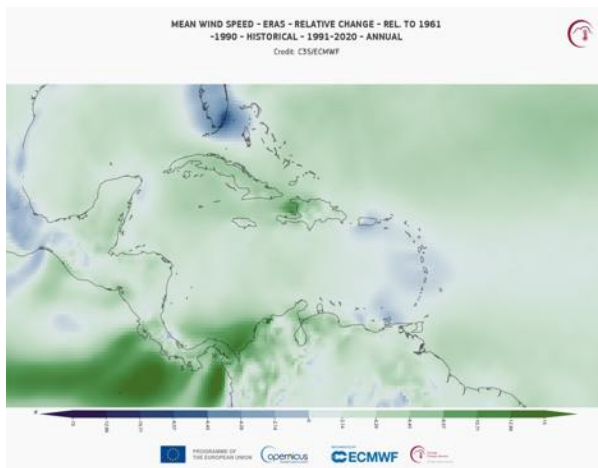


Figure 40 Mean wind speed ERA5 Relative change relation to 1961 - 1990 in 1991- 2020

Historical data from 1850-2014 also indicate significant increases of wind speed, with spatially averaged trends of 0.05 ± 0.01 m/s per century in the Caribbean and 0.08 ± 0.01 m/s per century within the **Caribbean Low-Level Jet (CLLJ)**. Projections for the 21st century under the SSP2-4.5 and SSP5-8.5 scenarios indicate that wind speeds will increase further, with rates ranging from 0.06 ± 0.02 to 0.22 ± 0.02 m/s in the broader Caribbean and from 0.16 ± 0.03 to 0.45 ± 0.03 m/s in the CLLJ, depending on the emission scenario. These projections suggest that the CLLJ will experience more pronounced increases in wind speeds compared to the overall Caribbean, particularly under the higher SSP5-8.5 emission scenario. This highlights the growing importance of understanding wind hazards and their potential impacts in the region¹⁹⁴.

3.1.6 Universal Thermal Climate Index (UTCI)

The **Universal Thermal Climate Index (UTCI)** is a biometeorological index that evaluates **human thermal stress** based on environmental factors like air temperature, humidity, wind speed, and radiation. It provides a more comprehensive measure of heat stress than traditional temperature readings by considering how the human body responds to different weather conditions. The rise in UTCI is explained by increasing air temperatures, higher radiation levels, and decreasing wind speeds, making conditions feel hotter and more stressful on the human body.

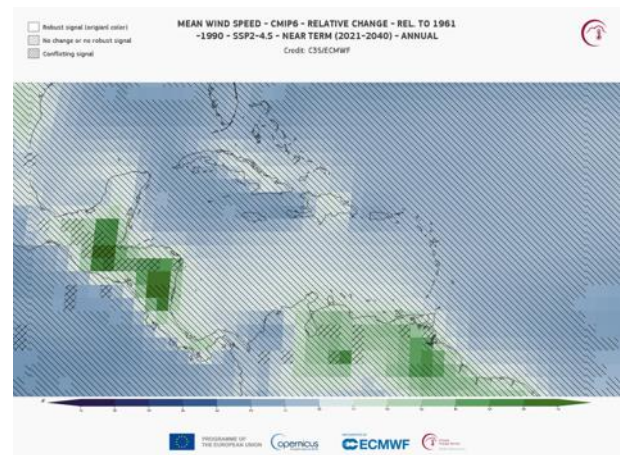


Figure 39 Projected mean wind speed 2021-2040 Near term

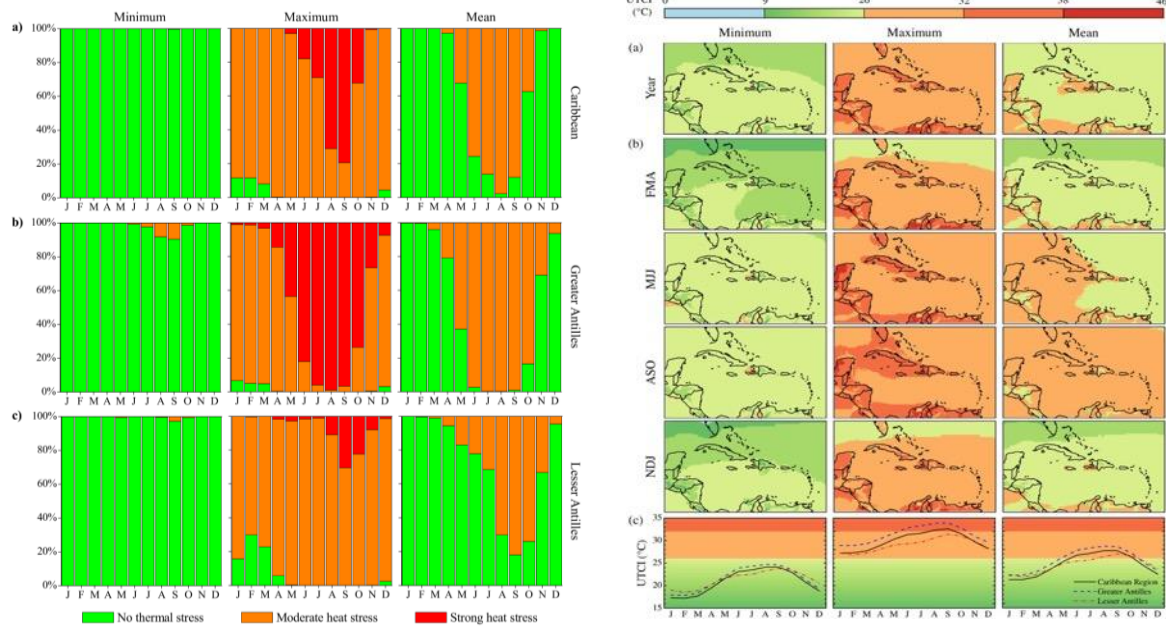


Figure 41 Monthly frequency of UTCI (Universal Thermal Climate Index) categories for the Caribbean region (a), the Greater Antilles (b) and the Lesser Antilles (c). The frequency refers to the percentage of days when daily minima, maxima and means fall in indicated UTCI categories over the 1980-2019 historical period.

Figure 42 Yearly (a), seasonal (b), and monthly (c) UTCI climatology for the 1980-2019 historical period. Background colors refer to the UTCI stress category scale at the top of the figure

A study¹⁹⁵ conducted in the Caribbean on UTCI figures identified that the peak heat stress season occurs during the rainy months of August, September, and October (ASO), when temperature and humidity are at their highest, and wind speeds are at their lowest. Over the past four decades, UTCI has been rising at a rate of more than 0.2 °C per decade across the region, with the most significant increases (0.45 °C per decade) observed in southern Florida and the Lesser Antilles. While the Lesser Antilles have experienced a continuous rise in UTCI, the Greater Antilles have shown fluctuations, with periods where the increase in heat stress slowed. The record-breaking heat season of 2020 further underscored this trend, with UTCI values surpassing historical averages, indicating that local populations faced more severe heat stress than usual, a trend that continues to intensify alongside rising air temperatures.

3.1.7 Extreme events

Extreme weather events have significantly impacted the Caribbean, with tropical cyclones being the most frequent and costly disasters in the region: As illustrated in Figure 43, tropical cyclones account for the majority of occurrences, far surpassing other events such as droughts, riverine floods, and flash floods. These cyclones are also responsible for the highest economic damages, reaching billions of USD. In comparison, riverine floods and droughts occur less frequently but still pose substantial risks. Events like forest fires, convective storms, and coastal floods are rare but contribute to the diverse range of extreme events impacting the region. This highlights the critical need for understanding and addressing the growing threats posed by extreme weather events to build resilience across the Caribbean.

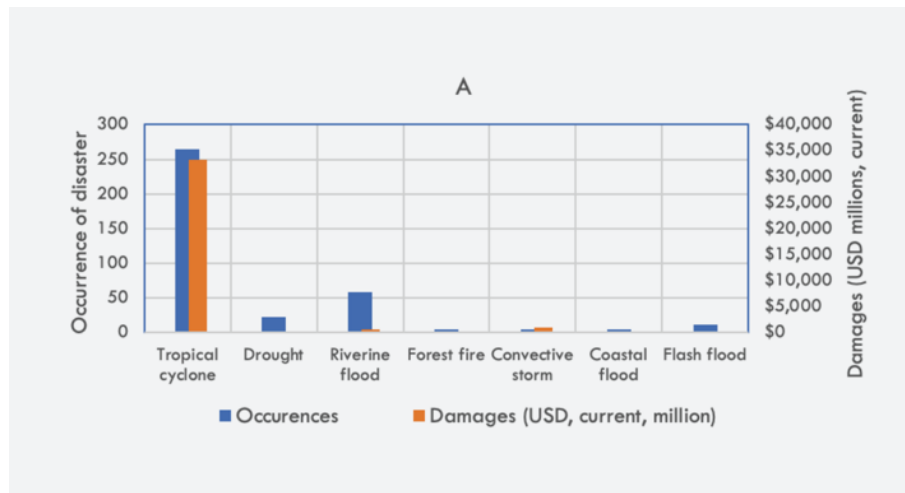


Figure 43: Occurrences of extreme events across the Caribbean

a) Tropical Cyclones

The North Atlantic hurricane season extends from June to November, aligning with the period when the Gulf of Mexico, the Caribbean Sea, and the North Tropical Atlantic are most active for convective activity: While the official season spans June 1 to November 30, storm activity can occasionally occur in May or December. The season peaks between mid-August and late October, with the highest activity typically around September 10th. A secondary peak, primarily affecting the Caribbean Sea and the Gulf of Mexico, occurs mid-October, followed by a rapid decline in storm frequency toward the season's end.

The total number of storms passing through the North Atlantic region from 1950 to 2019 reveals a marked increase in tropical cyclone activity since 1995, particularly in the frequency of intense category 4 and 5 storms: While recent research increasingly suggests a connection between global warming and changes in hurricane activity, especially the rise in intense hurricanes, consensus remains elusive regarding the extent of its impact. The El Niño-Southern Oscillation (ENSO) significantly impacts hurricane activity in the North Atlantic, with El Niño reducing hurricane frequency and La Niña increasing it. El Niño creates higher vertical wind shear, limiting hurricane formation in the deep Tropics, while La Niña encourages more storms, particularly major hurricanes.

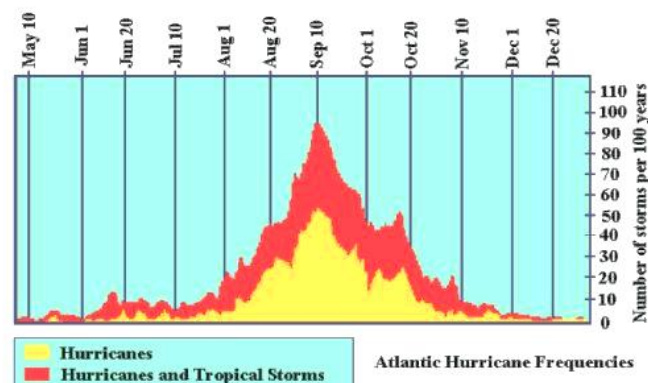


Figure 44 Seasonal Frequency of Atlantic Hurricanes and Tropical Storms¹⁹⁶.

An analysis of hurricane impacts across Caribbean zones reveals distinct patterns in storm frequency and intensity, highlighting the spatial variability of hurricane impacts: Zone 1 (Belize) experienced a

notable number of intense category 4 hurricanes, emphasizing its vulnerability. Zone 2, spanning multiple countries, had the highest total number of hurricanes (23) with a balanced distribution across categories. Zone 3 (Jamaica and the Bahamas) saw a mix of storms, including many category 1 hurricanes (9) and a significant number of category 4 storms (11). Zone 4 (Haiti) faced numerous category 1 storms (12) alongside moderate and strong hurricanes, showing its susceptibility. Zone 5 (Eastern Caribbean islands) displayed a similar pattern but with fewer category 4 storms, while Zone 6 (Grenada, Guyana, and Suriname) experienced no hurricanes during the analyzed period. See Table 12.

Table 12 Named storms within the region from 1980 to 2016 ¹⁹⁷ and ¹⁹⁸

ZONES	CABRIC countries	NUMBER OF HURRICANES					Total
		CAT 1	CAT 2	CAT 3	CAT 4	CAT 5	
1	Belize	2	3	2	4	3	14
2	-	6	5	4	5	3	23
3	Jamaica and Bahamas	9	2	3	11	0	25
4	-	12	1	4	7	1	25
5	St Lucia and St Vincent, the Grenadines	10	4	3	7	0	24
6	Grenada	0	0	0	0	0	0
Total		39	15	16	34	7	111

A slight increase in storm intensity, strong increase in cyclone- rainfall rates and moderate increases in wind speeds are projected globally: The IPCC Special Report on Extremes (2012) highlights key projections regarding future hurricanes under global warming, while there is low confidence in predicting changes to cyclone genesis, tracks, or locations due to complex atmospheric and oceanic variability, models consistently project a slight increase in storm intensity. Tropical cyclone-related rainfall rates are expected to rise by 20-30% in storm cores by the late 21st century, and maximum wind speeds could increase by 2-11%.

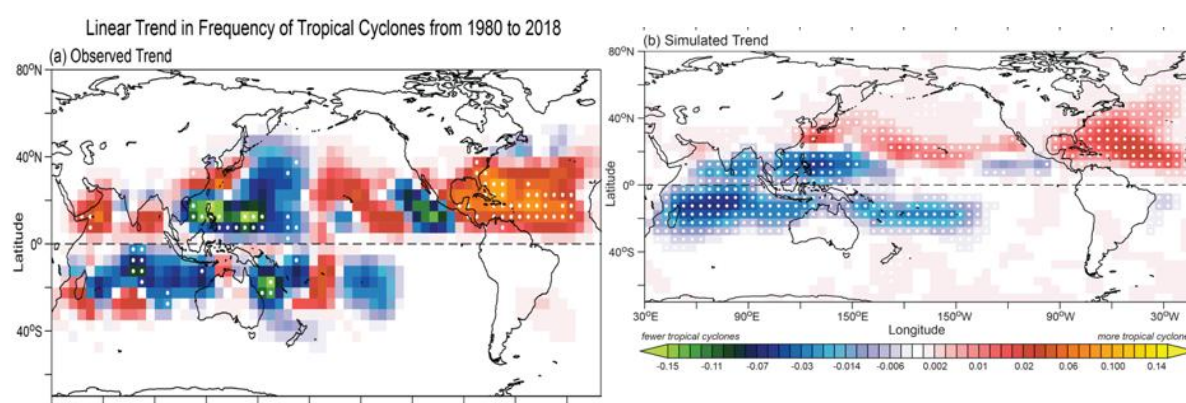


Figure 45 Comparison of observed (left) and modelled (right) linear trends of tropical cyclone occurrence (1980-2018)¹⁹⁹

Although the global frequency of tropical cyclones may remain stable or decrease, the frequency of intense storms, particularly category 4 and 5 hurricanes, is projected to increase: For the Atlantic, overall storm numbers are expected to decline by 28%, but category 4 and 5 hurricanes could rise by the

end of the century. These findings underscore the need for the Caribbean to prepare for fewer but more intense storms, with higher rainfall rates and stronger winds²⁰⁰.

Since 2020, the most devastating hurricane to impact the Caribbean was Hurricane Beryl in 2024. The focus in the Eastern Caribbean and Jamaica shifted to assessing and addressing the effects on the hardest-hit regions, particularly in Grenada, and Jamaica. In Grenada, six confirmed deaths were recorded, along with 27 injuries, and two individuals remained missing²⁰¹. The total economic damages in Grenada were estimated at \$218.0 million, which is approximately 16.5 percent of the country's 2023 GDP²⁰².

Hurricane Rafael was another significant storm to impact the Caribbean in 2024, responsible for at least two direct fatalities during its time as a tropical cyclone. Reports indicated that over 3,000 homes were damaged in the Artemisa and Mayabeque provinces of Cuba, including reinforced structures such as hospitals and schools. Jamaica suffered back-to-back hurricane hits in 2024 and 2025, with Hurricane Melissa's catastrophic toll in the latter year estimated to reach US\$20 billion, surpassing the country's entire 2024 economic output²⁰³.

b) Flooding

The Caribbean region is highly vulnerable to flooding, primarily driven by hurricanes and tropical storms: According to the EM-DAT disaster database, tropical cyclones accounted for 71.4% of meteorological disaster events between 1960 and 2013, often triggering riverine flooding²⁰⁴. Additionally, tropical cyclones were responsible for 94.5% of the total damage from meteorological disasters in the region since 1960, underscoring the significant role hurricanes play in causing floods. A study highlighted the impact of storms and flooding, with at least 250 events between 1970 and 2009 causing approximately USD 20 billion in damages²⁰⁵.

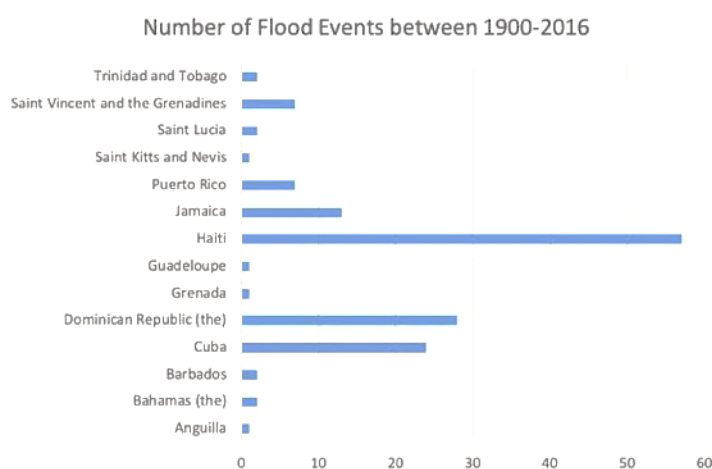


Figure 46 Flood events 1900 - 2016²⁰⁶

This disparity in flood frequency across the region underscores how heightened vulnerability is likely driven by a combination of geographic, climatic, and infrastructural factors that influence flood risks across the Caribbean: Figure 46 highlights the number of flood events recorded in various Caribbean Island nations between 1900 and 2016. Haiti stands out with nearly 60 flood incidents, far exceeding other countries in the region. In contrast, nations such as Anguilla, Grenada, and Saint Kitts and Nevis experienced minimal flooding, with fewer than five events each. Moderate flood activity, ranging from 10 to 20 events, was observed in countries like Jamaica and Puerto Rico.

The impacts from flash floods can range from water damage to infrastructure and property to crop losses to contamination of water supplies by waste, toxic material or biological contaminants: Flash

floods can also increase landslide risk, for instance by destabilising slopes and through erosion. Two recent notable examples of flash floods impacting the region are the 2015 floods in Dominica from Tropical Storm Erika and the 2013 'Christmas floods' between 24 and 26 December in Dominica, St. Lucia and St. Vincent and the Grenadines²⁰⁷.

The Caribbean wet season is characterized by intense rainfall, often resulting in flash flooding when heavy showers occur in rapid succession, exceeding the soil's infiltration and surface drainage capacity: While such rainfall replenishes water reservoirs, the increasing intensity of extreme rainfall events poses significant flood risks. Projections from SDSM models indicate a rise in key rainfall extremes, such as the number of heavy rainfall days and maximum 1-day and 5-day rainfall totals. These trends suggest that, even as overall rainfall may decline, extreme rainfall events are expected to become more frequent and severe²⁰⁸.

The Caribbean's most recent extreme flooding event occurred in 2022, causing significant impacts across several affected regions. The countries most affected by the 2022 flooding events were Saint Lucia and Jamaica, experiencing significant damage and disruption. Infrastructure was damaged, families were displaced, and access to clean water and electricity was disrupted. Impassable roads hindered relief efforts, requiring air and boat transport. Health risks increased due to improper waste disposal and a surge in mosquito populations²⁰⁹. The November 6, 2022, trough system caused significant flooding, flash floods, landslides, and land slippage across Saint Lucia, damaging both public infrastructure and private property. Around 300 households were affected, with losses of 80-90% of household items. Preliminary damage to residential properties exceeded EC\$1.8 million. Public infrastructure costs reached EC\$854,180, while agriculture losses totalled EC\$1.2 million. Eight schools, including Dame Pearlette Louisy Primary, suffered extensive damage, requiring EC\$2.4 million for repairs. Overall, preliminary loss estimates, excluding commercial sector damages, exceed EC\$6.2 million²¹⁰.

c) Drought

The Caribbean region faces significant challenges due to drought, often overlooked because of its slow onset: Over recent decades, the region has experienced several drought events, many linked to El Niño years, including notable occurrences in 1957, 1968, 1976-77, 1986-87, 1991, 1994, 1997-98, 2009-10, and 2013-16²¹¹. Among these, the 2013-16 drought was the most severe, affecting virtually the entire region as a Pan-Caribbean drought²¹². During this period, 2014 saw the largest area under drought conditions since 1950, while 2015 was the driest year, marked by the highest potential evapotranspiration (PET) and extreme temperatures, compounding the severity of the drought²¹³. Although the 2013-16 drought was linked to the 2015/16 El Niño event, anthropogenic warming contributed approximately 15-17% of the severity, increasing evapotranspiration rates and affecting 7% of the land area²¹⁴. These findings indicate that human-induced climate change is already amplifying drought risk across the region. Figure 47 shows drought index from 1974 to 2016.

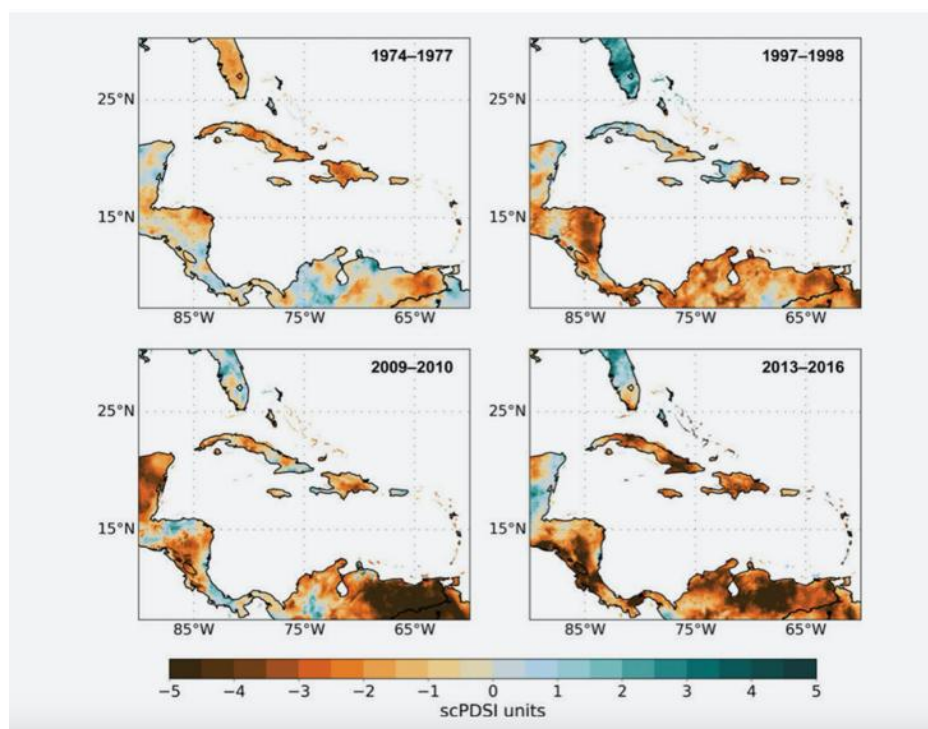


Figure 47: Regional incidence of drought 1974 - 2016

The Caribbean region has been facing increasingly severe drought conditions, particularly in Jamaica, where less than 10% of agricultural land is irrigated and 80% of farmers rely on rainfed agriculture²¹⁵. Studies indicate that droughts are becoming longer and more frequent, with 65% of Jamaican farmers observing these changes²¹⁶. Similarly, countries like St. Lucia and Dominica have reported significantly reduced stream flows, with St. Lucia's main reservoir nearing depletion, a situation that could impact over 50% of the population and disrupt key sectors like tourism and business²¹⁷.

Future drought projections for the Caribbean indicate a gradual drying trend towards the end of the century, with more pronounced impacts in the southern and southeastern regions compared to the far north²¹⁸. Annual rainfall reductions may reach up to 20% in the central and southern Caribbean, while regional models suggest declines of up to 25-30% by the century's end, particularly during the early and late wet seasons (May to October)²¹⁹. Although interannual rainfall variability will remain a dominant feature, it will occur around a decreasing long-term average, reflecting the linear drying trend. These trends highlight the growing risk of drought as a key climate challenge for the region²²⁰. Drought risk projections for Caribbean SIDS aligned with observations from the Shared Socioeconomic Pathway (SSP) 2 scenario indicate that a 1°C increase in temperature (from 1.7°C to 2.7°C) could result in a 60% increase in the number of people projected to experience severe water resources stress from 2043 to 2071.

d) Heat Waves

The WMO State of the Climate in Latin America and the Caribbean 2023 report confirmed that 2023 was by far the warmest year on record. During the summer of 2023, Puerto Rico and the U.S. Virgin Islands experienced an unprecedented surge in extreme heat, surpassing historical norms and raising concerns about its broader implications for the Caribbean region. CariCOF's experimental seasonal heat outlooks are delivered each month during the heat season from May to October i.e. over the six months during which all areas in the Caribbean experience at least two or three months with a regular recurrence of heatwave days. The outlooks present the heat forecasts as probabilities of the number of heat wave days exceeding thresholds such as 14 days, 30 days, and or 60 days. (Figure 48)

In 2020, the Caribbean region experienced an unprecedented heat season, with air temperatures reaching record highs. Cuba set new national records for air temperature in April, while Dominica, Grenada, and Puerto Rico followed with similar records in September. The year 2020 became one of the three warmest years on record for the Caribbean, surpassing the average temperature for the 1981-2010 period. This marked a significant continuation of the upward trend in air temperatures observed since the mid-1990²²¹. The increase in heat confirms that heat-related deaths among older adults in the Caribbean subregion surged by 103% between 2013 and 2022, compared to the period from 2000 to 2009, highlighting a significant rise in heat-related incidents in the region²²². Climate projections indicate that this trend will persist, with further increases expected in the duration, intensity, and frequency of extreme heat events across the region. Regardless of the scenario, warming is anticipated for both days and nights, exacerbating the region's vulnerability to heat-related impacts. Rising Caribbean temperatures are driving increased cooling demands in the tourism sector, with air conditioning now consuming 55% of total hotel electricity. This growing reliance on energy-intensive cooling highlights the region's vulnerability to climate change and rising operational costs²²³.

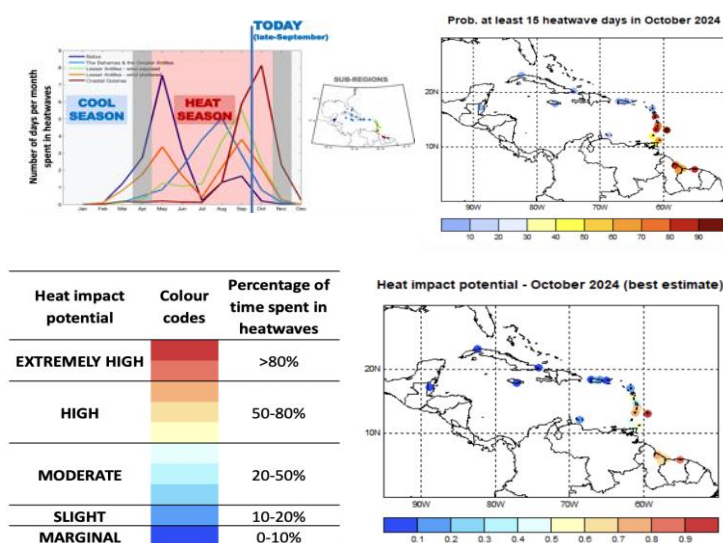


Figure 48: CariCOF October 2024 to March 2025 Experimental Heat Outlook. According to CARICOF experts, extreme temperature warnings were issued during the summer across multiple regions. Coastal Guianas experienced 8-14 heatwave days, while the ABC Islands, Lesser Antilles, and Puerto Rico recorded 3-8 heatwave days, with no more than three days elsewhere. The forecast shows a strong increase in the number of heatwaves is expected in Barbados, coastal Guianas, Trinidad & Tobago, and the Windward Islands²²⁴.

e) Marine Heat Waves and Marine Cold Spells

A study analysed marine heatwaves (MHWs) and marine cold spells (MCSs) in the Caribbean Sea from 1982 to 2021 and found that these extreme temperature events often coincide with reported coral bleaching. Over time, MCSs have become less frequent, while MHWs are occurring more often and lasting longer. However, their intensity has remained consistent over the past four decades.

Since 1995, there has been a clear increase in the frequency and duration of MHWs, coinciding with shifts in climate patterns like the Atlantic Multidecadal Oscillation (AMO), Atlantic Meridional Mode (AMM), and Caribbean Index (CAR), which influence temperature anomalies in the Atlantic. The occurrence of MHWs and MCSs also shows year-to-year variability, with peaks aligning with El Niño and La Niña years, respectively. Seasonally, MHWs are most intense and frequent in summer, while MCSs occur more often in autumn and winter. Spatially, the strongest MHWs and MCSs tend to form in the southern Caribbean, near the northern coast of South America²²⁵.

During 2023, the entire Caribbean region, both islands and continental coasts, was affected by severe excess temperature with the longest duration of abnormal heating in the Haiti-Jamaica-Nicaragua-Honduras-Costa Rica area, along with the west coasts of Mexico and Central America. Severe bleaching began in Florida and Bahamas and moved steadily southward across the region, ending in the southern Caribbean. In Jamaica almost all hard corals bleached completely and many died, while bleaching of soft corals and anemones was much less, with little mortality. Coral fragmentation nurseries costing millions of dollars are reported to have lost all their corals, even those removed from the ocean to indoor refrigerated aquariums in Florida²²⁶.

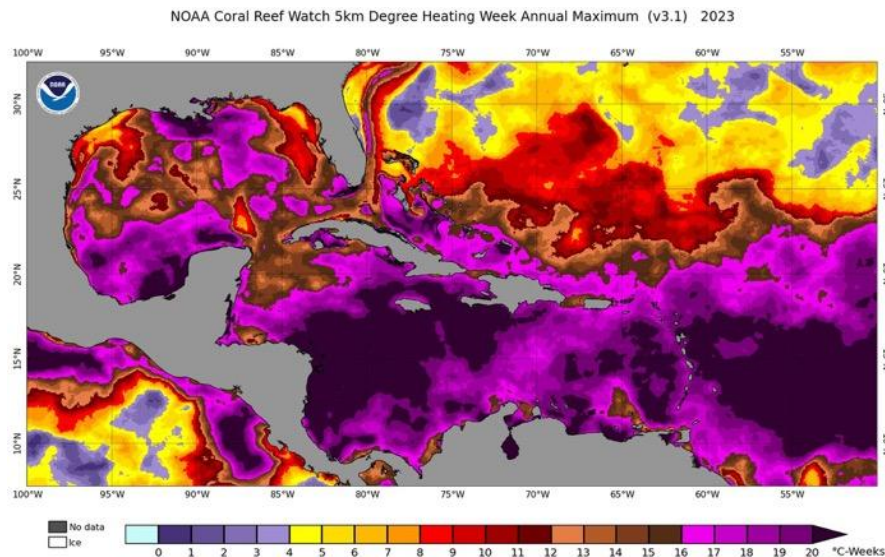


Figure 49 2023 Caribbean Maximum DHW map, the product of excess temperature and duration. The entire region was severely affected by coral reef bleaching, with the longest duration of excessively high temperatures around Jamaica, stretching to Nicaragua in the west and Haiti in the east. Figure from NOAA²²⁷.

This chapter provided an overview of climatology in the Caribbean, setting the foundation for understanding regional climate patterns. In the following chapters, we will delve deeper into the climatology of each CABRIC country, exploring their unique climate characteristics in greater detail.

3.2 Bahamas

The Bahamas is located on the boundary of the tropical and subtropical zones and, as such, has a semi-tropical or subtropical marine climate, which is moderated by the warm waters of the Gulf Stream: The islands experience warm, humid conditions year-round, though with more seasonal variations than the Southern Caribbean islands. Variation is shown in Figure 19. There are also variations between the islands of the Bahamas, with rainfall falling twice as much in the northwestern islands than in the southeastern islands, and the more northerly islands experiencing temperatures up to 5° cooler than the southern islands. Average temperatures are high, with the mean daily temperatures fluctuating between 17°C and 32°C. Mean annual rainfall for the Bahamas varies from about 865 mm to about 1470 mm. Inter-annual variability in climate is strongly influenced by the El Niño Southern Oscillation (ENSO). El Niño episodes bring warmer and drier conditions between June and August. Located in the heart of the Atlantic hurricane belt, the Bahamas is also subject to hurricanes and tropical cyclones especially during the August - November period. Table 13 summarises Bahamas climatic historic and projected trends.

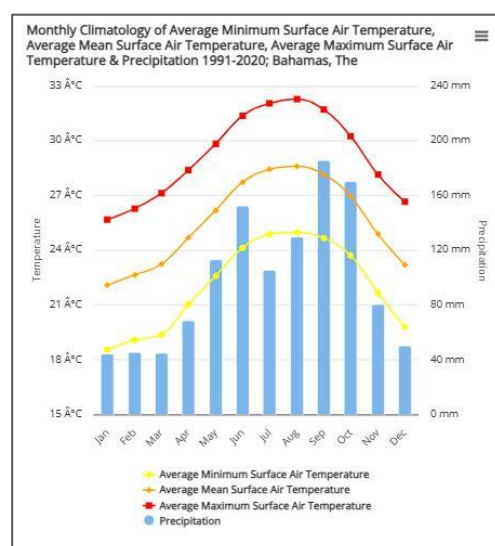
Figure 50 Bahamas Monthly Climatology²²⁸

Table 13: Bahamas historic and projected climate

KEY: Green = statistically significant. Grey = no assessment

HISTORICAL TREND		PROJECTION	
RAINFALL & rainfall hazards			
There have been no significant or consistent changes observed for mean precipitation since 1960. However, particularly dry periods have occurred in the years 2004, 2005 and 2006²²⁹.		Total annual precipitation is projected to decrease by approximately 5% on average under a high-emissions scenario, with a wide uncertainty range of -17% to +8%.²³⁰	
AIR TEMPERATURES and temperature hazards			
- Mean temperatures have increased by around 0.5°C since 1960, at an average rate of 0.11°C per decade. 0.61 - 0.63 increased when compared to 1850 - 1900 - mean daily maximum temperature for July has increased at a rate of 2°C per 100 years, and more recently at a rate of 2.6°C per 100 years. - There is seasonal variation in the rate of temperature increase, with the rate being most rapid in the warmest seasons, June-August and September-November, having rates of 0.13 and 0.15°C per decade respectively. - There is also variation between islands, where the rate of warming is more rapid in the northeastern islands compared to the southwestern islands. - There have been statistically significant increases in the frequency of 'hot' days and nights and decreases in 'cold' days and nights during the period 1973-2008.		- Compared to the historical average of 25.61°C (1950-2014), the mean temperature is projected to increase by 1.30-1.34°C in the near term and 2.42-2.47°C by 2100 under the SSP4.5 scenario, while under the SSP5-8.5 scenario, the increase is projected to be 1.38-1.40°C in the near term and 4.0-4.5°C by the end of the century. - Under the SSP2-4.5 scenario, the mean daily maximum temperature for July is projected to increase at a rate of 3.8°C per 100 years, while under the SSP3-7.0 scenario, it is projected to increase at a rate of 6.4°C per 100 years. - The projected average rate of temperature increase for the warmest seasons (June-August and September-November) is approximately 0.17°C per decade. - Under a high-emissions scenario, the percentage of hot days is projected to rise from about 15% in 1981-2010 (10% in 1961-1990) to nearly 100% by the end of the century. With rapid emission reductions, this	

	figure decreases to around 70%. A similar trend is observed for hot nights.
SEA SURFACE TEMPERATURES and SST hazards	
- Currently, sea surface temperature shows minimal variation, with a minimum of 23°C and peaks exceeding 30°C in certain conditions²³¹. - Compared to the 1850 - 1900 the increase in 1991-2020 is between 0.56 0.6	Predicted sea surface temperature increases across all seasons exceed 1°C. The highest rise is observed from September to November, reaching a maximum of 1.7°C, while the lowest increase, at 1.0°C, occurs from June to August.²³²
SEA LEVEL RISE and SLR hazards	
The Bahamas' low-lying nature makes it "extremely susceptible to the effects of sea level rise"²³³. Tide gauge data reveals that sea levels at Andros Island rose by approximately 10 centimetres (4 inches) between 1985 and 2018, aligning with the global sea level rise observed since the 1990s²³⁴.	Sea levels are projected to rise by 32 cm (1.04 ft) by 2050 and 82 cm (2.68 ft) by 2100, highlighting significant long-term impacts on coastal areas²³⁵.
HURRICANE and windspeed hazards	
Since 2000, six major hurricanes have made landfall in The Bahamas or significantly impacted the islands. Tropical storms and hurricanes are most frequent during September, October, August, and November²³⁶	There is no consensus on whether the frequency of hurricanes will increase in future projections; however, predictions indicate increased intensities and stronger wind speeds.²³⁷

Observed & Projected Temperature

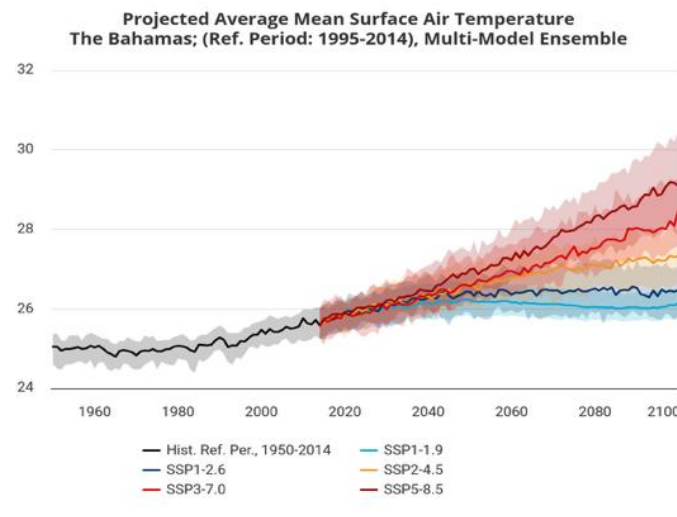


Figure 51 Bahamas Mean temperature change Historical - Spatially 1991 to 2020 change
Figure 52 Mean temperature change Bahamas

The Bahamas' mean temperatures steadily rise throughout the year, ranging from 22.0°C in January to a peak of 28.6°C in August, Figure 50: This consistent warming trend reflects the tropical maritime climate, with the hottest months occurring between June and September, coinciding with increased rainfall. Cooler months, such as January and February, still maintain relatively mild temperatures, emphasizing the region's year-round warmth. The temperature fluctuations, though moderate, align

closely with seasonal rainfall patterns, suggesting a climatic interplay between heat and precipitation across the islands.

Under a high emissions scenario, the mean annual temperature is projected to increase by approximately 3°C by the end of the century (2071-2100 compared to 1981-2010): In contrast, if emissions decrease rapidly, the temperature rise is limited to around 0.9°C. The proportion of hot days is expected to rise significantly, from about 15% of all observed days on average in 1981-2010 (and 10% in 1961-1990) to nearly 100% of days by the end of the century under a high emissions scenario. With rapid emissions reductions, around 70% of days will be considered hot. However, it is important to note that models tend to overestimate the observed increase in hot days, which was around 25% of days on average in 1981-2010, rather than 15%²³⁸.

Observed Precipitation and Predicted Precipitation

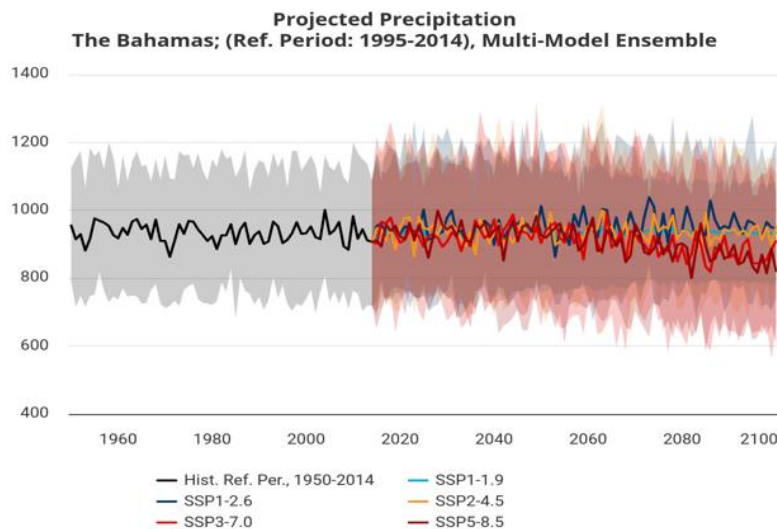


Figure 53 Observed and Projected Precipitation for Bahamas

Figure 54 Observed Precipitation Spatially - Bahamas 1991 - 2020 change

During the period 1991-2020, precipitation in The Bahamas displayed a distinct seasonal pattern, with the highest rainfall observed from May to October: Figure 50 shows the precipitation in The Bahamas²³⁹. Precipitation peaks in June, September and October, exceeding 150 mm, coinciding with the region's wet season. In contrast, the dry season spans from November to April, with the lowest rainfall recorded in February, averaging less than 45 mm. This pattern reflects the influence of tropical climatic conditions, with notable variability between the wet and dry seasons.

Under a high-emissions scenario, total annual precipitation in Bahamas is projected to decrease by approximately 5% on average, with a wide uncertainty range of -17% to +8%: In contrast, with rapid emissions reductions, annual precipitation is expected to show little change, potentially increasing by 4% on average, within an uncertainty range of -4% to +13%. The proportion of annual rainfall from very wet days, which was around 25% during 1981-2010, could increase slightly to about 30% by the century's end, with an uncertainty range of 15% to 40%. Similar trends are projected under both high and low emissions scenarios, indicating minimal or no significant change in total annual rainfall²⁴⁰.

Observed Sea Surface Temperature:

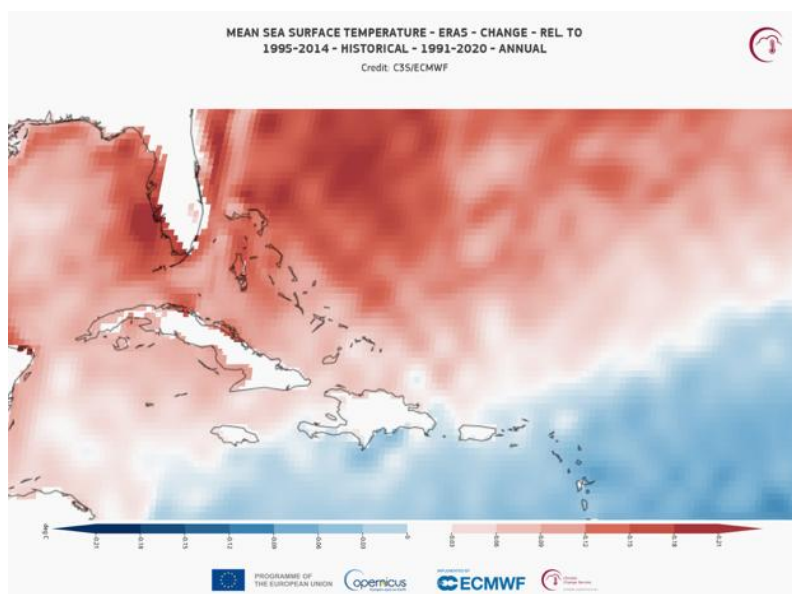


Figure 55 SST relative change Bahamas in 1991 -2020 in relation to 1995-2004

Sea surface temperatures in The Bahamas are typical of a tropical climate, staying warm year-round with minimal variation: Temperatures often exceed 30°C, peaking in September, and follow a north-south gradient. The Gulf Stream to the northwest has warmer waters, while cooler waters are found toward the North Atlantic. Minimum temperatures reach 23°C, and maximums stay below 30°C, highlighting stable and warm conditions in the region²⁴¹.

Predicted Sea Surface Temperature:

Sea surface temperatures in The Bahamas are projected to increase steadily over the next decades, with all seasons expected to warm by more than 1°C within 25 years: The highest increase is projected for September to November, with temperatures rising by 1.7°C, while the lowest increase of 1.0°C is expected during June to August. This trend highlights the impact of global warming on the marine environment in The Bahamas, which may soon approach critical temperature thresholds identified by the IPCC²⁴².

Sea Level Rise and SLR hazards:

The Bahamas' low-lying geography makes it highly vulnerable to sea level rise, with significant portions of its land, population, and infrastructure at risk: The government has warned that a global sea level rise of 0.43 to 0.84 meters by 2100 would be catastrophic for the country. Compared to neighbouring island nations, The Bahamas faces the highest proportional threat, with 32% of its land, 25% of its population, and 13% of its infrastructure situated less than 0.5 meters above sea level²⁴³. Tide gauge data from Andros Island shows a sea level rise of approximately 10cm (4 inches) between 1985 and 2018, consistent with global trends since the 1990s. Historical estimates suggest an average sea level rise of 0.18cm per year in the region since 1950, emphasizing the long-term and escalating nature of the threat²⁴⁴. A study by Stanford University, focused on coastal hazard mapping in the Bahamas, identified the islands with the highest proportion of high-risk shorelines at a national scale. These include Grand Bahama, Abaco, Crooked Island, The Exumas, and Long Island, with the west coast of Andros Island also standing out. The findings highlight the significant role of storm surge potential as a key driver of coastal hazard risk²⁴⁵. It was projected that due to the sea level rise alone, annual tourism losses could surpass \$2.6 billion by 2080 because of hotels experiencing beach loss.

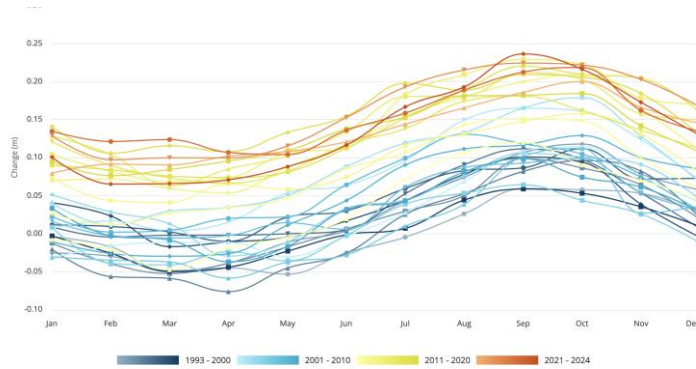
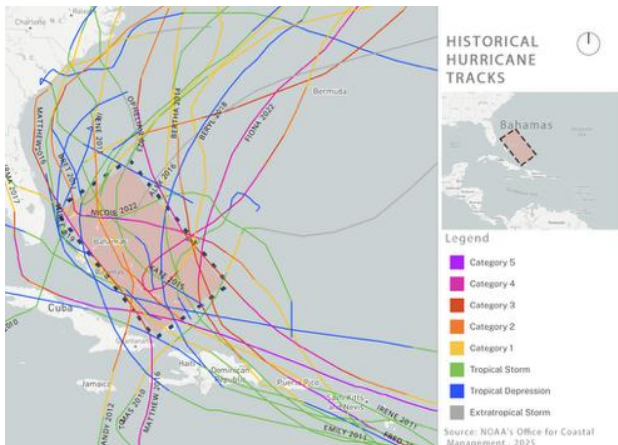


Figure 56 Sea Level Rise Change 1992 - 2024 Bahamas (Observed)
Figure 57 Relative exposure to coastal hazards predicted

Hurricane and windspeed hazards:



Simulated Relative Frequency (Percent) of Cyclone Types for Global, North Atlantic Ocean, Bahamas Exclusive Economic Zone, Bahamas, The (landfalls); CHAZ; Historical (1951-2014)

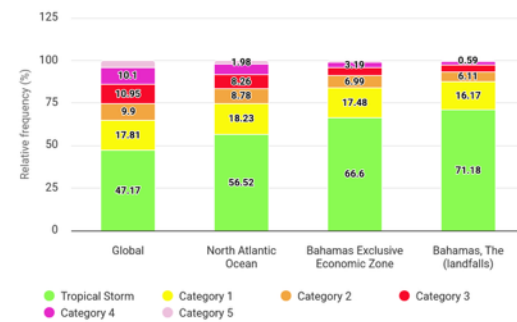


Figure 58 Historical Hurricane Tracks - Bahamas

Figure 59 Simulated frequency of cyclone types for Bahamas²⁴⁶

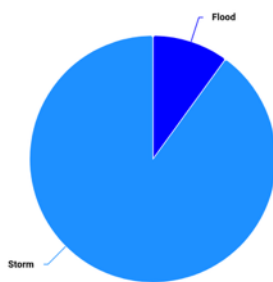
The Bahamas' location within the Atlantic hurricane belt makes it highly prone to hydro-meteorological disasters such as hurricanes, storms, and cyclones, which are most frequent from **August to November**: The islands' low-lying terrain heightens their vulnerability to flooding from storm surges and sea level rise. Although the flat topography limits landslide risk, the calcareous and fragile soils are particularly susceptible to erosion from rain and wind, posing a significant challenge to land stability and environmental resilience²⁴⁷. According to the Figure 59 it can be seen that tropical storms make landfall in the Bahamas more frequently than in the Global and North Atlantic Ocean figures. This suggests that the Bahamas is regularly impacted by tropical storms, making it highly vulnerable to their effects. Similarly, for hurricanes (Category 1-5), the relative frequency of storms entering the Bahamas Exclusive Economic Zone (EEZ) is higher compared to the Global and North Atlantic Ocean averages. This indicates that while hurricanes may form and intensify over the Atlantic, a significant proportion of them impact the Bahamas EEZ, highlighting the severity of hurricane activity in the region. Additionally, the decline in hurricane frequency upon landfall suggests that storms weaken before reaching the Bahamas, but the region still experiences a disproportionate number of strong storms compared to global trends. This reinforces the high hurricane risk faced by the Bahamas, making it crucial for disaster preparedness and resilience planning.

The predictability of future tropical cyclones comes with significant uncertainties due to multiple factors. These include differences among climate models, the complexity of tropical cyclone processes, and regional variations in cyclone formation, behaviour, and dispersal. However, World Bank estimations based on the Columbia HAZard Model predict that in the Bahamas: Tropical cyclones are expected to occur approximately 4 times with a return period of 0.24 years. Category 1 hurricanes are projected to occur 1.4 times with a return period of 0.68 years. These findings should be interpreted with caution, as the model predictions only materialize if the necessary atmospheric and oceanic conditions align to support cyclone formation and intensification²⁴⁸.

3.2.1 Exposure to climate hazards by country geography

The Bahamas, located in the Atlantic hurricane belt, are regularly impacted by hydro-meteorological disasters such as hurricanes, storms, and cyclones, particularly during the months of August, September, October, and November: The islands' low-lying topography makes them especially susceptible to flooding from storm surges and rising sea levels. While the risk of landslides is limited due to the flat terrain, the fragile, calcareous soils are highly vulnerable to erosion caused by both rainfall and wind.

Average Annual Natural Hazard Occurrence for 1980-2020



Key Natural Hazard Statistics for 1980-2020

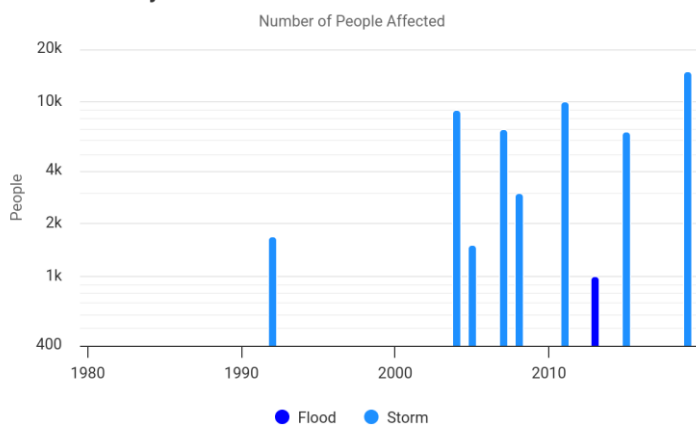


Figure 60 (left): Average Annual Hazard Occurrence²⁴⁹

Figure 61 (right): Key natural hazards statistics²⁵⁰

Flood and storm hazards impact:

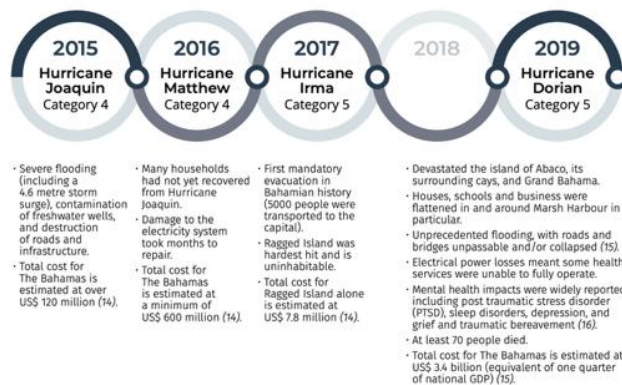


Figure 62 Hurricane impacts in the Bahamas²⁵¹

Like other Small Island Developing States, the Commonwealth of the Bahamas is uniquely challenged by the effects of climate change, including increased flooding, more powerful hurricanes and rising sea levels. Particularly, The Bahamas main hazards are storms and floods (See Figure 45) due to its geographical location within the Atlantic Hurricane belt, and the low relief of its islands²⁵². This reality is, has seen the country experiencing some of the worst hurricanes have to offer in 2019 hurricane Dorian and since 2010 the islands have been affected by 29 hurricanes with varying intensity and 4 category 5 hurricanes creating devastating impacts.

From 1994 to 2024, the Bahamas experienced significant losses due to drought, sea level rise, and major hurricanes, including Dorian (2019), Matthew (2016), and others: Hurricane Dorian caused \$3.18 billion in damages, destroying 80% of the fisheries sector in Grand Bahama and Abaco, with losses totaling \$21.7 million. The agricultural sector suffered \$10 million in damages due to saltwater intrusion and wind impacts, while forestry on Abaco and Grand Bahama sustained damage to 24% and 77% of forests, respectively, leading to significant declines in bird populations. Tourism, contributing 70% of GDP, was severely impacted by Dorian, with \$530 million in damages, a 12.8% drop in visitor arrivals, and fiscal deficits rising to 5% of GDP. Infrastructure damage was extensive, with 50% of buildings on Abaco and 16% on Grand Bahama rendered unsalvageable, displacing 76,000 people. Healthcare systems also faced \$37.7 million in damages, primarily to facilities, equipment, and supplies. Overall, hurricanes and floods induced by hurricanes pose severe risks to agriculture, fisheries, tourism, infrastructure, and healthcare, resulting in substantial economic losses and recovery challenges. (See Table for a summary of loss and damages data)

Table 14 Summary Effects of Hurricane Dorian in USD. Source: IDB

Sector	Damage	Losses	Additional Costs
Social	1,597,290,766	93, 163,186	82,254,021
Housing	1,487,167,663	65,014,267	57,809,391
Education	72,406,603	6, 799, 026	19,100,000
Health	37,716,500	21,351,380	5,344,630
Infrastructure	239,135,274	197,136,671	16,236,779
Power	131,355,000	68,924,558	6,335,000
Telecommunications	42,150,000	54,380,149	1,039,960
Water and Sanitation	14,853,000	36,624,014	2,289,200
Productive	620,650,850	400,285,030	19,954,141
Tourism	529,550,208	325,199,267	15,146,625
Commerce	77,584,545	64,973,002	4,807,516
Fisheries and Agriculture	13,516,097	10,112,761	
Environment	7,146,963	27,435,048	102,473,000
Total	\$2,464,223,852	\$718,019,935	\$220,917,941

Hurricane Matthew struck The Bahamas in October 2016, marking the second time in just over a year that the country was affected by a Category 4 hurricane. The storm caused \$580.4 million in total costs, more

than three times the impact of Hurricane Joaquin. While no deaths or injuries were reported, the hurricane significantly affected infrastructure, housing, and key economic sectors.

The housing sector suffered the most damage, leading to a temporary decline in quality of life due to disruptions in essential services such as health, electricity, telecommunications, and transport. Approximately 127,000 consumers were left without power, affecting the availability of drinking water, while 3,221 people sought shelter in 50 facilities across four affected islands. The education sector was also impacted, with 13,354 students affected by school closures, leading to \$4.76 million in total estimated costs.

The productive sectors—tourism and fisheries—accounted for \$109.3 million of the total \$145.5 million in income losses. The tourism sector alone suffered \$219.2 million in total costs, with \$129 million in damage to infrastructure, primarily in Grand Bahama, and \$88.3 million in revenue losses. In the fisheries sector, the damage was estimated at \$833,500, while losses reached \$21 million, with an additional \$25,000 in debris removal costs. The fisheries sector also had the highest income loss-to-damage ratio, losing \$25 of income for every \$1 of damage.

The infrastructure sector sustained \$60.9 million in additional costs, with power (\$23.6 million) and telecommunications (\$10.3 million) being the most affected. Damage to transportation infrastructure—including roads, airports, bridges, and docks in New Providence, Andros, Grand Bahama, and the Berry Islands—amounted to \$10.77 million, with \$1.9 million in additional costs primarily for debris removal and fencing. The telecommunications sector reported \$9.86 million in damage, \$13.6 million in losses, and \$10.26 million in additional costs.

The health sector incurred \$3 million in total costs, including \$884,007 in damage to clinics due to wind and flooding. Meanwhile, the environment sector experienced \$1.7 million in damage, primarily to coral reefs, beaches, and protected areas, with \$72,364 in losses and \$4.4 million in additional costs.

The impact of Hurricane Matthew underscored The Bahamas' vulnerability to extreme weather events. The widespread economic losses and damage across housing, infrastructure, tourism, fisheries, and the environment highlight the urgent need for strengthened disaster resilience and climate adaptation measures.

Table 15: Climate hazards risk in the Bahamas (source: WB Think Hazard)

Cyclone	Coastal flood	Tsunami	Extreme heat	Landslide	Wildfire	Water scarcity	Urban flood	Earthquake	River flood
High	High	Medium	Medium	Very low	Very low	Very low	Very low	Very low	Very low

3.3 Belize

Belize is characterized by a moist tropical climate with a seasonal variation slightly different than other Caribbean countries: Its wet season occurs during the months of May to October and its dry season occurs during the months of November to April. The mean annual temperature ranges from 23-27°C, providing some variation throughout the country, with the coast generally exhibiting hotter temperatures than the interior. The El Niño Southern Oscillation (ENSO) heavily influences Belize's climate, in addition to the intensification of the Inter-Tropical Convergence Zone (ITCZ). The El Niño phenomenon generally produces warmer conditions during the months of June to August, whereas La Niña produces wetter conditions typically associated with the tropical Atlantic cyclones. During the wet season, Belize usually receives mean monthly rainfall of 150-400 mm in the south of the country. The rest of the country receives

less than 100 mm of rainfall per month, where precipitation is limited. Belize is prone to hurricane impacts since it lies in the direct path of most Atlantic storms²⁵³.

Table 16: Belize historic and projected climate

KEY: Green = statistically significant. Grey = no assessment

HISTORICAL TREND	PROJECTION
RAINFALL & rainfall hazards ²⁵⁴	
Mean annual rainfall over Belize has decreased at an average rate of 3.1 mm per month per decade since 1960, but this trend is not statistically significant.	Projections of mean annual rainfall from different models in the ensemble are broadly consistent in indicating decreases in rainfall for Belize. Ensemble median values for almost all seasons and emissions scenarios are negative. Projections vary between -64% and +20% by the 2090s with ensemble median values of -11 to -22%²⁵⁵.
While all seasons appear to have shown decreasing precipitation trends since 1960, only February, March and April have a statistically significant trend.	Changes in rainfall projected show the strongest decreasing signal in MJJ rainfall, at -83 to +22% by 2090s.
The magnitude of maximum 5-day rainfall shows an increasing trend of 5.37 mm per decade over the period 1960 - 2006.	Maximum 1- and 5-day rainfalls tend towards negative changes in MJJ but show little consistent change in other seasons. This is inconsistent with the observed trends for increases in these maximum rainfalls²⁵⁶.
AIR TEMPERATURES and temperature hazards	
- Mean annual temperatures have increased by 0.45 °C at an average rate of 0.10 °C per decade since 1960²⁵⁷. - The frequency of hot days and hot nights has increased by 67 days per year, respectively, between 1960 and 2003. - The frequency of cold days and cold nights has decreased by 21 days per year, respectively between 1960 and 2003.	- The mean annual temperature is projected to increase by 0.8 °C by 2040 and 2.1 °C by 2100 under the SSP2-4.5 scenario, while under the SSP5-8.5 scenario, it is expected to rise by 0.84 °C in the near term and up to 4.1 °C by the end of the century. - The projected rate of warming is a little more rapid in the wet seasons, MJJ and ASO than the dry seasons NDJ and FMA. - Annually, projections indicate that 'hot' days will occur on 20-55% of days by the 2040s, and 17-76% of days by the 2090s. Days considered 'hot' by current climate standards for their season are projected to occur on 21-95% of days of the season by the 2090s, with the fastest rates of increase projected for MJJ and ASO. - Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 30-61% of nights by the 2060s and 37-84% of nights by the 2090s. Nights that are considered hot for each season by 1970-99 standards are projected to occur on 34-99% of nights in every season by the 2090s, with the fastest rates of increase in MJJ and ASO.

	All projections indicate that days and nights that are considered 'cold' in current climate will become rarer, occurring on 0-6% of days and 0-8% of nights by the 2090s. The rate of decrease in their frequency is greatest in MJJ and ASO.
SEA SURFACE TEMPERATURES and SST hazards	
Sea surface temperature in Belize increased by approximately 0.53-0.57°C in 2020 compared to pre-industrial levels. In Belize's Barrier Reef Lagoon, in situ measurements from 2003 to 2014 showed a warming trend, with temperatures ranging from 22.3°C to 32.4°C²⁵⁸.	Under the SSP2-4.5 scenario, sea surface temperature (SST) is projected to increase by 1.2°C by 2040 and 2.2°C by 2100. Under the higher emission SSP5-8.5 scenario, SST is expected to rise by 1.25°C by 2040 and 3.6°C by 2100²⁵⁹.
SEA LEVEL RISE and SLR hazards ²⁶⁰	
3.90 mm/yr, but the country's low-lying coastal areas are predicted to be vulnerable to inundation.	Under the SSP2-4.5 scenario, the total sea level rise rate is projected to reach 9.0 mm/yr by 2050 and 11 mm/yr by 2100. Under the SSP5-8.5 scenario, the rate is expected to increase to 11 mm/yr by 2050 and 16 mm/yr by 2100.
HURRICANE and windspeed hazards	
Mean wind speed approx. increased by 1% when compared to preindustrial levels by 2020. highly prone to cyclones, experiencing 14 storm events between 1931 and 2010, which caused significant damage, particularly to the agriculture and tourism sectors. The country's low-lying coastal terrain increases its vulnerability to flooding from hurricanes and storms²⁶¹.	There is no consensus on whether the frequency of hurricanes will increase in future projections; however, predictions indicate greater intensities and stronger wind speeds²⁶². Relative wind speeds are expected to increase by 4.04% by 2040 under SSP4.5 and by 7% under SSP5-8.5²⁶³.

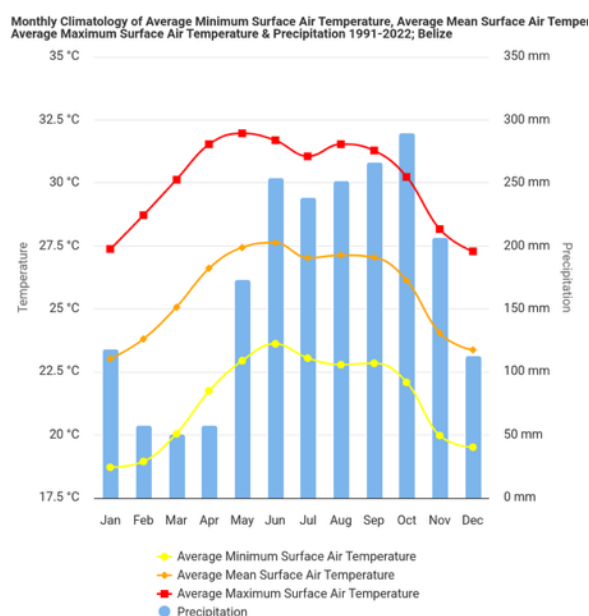
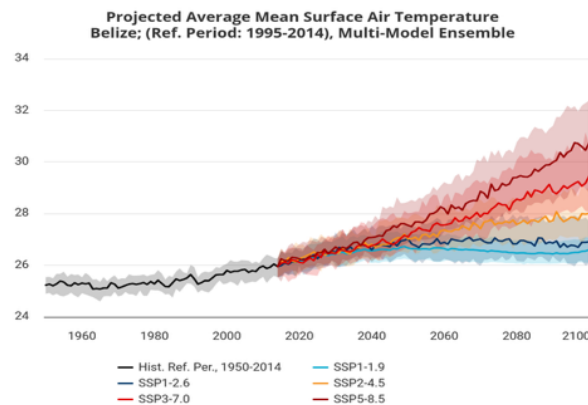


Figure 63: Belize Monthly Climatology

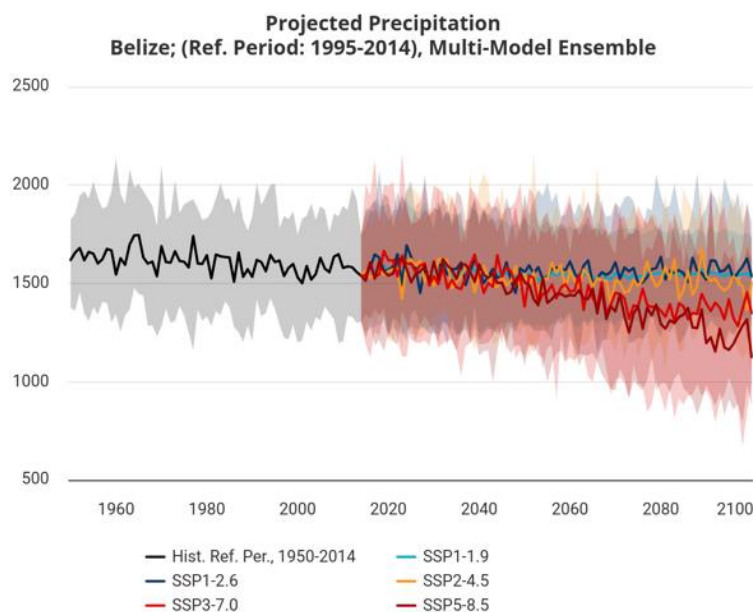
Observed Temperature & Predicted Temperature

Figure 64 Belize Projected and Observed Temperature²⁶⁴

The monthly climatology of Belize shows distinct temperature and precipitation patterns, Figure 63: Average maximum surface air temperatures peak during the summer months, reaching over 32°C from June to August, while average minimum temperatures stay around 20-22°C year-round. During the period 2018-2011, the highest number of warm nights was observed in rainfall in Belize, compared to the Caribbean's other rainfall zones. Additionally, the greatest increase for warm days was observed in within the zonal region.

Projections for Belize indicate a significant warming trend, with mean annual temperatures expected to rise by 1.3 to 4.9°C by the 2100s, depending on the emissions scenario: The warming is projected to be faster during the wet seasons (MJJ and ASO) than the dry seasons (NDJ and FMA). Hot days and nights are expected to become more frequent, occurring on 37-84% of nights and up to 95% of days by the 2100s, while cold days and nights will nearly disappear. These changes highlight the intensifying impacts of climate change, with the coastal areas expected to experience slightly slower warming rates.

Observed Precipitation & Predicted Precipitation

Figure 65 Observed and Projected Precipitation Belize²⁶⁵

Precipitation is highest during the wet season, particularly between June and October, with a notable peak in September, corresponding to the region's tropical climate: The driest months occur between February and April, characterized by lower precipitation and moderate temperatures. This pattern reflects Belize's pronounced seasonal variability influenced by its tropical environment.

Precipitation is variable across Belize: According to the State of the Caribbean Climate Report (2020)²⁶⁶ extreme rainfall indices to provide more detail about the mean climate. It indicates that countries in Zone 1 which Belize is a part of received the largest Maximum Number of Dry Consecutive Days (CDD), with Belize Central Farm having the highest CDD in the Caribbean. Zone 1 also had some of the highest values for extreme rainfall, namely the Monthly Maximum One Day Rainfall Amount (RX1), and Monthly Maximum Consecutive Five Day Rainfall Amount (RX5).

Belize will experience variable precipitation pattern changes spatially and temporally: Projections from the PRECIS/ECHAM5 model suggest a slight increase in rainfall during the early (May) and late (October-November) wet season in the 2020s, with peak increases of 2-4 mm/day in the Stann Creek District. However, the dry season and mid-wet season (June) are expected to see reduced rainfall, with the largest decreases of around 4 mm/day in the Stann Creek and Cayo Districts. By the 2030s, most of Belize is projected to experience reduced rainfall, except for minor increases in early (May) and late (November) wet seasons. This pattern intensifies by the 2050s, with rainfall reductions of 1-4 mm/day during the dry season (December-April).

Projections for mean annual rainfall consistently indicate an overall decrease across Belize: While projections for the 2090s range from -64% to +20%, the ensemble median shows a reduction of -11% to -22% under most scenarios, highlighting a trend toward drier conditions in the future²⁶⁷.

Sea level Change

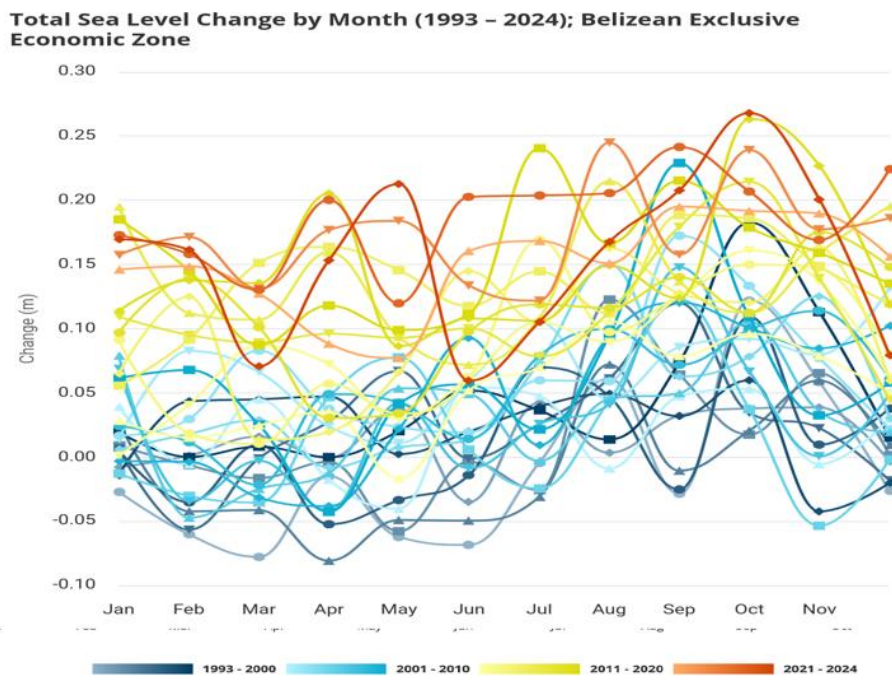


Figure 66 Sea Level Change - Belize EEZ²⁶⁸

It can be seen that by 2021 - 2024 there has been an increase in sea level in all the months in around 0.15 meters showing a steady increase. It is projected to rise steadily along the coast of Belize. In the low, medium and high emission scenarios, SLR is projected to exceed 10cm by the 2030s. Heights of 22, 23

and 38cm respectively are projected for the low, medium and high emission scenarios by 2050 and 34, 56 and 120cm respectively by the end of the century. Therefore, many of the effects of climate change are already being felt on the low-lying coastal zone and are expected to have significant impacts on many environmental, physical, social and economic systems in Belize.

Sea Surface Temperature

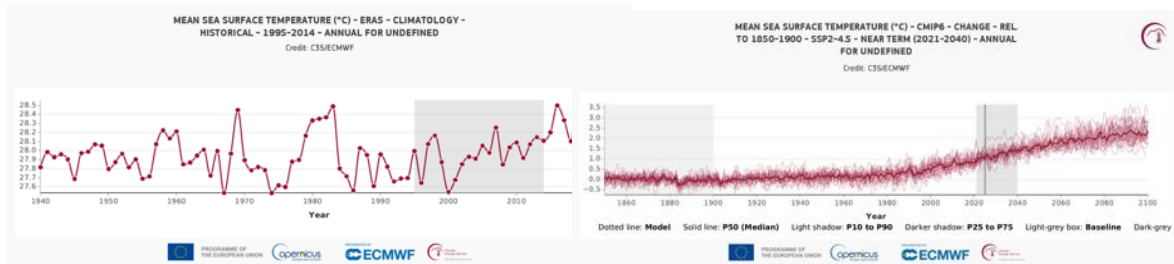


Figure 67 SST - Belize Observed change from 1991-2020 based on 1961-1990
Figure 68 Predicted SST under SSP 4.5 near term

Belize's annual mean sea surface temperature (SST) typically ranges between 26°C and 28°C. However, SST levels have been steadily increasing, with temperatures reaching 28.5°C by 2020, marking a noticeable rise from levels recorded in the 1940s. This warming trend is expected to continue, with projections indicating that coastal waters around Belize will warm by approximately 0.5°C every 25 years. This pattern aligns with global CMIP6 model projections, which suggest that mean SST will increase by 1.5°C above pre-industrial levels by 2050 and by 3.5°C by the end of the century. These rising temperatures pose significant risks to marine ecosystems, coral reefs, and coastal communities, highlighting the urgent need for climate adaptation and marine conservation efforts in Belize.

Hurricane and windspeed hazards:

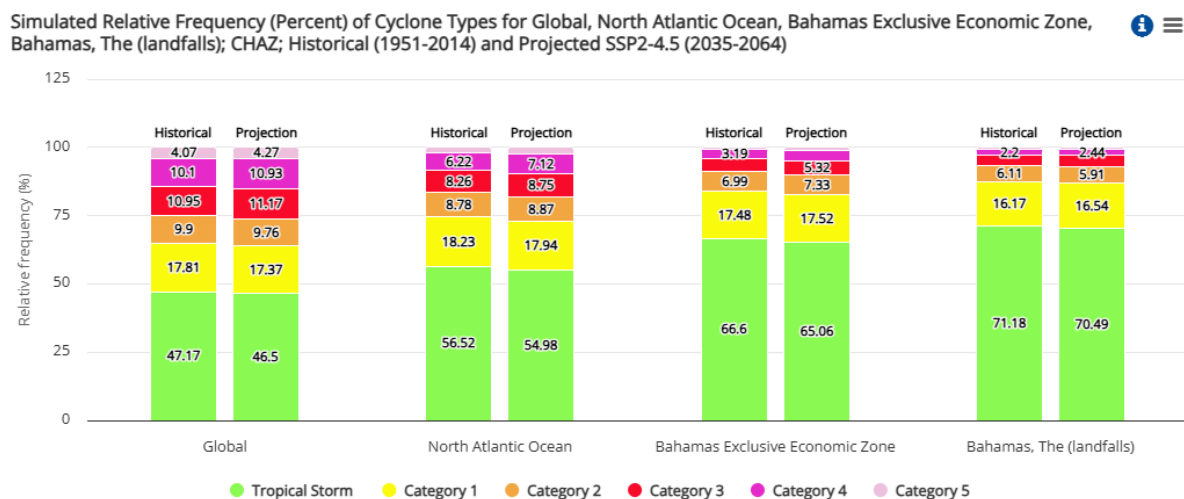


Figure 69 - Simulated relative frequency of cyclone types for Belize (Historical & Projected)²⁶⁹

It can be seen that tropical storms make landfall in Belize more frequently than in the Global and North Atlantic Ocean figures. Historically, tropical storms accounted for 71.18% of cyclone activity in Belize, higher than the North Atlantic Ocean (56.52%) and Global (47.17%) averages. Projections indicate a slight decrease to 70.49%, yet this remains notably higher than the comparative regions, emphasizing Belize's continued exposure to tropical storms. Similarly, for hurricanes (Category 1-5), the relative frequency of storms entering Belize's Exclusive Economic Zone (EEZ) is higher compared to the Global and North

Atlantic Ocean averages. While Category 1 hurricanes are projected to maintain similar frequencies at 17.52%, stronger storms such as Category 3 and 4 are expected to decrease from 6.99% to 5.32% and 3.19% to 2.44%, respectively. This suggests that although stronger storms may slightly decline, Belize remains disproportionately impacted by high-intensity storms compared to global trends. Additionally, the minor reduction in tropical storms and stronger hurricanes upon landfall indicates a slight weakening before reaching Belize, but the region still experiences a substantial number of significant storms. This reinforces the high hurricane risk faced by Belize, making it crucial for disaster preparedness and resilience planning.

The predictability of future tropical cyclones comes with significant uncertainties due to multiple factors. These include differences among climate models, the complexity of tropical cyclone processes, and regional variations in cyclone formation, behaviour, and dispersal. However, World Bank estimations based on the Columbia HAZard Model project that tropical cyclones in Belize will continue to occur at a relatively high frequency, with the proportion of Category 1 storms remaining stable, while the frequency of stronger hurricanes (Categories 3-5) shows a slight reduction.

3.3.1 Exposure to climate hazards by country geography

Belize is one of the most vulnerable countries to natural hazards and climate change, incurring annual losses of approximately 3% of GDP due to disasters: Situated in a hurricane-prone region, the country faces frequent hurricanes, floods, droughts, forest fires, and rising sea levels, all of which significantly impact its economy, infrastructure, and population. According to the Natural Disaster Hotspot study by the World Bank, Belize is the 61st highest exposed country for relative mortality risk from multiple hazards in the world and ranked 8th out of 167 countries for climate risk²⁷⁰.

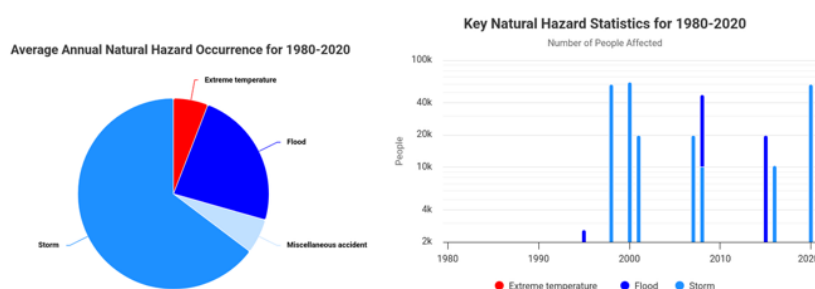


Figure 70 (Left) Average Annual Hazard Occurrence
Figure 71 (Right) Hazard statistics

A Sea level rise and erosion threaten Belize's coastline, impacting tourism, infrastructure, and livelihoods, with severe shoreline retreat in vulnerable communities. Dangriga and Hopkins areas in Belize, face severe coastal erosion, ranking in the highest coastal hazard category²⁷¹. In the past five years, the shoreline has retreated 20-25 feet, causing beach scarp, dead trees, and waves reaching building foundations in these areas. Inefficient coastal protection structures, river mining, and poorly located buildings exacerbate erosion, threatening infrastructure and livelihoods in these vulnerable coastal communities of Belize.

Sea surface temperatures in Belize have surpassed critical bleaching thresholds, with recorded exceedances of 31.5°C during summer months between 2007 and 2013. Satellite data indicate that shallow reefs in the Belize Reef System experienced temperatures above 29.7°C for 54-78 days annually from 2003 to 2012. Projections for 2030-2039 and 2090-2099 under B1 and A2 emissions scenarios indicate continued warming²⁷².

As a result, Belize has experienced four significant coral bleaching events: in 1995, 1998, 2005, and an additional widespread southern Caribbean event in 2010. These events have led to a dramatic decline in coral populations, severely affecting the health of the Belize Barrier Reef²⁷³. The Belize National Biodiversity Strategy and Action Plan 2016-2020 highlighted a significant decline in coral reef health over the past 40 years, marked by increased coral bleaching events and macro-algal growth²⁷⁴.

The 2017 coral bleaching event in Belize was severe, affecting the Mesoamerican Reef. Fragments of Hope expanded restoration efforts, collecting temperature data from multiple sites. While 2018 saw mild bleaching, the 2019 event was even more intense, with late-year temperature spikes causing bleaching to persist until January 2020²⁷⁵. This prolonged event underscored the growing vulnerability of Belize's coral reefs.

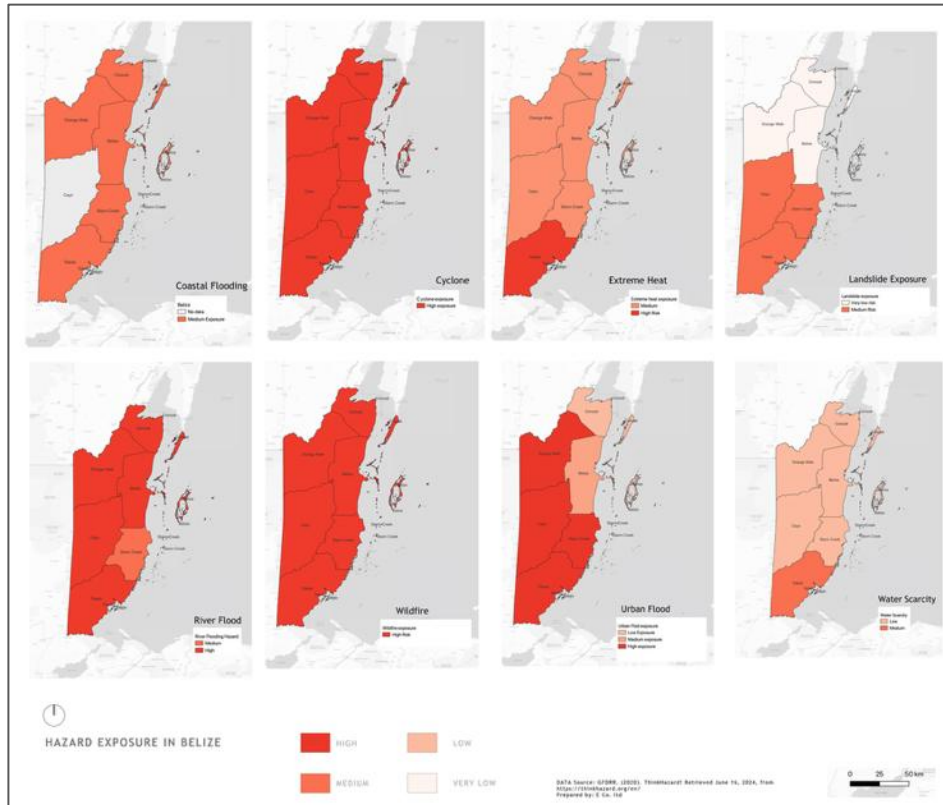


Figure 72 Hazard Exposure Indicators - Belize

In Belize, most hazards exhibit a countrywide impact, with coastal flooding, cyclones, and tsunamis posing significant risks, particularly in the eastern coastal regions. Urban flooding and extreme heat hazards also affect large parts of the country, with urban flooding being more prominent inland than in coastal districts.

Some hazards show more pronounced regional differences; for instance, landslide exposure is higher in the southern, mountainous regions compared to the northern areas, while wildfire exposure is more significant in central and northern parts of the country. Earthquake exposure remains moderate across Belize and extreme heat is also more prevalent in the district of Toledo.

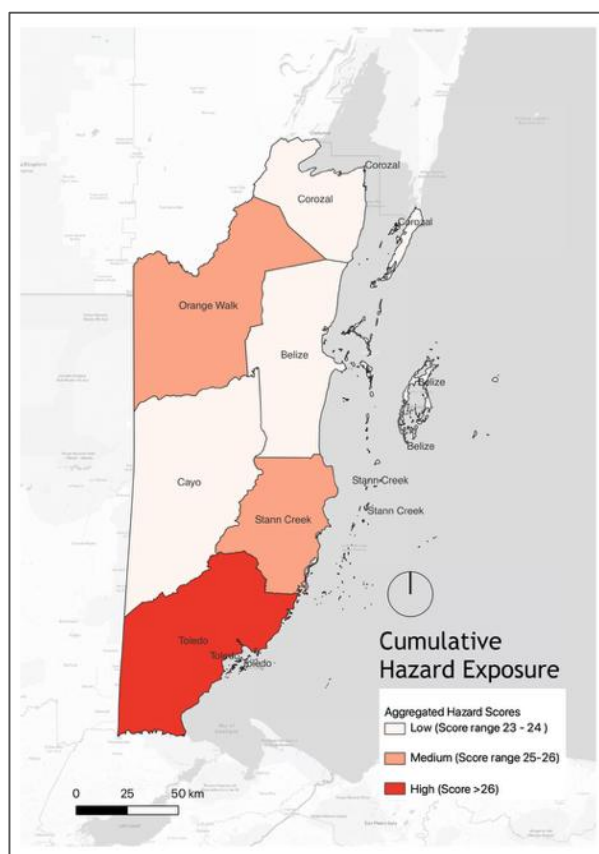


Figure 73 Cumulative Hazard Exposure Map

The cumulative hazard exposure map for Belize highlights varying levels of exposure across the country, with southern districts such as Toledo and Stann Creek facing high hazard exposure due to the combined impacts of coastal flooding, landslides, and cyclones. In contrast, northern districts like Corozal and Orange Walk exhibit moderate hazard exposure, similar central areas, such as Cayo experiences the lowest exposure possibly due to its landlocked nature reflecting the difference of exposure to a mix of coastal and inland cities. Belize's low-lying terrain exacerbates the effects of flooding and sea level rise, adding to its vulnerability. The country is also at risk from extreme temperature events. Belize's topography, divided into two main regions—the mountainous central and western areas dominated by the Maya Mountains and the Cockscomb Range, and the northern lowlands and southern coastal plain—plays a crucial role in shaping hazard exposure.

From 2000 to 2016, Belize experienced 16 natural hazards with damages totalling USD 736.99 million: Hurricanes are the most destructive, with storms like Hurricane Keith (2000) affecting 22% of GDP, and Hurricane Earl (2016) impacting 11% of GDP. Agricultural losses exceeded USD 232 million, with drought further reducing production by BZ\$35 million in 2019, affecting crops like sugarcane, corn, and soybeans. Fisheries, a critical sector, are highly vulnerable to hurricanes, storm surges, and sea-level rise, with 57% of the population living near the coast²⁷⁶.

Infrastructure damage has been severe, including road erosion, water and sanitation system failures, and widespread disruptions to electricity: For instance, Hurricane Keith damaged 740 miles of roads and disrupted power for 22,000 customers²⁷⁷. Hurricanes also severely impacted health systems: Hurricane Earl left over 110,000 children affected, compromising access to clean water and sanitation. Forest fires, exacerbated by hurricanes like Hurricane Richard (2010), destroyed over 58,000 hectares of land between 2010 and 2012.

The tourism sector, which underpins Belize's economy, has been repeatedly impacted, with Hurricane Keith causing USD 80.2 million in losses, and settlements and infrastructure highly exposed to storm surges and erosion: From 1980 to 2016, 14 hurricanes and storms passed within 200 km of Belize, half of which were Category 4 or 5, making it the only participating country hit by three Category 5 hurricanes²⁷⁸.

Hurricane Lisa caused significant damage to Belize in 2022, with total damages to physical infrastructure and assets amounting to BZ\$131.1 million. Losses from disruptions in the production of goods and services, access to services, governance, and emerging risks reached BZ\$62.8 million.

The agricultural sector faced the highest loss, with Agriculture, Fisheries, and Forestry suffering BZ\$33 million in losses, followed by Tourism with BZ\$19 million. Housing sustained the highest damage, with BZ\$54 million in damages, followed by Agriculture, Fisheries, and Forestry at BZ\$31 million. Infrastructure and transportation sustained BZ\$14 million in damage, while the Education sector faced BZ\$11 million in damages.

The Social Sector accounted for 51.1% of the damage, but only 7.2% of the losses. The Productive Sector saw the largest proportion of the economic losses, accounting for 84.3% of the total loss, while also contributing 34% to the overall damage. Infrastructure accounted for 14.9% of the damage and 8.2% of the losses²⁷⁹.

Overall, the impacts of Hurricane Lisa highlight the severe risks posed to Belize's agricultural, tourism, and infrastructure sectors, resulting in substantial economic damages and challenges for recovery.

Table 17 - Summary Effects of Hurricane Lisa in BZ\$²⁸⁰.

Sector	Damage	Losses
Social Sub Sector	66,990,084	4,489,268
Housing	54,391,262	3,509,541
Education	10,572,494	406,037
Culture	2,026,329	573,689
Productive Sub Total	44,603,014	52,902,867
Agir, fish, forest	31,433,760	33,370,330
Tourism	6,591,861	18,744,063
Commerce	6,577,393	788,474
Infrastructure Sub Total	19,520,575	5,123,681
Infra & trans	13,959,325	4,157,681
DRM		268,339

Total	131,113,673	62,784,155
-------	-------------	------------

In summary, Belize's vulnerability to hurricanes, floods, droughts, and forest fires poses significant challenges to key sectors such as agriculture, fisheries, tourism, infrastructure, and health: Building resilience in these areas is crucial to mitigate the escalating impacts of climate change and safeguard the country's economy and population.

Table 18: Climate hazards risk in Belize (source: WB Think Hazard)

Cyclone	River flood	Urban flood	Extreme heat	Wildfire	Coastal flood	Earthquake	Landslide	Water scarcity	Tsunami
High	High	High	High	High	Medium	Medium	Medium	Medium	Low

3.4 Grenada

Grenada is a small island country located at 11°58' North latitude and 61°20' West longitude, the southern end of the Caribbean Island chain between the Caribbean Sea and Atlantic Ocean: Grenada consists of three islands with a total area of 345 square km (133 sq miles), which includes mainland Grenada, Carriacou, and Petite Martinique. Grenada is volcanic in origin, characterized by mountainous terrain with extensive corals and mangroves ringing the islands. Approximately 3% of the land area in the country is at sea level. The main towns and key socio-economic facilities are located on the coast. The highest point in the country is Mount Saint Catharine at 840 m. Grenada's total population was estimated at 113,000 in 2020. Most of the population is of African descent (more than 80%). The Grenadian economy is mainly based on agriculture and tourism.

As a result of its location close to the equator and a strong marine influence, the climate of tri-state Grenada is characterized by high and relatively unchanging temperatures year-round, as well as a dry season that lasts from January to May and a wet season that lasts from June to December: The annual average temperature in Grenada is around 25°C, with a small variation (one degree) at annual seasonal cycle. The mean maximum temperature is 31.4°C while the mean minimum is 24.0°C. Annual rainfall ranges from 750 to 1400 mm. Carriacou and Petit Martinique generally receive lower levels of rainfall and during the dry season can experience severe drought conditions.

Grenada is particularly vulnerable to the impacts of climate change, as evidenced by the impacts of extreme events and occurrences of increased forest fires, crop loss, water shortages and incidence of pests and disease occurring in recent years: Grenada's key economic sectors like agriculture and tourism are extremely vulnerable to the impacts of climate change.

Table 19: Grenada historic and projected climate

KEY: Green = statistically significant. Grey = no assessment

HISTORICAL TREND	PROJECTION
RAINFALL & rainfall hazards ²⁸¹	
Rainfall patterns have changed, particularly during the late wet season. Mean precipitation,	Projections indicate a consistent decline in mean annual rainfall for Grenada across all models. Under the SSP4.5 scenario, annual rainfall is expected to decrease

which was 2.66 mm/day during preindustrial levels, has decreased by 6.99% by 2020 ²⁸² .	by 10.08% to 19.19%, while the SSP5-8.5 scenario projects reductions ranging from 15.17% to 40.88% in the short and long term ²⁸³ .
1990's has been the driest decade since 1986, as monthly rainfall was below 14 cm for majority of the rainy seasons.	The proportion of total rainfall that falls in heavy events decreases in most model projections, changing by -20% to +7% by the 2090s
Mean rainfall over Grenada has increased in SON, by 12.0 per month (6.3%) per decade since 1960, but this increase is not statistically significant. This increase is offset partially by decreases of around 4.5mm per month (2.5%) per decade in JJA.	Maximum 5-day rainfalls tend to decrease in model projections, but the ensemble range covers both increases and decreases at -29 to +20mm by the 2090s.
AIR TEMPERATURES and temperature hazards	
Decadal trends show that temperatures have risen steadily over time, with the 2000s being the hottest decade on record.	The mean annual temperature is projected to increase by 1.26°C by 2040 and 2.31°C by 2100 under the SSP2-4.5 scenario. Under the SSP5-8.5 scenario, temperatures are expected to rise by 1.30°C in the near term and up to 3.68°C in the long term²⁸⁴.
Mean annual temperature in Grenada has increased by around 0.6°C since 1960, at an average rate of 0.14°C per decade.	Annually, projections indicate that 'hot' days will occur on 33-66% of days by the 2060s, and 41-89% of days by the 2090s. Days considered 'hot' by current climate standards for their season are projected to increase most rapidly in DJF and SON, occurring on 52-99% of days of the season by the 2090²⁸⁵s.
	Hot nights, relative to the 1970-99 annual climate, are projected to increase faster than hot days, occurring on 33-83% of nights by the 2060s and 41-99% by the 2090s. Seasonal hot nights will increase most rapidly in DJF and SON, reaching 67-100% of nights across all seasons by the 2090s²⁸⁶.
SEA SURFACE TEMPERATURES and SST hazards	
Observed data from 1960 to 2006 indicates that sea surface temperatures in Grenada have been increasing at a rate of 0.05°C per decade, with seasonal variations such as 0.08°C per decade during the warmer months of June to November²⁸⁷.	Projections indicate that by 2050, sea surface temperatures in Grenada could rise by 1.17°C under the SSP4.5 scenario, reaching 2.16°C by 2100. Under the high-emission SSP5-8.5 scenario, temperatures are expected to increase between 1.20°C and 3.43°C, with the most significant warming occurring during the warm season (SON) and moderate increases during the cooler season (DJF)²⁸⁸.
SEA LEVEL RISE and SLR hazards	
Approximately 3% of Grenada's land area is situated at sea level, making it particularly vulnerable to the impacts of sea-level rise.²⁸⁹	Projections suggest that by 2050, sea level rise in Grenada could reach 6 mm/yr under the SSP4.5 scenario and 7 mm/yr under the high-emission SSP5-

8.5 scenario. By 2100, the rate is expected to increase to 8-13 mm/yr under the SSP5-8.5 scenario²⁹⁰.

HURRICANE and windspeed hazards

- Compared to other Caribbean countries, Grenada was historically at low risk of tropical storms. Since 1955, no major hurricanes affected the island until the passages of hurricanes Ivan and Emily, 10 months apart, in 2004 and 2005, respectively. The official season in Grenada for tropical cyclones is between June and November²⁹¹ Historical mean wind speed change of 0.04m/s compared to preindustrial level²⁹².
- There is no consensus on whether the frequency of hurricanes will increase in future projections; however, predictions indicate increased intensities and stronger wind speeds.²⁹³ Mean wind speeds are expected to increase by 0.29-0.69% under SSP4.5 for 2040-2100, and by 0.69-2.56% under the high-emission SSP5-8.5 scenario²⁹⁴.

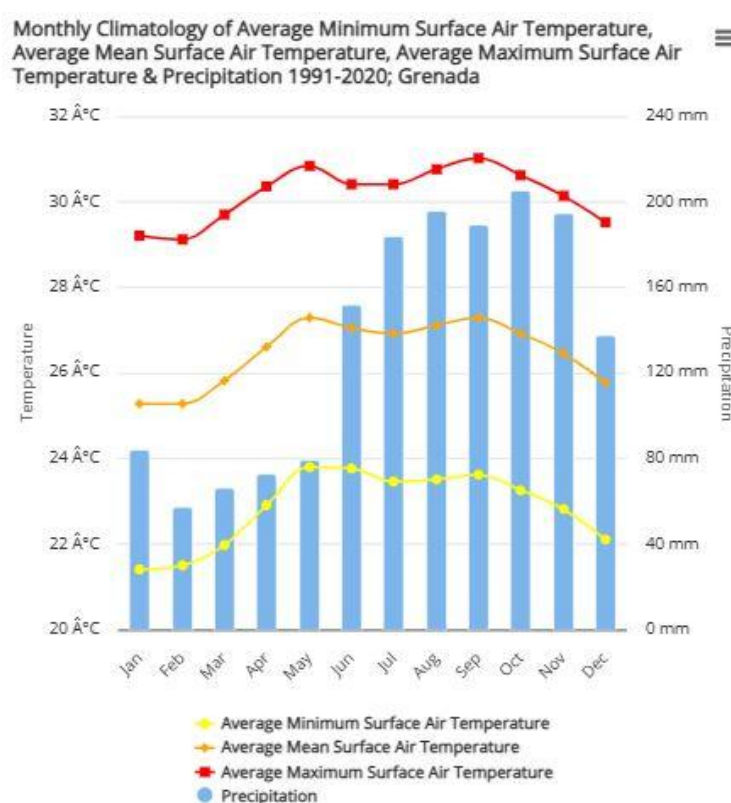


Figure 74 Monthly Climatology - Grenada

Observed Temperature & Projected Temperature

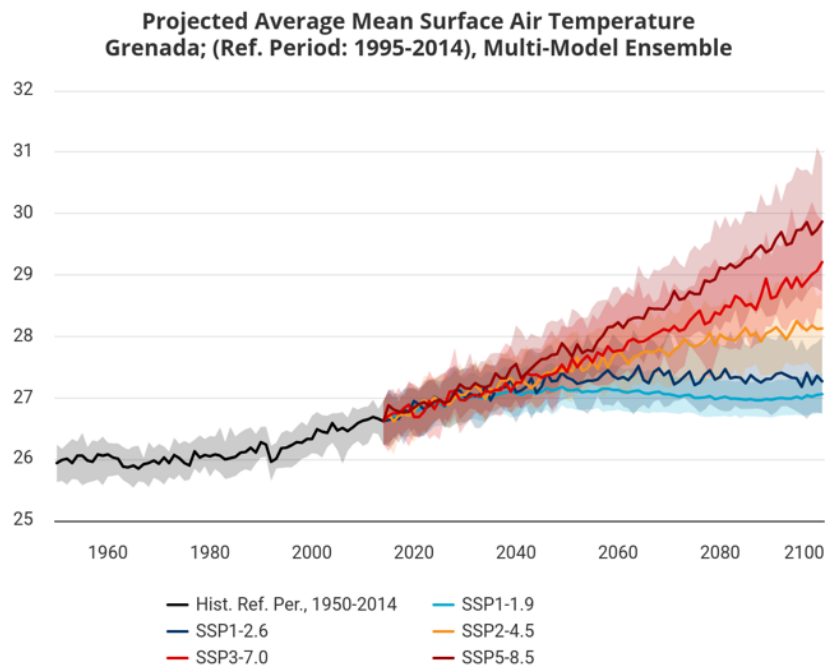


Figure 75 Observed and Projected Temperature - Grenada

The temperature analysis for Grenada reveals distinct seasonal variations, as shown in Figure 74: Between 1991 and 2020, average maximum temperatures peaked in the months of August and September, reaching approximately 27°C, while the coolest temperatures occurred in January and February, averaging around 25°C. The minimum temperatures follow a similar pattern, ranging from 25°C in the cooler months to 27°C during the warmer season. Decadal trends indicate a steady rise in temperatures over time, with the 2000s recorded as the hottest decade to date²⁹⁵.

Under a high-emissions scenario, Grenada's mean annual temperature is projected to increase by approximately 2.9°C by the end of the century (2071-2100), compared to 1981-2010 levels: This significant warming would result in nearly all days being classified as "hot," with almost 100% of days experiencing high temperatures. Conversely, under a scenario with rapid emissions reductions, the temperature rise would be limited to around 0.9°C, with approximately 90% of days categorized as "hot".

The proportion of hot days is expected to increase dramatically, rising from 23% of days between 1981-2010 to nearly 100% under a high-emissions scenario: However, models may overestimate this trend, as observed data from 1981-2010 showed that only about 30% of days were classified as "hot," rather than the predicted 23%. This warming trend is expected to extend to nighttime temperatures, with similar increases projected for hot nights²⁹⁶.

Observed Precipitation & Projected Precipitation

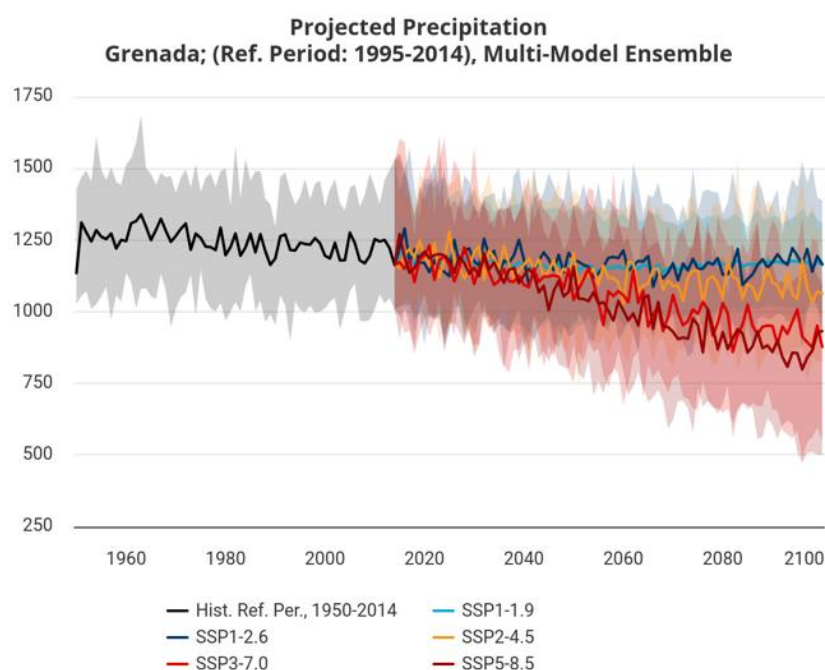


Figure 76 Observed and Predicted Precipitation - Grenada

Between 1991 and 2020, precipitation in Grenada exhibited a clear seasonal trend, with the wet season occurring from June to November, reaching its peak in October with rainfall exceeding 200 mm²⁹⁷. Conversely, the dry season extends from January to May, with February recording the lowest rainfall, averaging approximately 57.8 mm. Annual rainfall across the country ranges between 750 and 1,400 mm, highlighting significant variability between the wet and dry periods.

Under a high emissions scenario, Grenada's total annual precipitation is projected to decrease by approximately 24% on average. However, this forecast carries significant uncertainty, with potential changes ranging from a 55% decrease to a 5% increase. If emissions decline rapidly, the decrease in rainfall is projected to be much smaller, averaging a 6% reduction, with an uncertainty range from -22% to +7%. Additionally, the proportion of annual rainfall from very wet days (currently about 30% for the period 1981-2010) is expected to decrease slightly by the end of the century, potentially dropping to around 25% on average, with uncertainty ranging from 5% to 45%. However, if emissions decrease quickly, this shift is expected to be minimal²⁹⁸.

Winds

Grenada has a major Wind Factor™ risk based on the projected likelihood and speed of hurricane, tornado, or severe storm winds impacting it. It is most at risk from hurricanes. Average maximum wind speeds in Grenada are higher now than they were 30 years ago²⁹⁹. It is projected that the total number of tropical cyclones affecting Grenada may decrease by the end of the century. However, human-induced climate change is expected to increase the intensity of these cyclones. Most notably, the frequency of the most intense cyclones—Category 4 and 5 storms—could rise, though these projections are highly sensitive to model resolution. Additionally, average precipitation rates within 100 km of a storm's center are expected to increase, with a maximum increase of about 10% per degree of warming. These higher rainfall rates would be further intensified if the translation speeds of tropical cyclones continue to slow down, leading to longer-duration, more damaging storms³⁰⁰.

Sea level rise

Total Sea Level Change by Month (1993 – 2024); Grenadian Exclusive Economic Zone

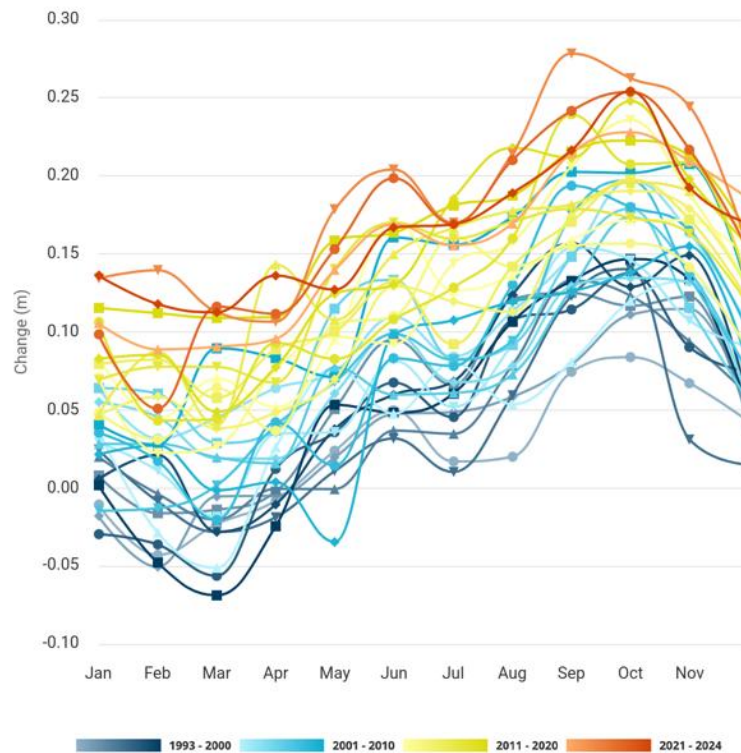


Figure 77 Sea Level rise changes in Grenada

Sea level rise poses one of the most significant threats to Grenada, particularly for low-lying areas and coastal regions: Research indicates that global mean sea level rise is accelerating due to climate change, and the relatively slow response time means that sea levels will continue to rise for decades, even after emissions are reduced. In Grenada, a 0.5-meter rise in sea level could result in the loss of up to 60% of the island's beaches³⁰¹.

Hurricane and windspeed hazards:

Simulated Relative Frequency (Percent) of Cyclone Types for Global, North Atlantic Ocean, Grenadian Exclusive Economic Zone, Grenada (landfalls); CHAZ; Historical (1951-2014) and Projected SSP2-4.5 (2035-2064)

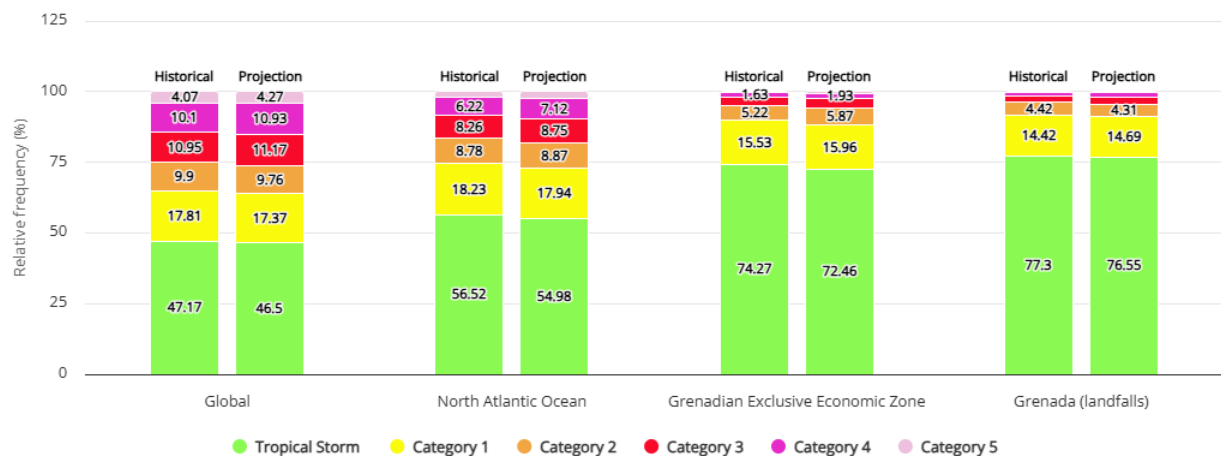


Figure 78 - Simulated relative frequency of cyclone types for Grenada (Historical & Projected)³⁰²

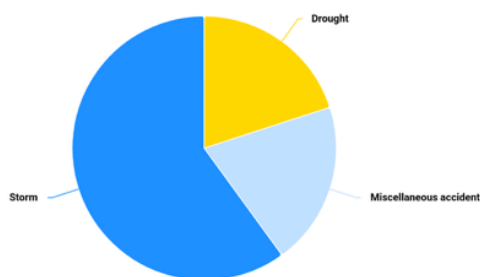
Tropical storms make landfall in Grenada more frequently than in the Global and North Atlantic Ocean figures. Historically, tropical storms accounted for 77.3% of cyclone activity in Grenada, significantly higher than the North Atlantic Ocean (56.52%) and Global (47.17%) averages. Projections indicate a slight decrease to 76.55%, yet this remains notably higher than the comparative regions, emphasizing Grenada's continued exposure to tropical storms. Similarly, for hurricanes (Category 1-5), the relative frequency of storms entering Grenada's Exclusive Economic Zone (EEZ) is higher compared to the Global and North Atlantic Ocean averages. While Category 1 hurricanes are projected to increase slightly from 15.53% to 15.96%, stronger storms such as Categories 3 and 4 are expected to rise marginally from 5.22% to 5.87% and 1.63% to 1.93%, respectively. This suggests that while tropical storms continue to dominate, Grenada remains vulnerable to high-intensity storms, with projections indicating a persistent risk of severe weather events. Additionally, the minor reduction in tropical storms and the increase in stronger hurricanes upon landfall highlight the need for enhanced disaster preparedness and resilience planning.

The predictability of future tropical cyclones comes with significant uncertainties due to multiple factors. These include differences among climate models, the complexity of tropical cyclone processes, and regional variations in cyclone formation, behavior, and dispersal. However, World Bank estimations based on the Columbia HAZard Model project that tropical cyclones in Grenada will continue to occur at a relatively high frequency, with the proportion of Category 1 storms showing a slight increase, while stronger hurricanes (Categories 3-5) are projected to rise slightly.

3.4.1 Exposure to climate hazards by country geography

Grenada is highly vulnerable to extreme events, particularly hurricanes, droughts, and storms, which pose significant risks to the country's economy, infrastructure, and social stability: Over the past three decades, Grenada has experienced 10 major hurricanes and several severe droughts, including notable events like Hurricanes Ivan (2004), Emily (2005), and Beryl (2024). These extreme events have caused widespread devastation, disrupting key sectors such as agriculture, fisheries, tourism, forestry, and healthcare, while also exposing the island's infrastructure and housing stock to immense damage. The cumulative impact of these events underscores the country's susceptibility to climate-related hazards, with economic losses estimated at 1.7% of GDP annually. These recurring extreme events pose significant challenges to Grenada's long-term stability, emphasizing the urgent need for strengthening resilience across key economic sectors and infrastructure to mitigate future risks.

Average Annual Natural Hazard Occurrence for 1980-2020



Key Natural Hazard Statistics for 1980-2020

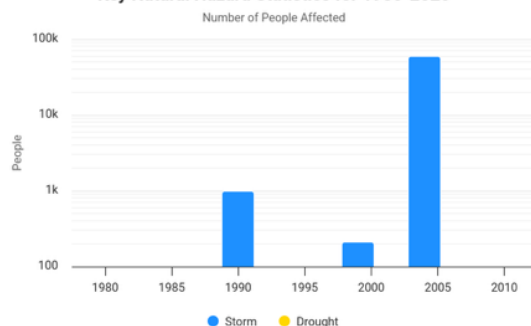


Figure 79 (left): Grenada average annual hazard occurrence²

Figure 80 (right): Grenada hazard statistics³

² <https://climateknowledgeportal.worldbank.org/country/suriname/vulnerability>

³ <https://climateknowledgeportal.worldbank.org/country/suriname/vulnerability>

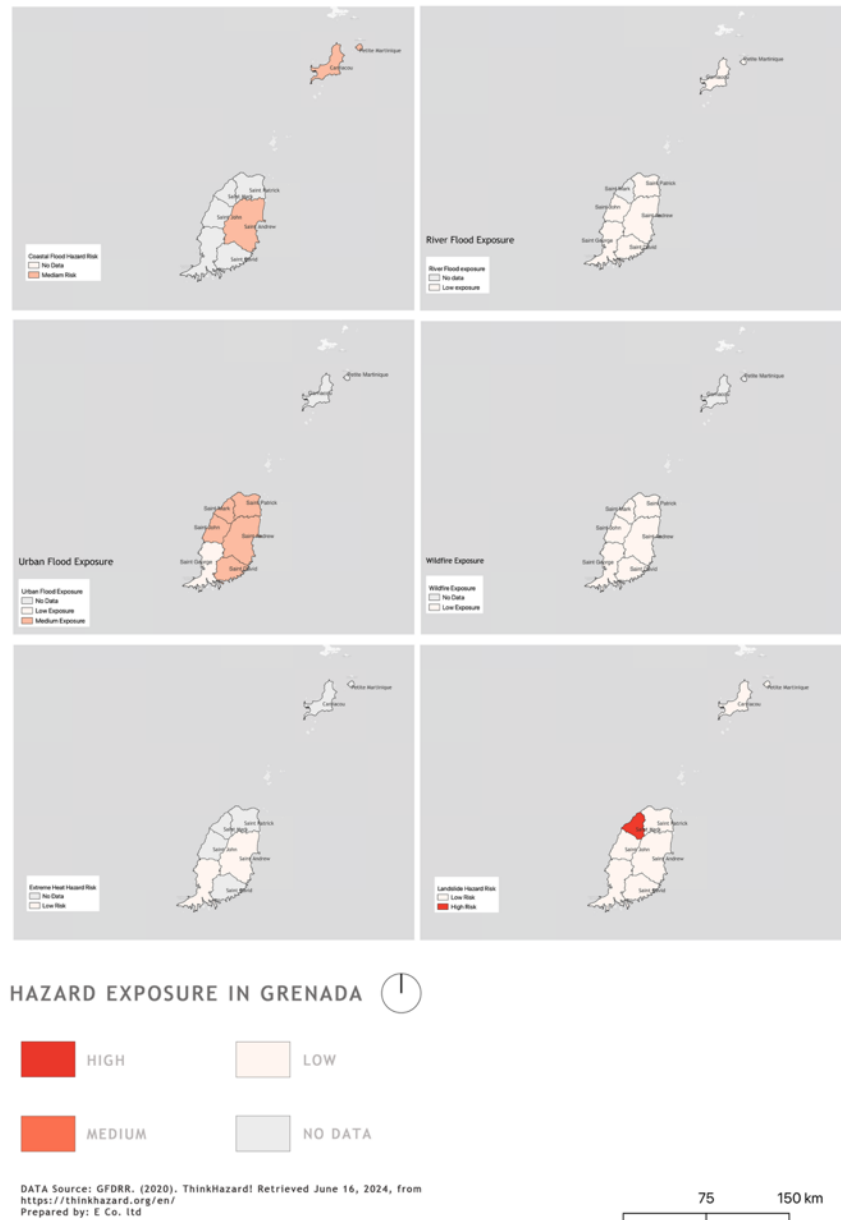


Figure 81 Exposure to different hazards - Grenada

In Grenada, the hazards with the highest overall impact include earthquakes, landslides, and tsunamis, which pose significant exposure risks across the country despite regional variations. Other hazards demonstrate more pronounced regional differences. For instance, urban and coastal flooding show higher exposure in St. Andrew Parish, while volcanic hazards particularly affect St. Andrew and St. George. In contrast, wildfire and river flood exposure in Grenada remain minimal.

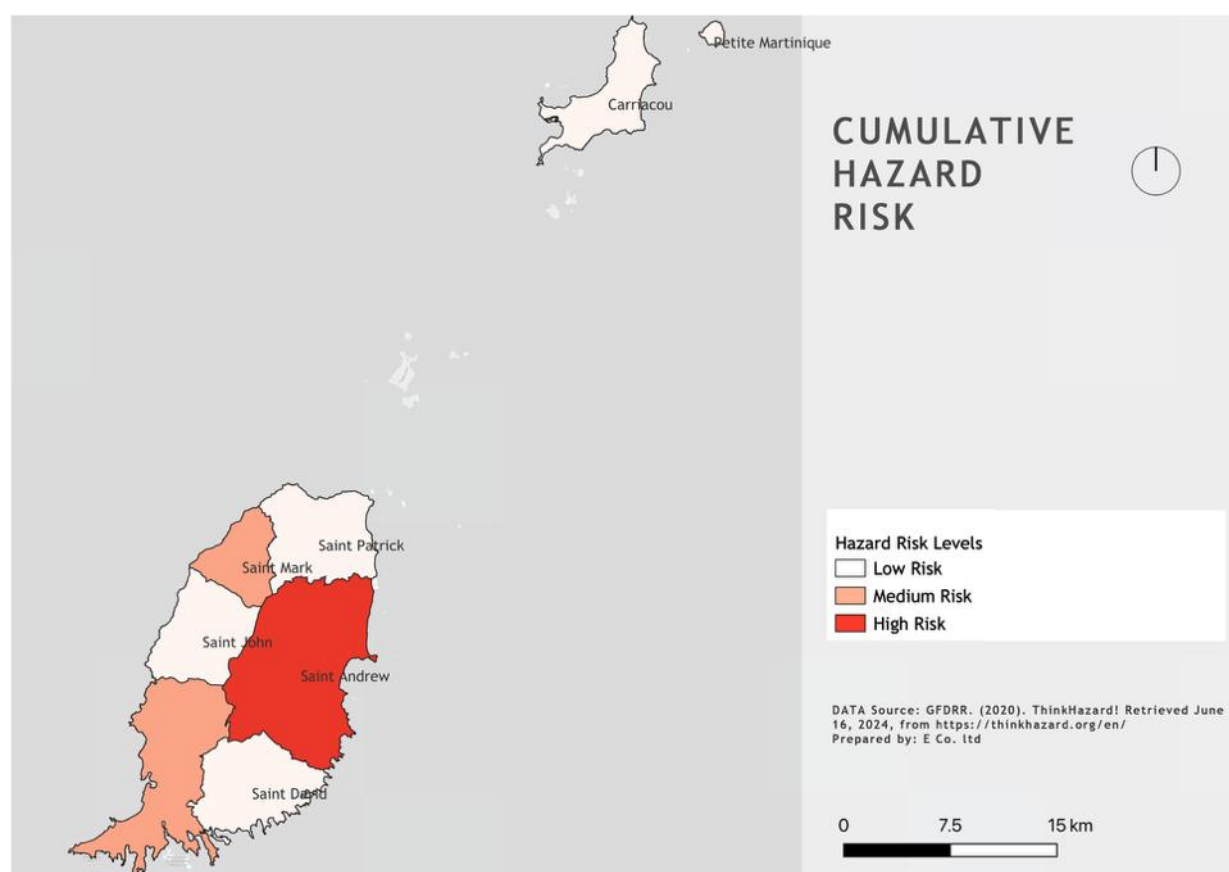


Figure 82 Cumulative hazard exposure map

This map uses think hazard database data and illustrates the cumulative hazard exposure across Grenada, categorizing regions into low, medium, and high exposure levels⁴. The data indicates limited regional variation in hazard exposure across the country, with exposure levels generally high and moderately influenced by the nature of the hazards. This uniformity can be attributed to Grenada's small land area of just 344 km², which reduces significant geographical disparities in hazard exposure. While St. George, St. David, and St. Andrew exhibit slightly higher levels of cumulative hazard exposure, represented by the darker shades, the differences across the remaining parishes, such as St. Patrick and St. Mark, which are classified as medium exposure, are relatively minor. Carriacou and Petite Martinique are categorized as areas of low exposure; however, this classification may be influenced by the lack of available data rather than actual lower exposure levels.

Grenada's topography also contributes to its hazard exposure. The island is predominantly mountainous, with Mount St. Catherine, its highest peak at 840 meters (2,760 feet), serving as the youngest and highest of the five volcanic centers forming Grenada. Other significant mountains, such as Mount Granby and Southeast Mountain, add to the steep-sided valleys and small rivers that flow into the sea, increasing the risks of landslides and flooding³⁰³.

The fisheries and aquaculture sector has repeatedly suffered substantial damages. Hurricane Beryl in 2024 alone caused losses of \$4.08 million, affecting boats, fish processors, jetties, and coral nurseries: In earlier events, Hurricane Emily (2005) and Hurricane Ivan (2004) resulted in significant

⁴ <https://thinkhazard.org/en/>

damage to vessels, communication systems, and fish markets, rendering many fishers unable to operate for months.

The agriculture sector, a cornerstone of Grenada's economy, is particularly vulnerable to strong winds and extreme weather events: Hurricane Beryl led to over \$13.04 million in crop losses, impacting cacao, bananas, nutmeg, and breadfruit. Livestock losses amounted to \$3.38 million. Similarly, Hurricane Ivan devastated 85% of the nutmeg crop and 60% of cocoa trees, leading to long-term impacts on farming families and foreign exchange earnings³⁰⁴.

The forestry sector has also faced extensive damage: Beryl destroyed forests in Carriacou, uprooting hardwoods and impacting ecosystems, while earlier hurricanes like Ivan and Emily damaged nearly 90% of Grenada's forest resources. Coastal ecosystems and forest plantations remain highly vulnerable³⁰⁵.

In the tourism sector, which plays a critical role in Grenada's economy, hurricanes have hindered growth and caused millions in damages: Hurricane Beryl severely affected Carriacou and Petite Martinique, where hotels, guest houses, and restaurants sustained most of the \$4.11 million in losses³⁰⁶.

Grenada's infrastructure, especially housing, is consistently the most impacted due to weak building standards: During Hurricane Ivan, 90% of the housing stock was destroyed, while Hurricane Beryl damaged critical health facilities, particularly in Carriacou and Petite Martinique, with total health sector losses reaching \$246.19 million³⁰⁷.

Overall, Hurricane Beryl caused extensive damage across Grenada, with the most severe impacts in Carriacou and Petite Martinique. The total estimated damage amounted to XCD\$467.75 million (US\$173.24 million), affecting approximately 40,600 people, or 39% of the population.

The housing sector suffered the greatest damage, with 3,736 dwellings affected, leading to an estimated loss of XCD\$19.21 million (US\$7.11 million). The health sector experienced damage to 11 health facilities, including hospitals and medical stations, with total damages amounting to XCD\$4.16 million (US\$1.54 million). In the education sector, 15 schools were affected, disrupting the education of 1,984 students and 281 staff, resulting in damages of XCD\$18.14 million (US\$6.72 million) and losses of XCD\$3.87 million (US\$1.43 million).

The cultural sector faced significant damage to museums, churches, and historic sites, with losses disrupting intangible heritage practices and cultural industries. The sector suffered damages of XCD\$1.33 million (US\$0.49 million) and losses of XCD\$0.67 million (US\$0.25 million).

WASH infrastructure was severely impacted, with significant damage to desalination plants, surface water systems, and rainwater catchments, leading to disruptions in water supply. The estimated damage was XCD\$1.75 million (US\$0.65 million), while losses reached XCD\$8.92 million (US\$3.3 million). The energy sector also suffered, with damages of XCD\$12.88 million (US\$4.77 million) and losses of XCD\$6.91 million (US\$2.56 million), leaving over 40% of affected areas without power.

Transport infrastructure, including airports and ports, experienced structural and electrical damage, leading to estimated damages of XCD\$1.96 million (US\$0.73 million) and losses of XCD\$0.51 million (US\$0.19 million). The environment was also severely affected, with coastal erosion, habitat degradation, and worsened water quality.

Hurricane Beryl underscored the urgent need for disaster risk reduction, as damages to emergency operations facilities and early warning systems amounted to XCD\$0.04 million (US\$0.01 million), with losses totaling XCD\$1.77 million (US\$0.66 million)³⁰⁸.

Table 20 - Summary Effects of Hurricane Beryl in Million XCD. Source: GOG, 2024

Sector	Damage	Losses
Social	387.07	23.79
Housing	363.95	19.21
Health	4.16	0.66
Education	18.14	3.87
Culture	0.83	0.05
Productive	64.06	85.50
Agriculture	52.95	78.51
Tourism	11.11	6.99
Infrastructure	16.58	16.35
Wash	1.75	8.92
Energy	12.88	6.91
Transport	1.96	0.51
Cross-Cutting	0.04	1.77
Environment		
DRR	0.44	1.77
Total	467.75	127.410
Total USD	173.24	47.19

Table 21: Climate hazards risk in Grenada (source: WB Think Hazard)

Landslide	Coastal flood	Earthquake	Tsunami	Urban flood	Volcano	Extreme heat	River flood	Wildfire
High	Medium	Medium	Medium	Low	Low	Low	Very low	Very low

3.5 Jamaica

In Jamaica, peak temperatures occur during summer months of June to September while the coolest temperatures occur during winter between December through March: The Northern portions of the island tend to be exposed to colder temperatures from occasional surges of cool air from continental North America during fall and winter months. There exists a dry season between December through March and a rainy season between April through November which are divided into early rainfall and late rainfall seasons. There exists a mid-summer minimum around July that separates early and late wet seasons. Most

of Jamaica's rainfall occurs during the wet season (May and October) and experiences its driest conditions in February and March³⁰⁹.

Table 22: Jamaica historic and projected climate

KEY: Green = statistically significant. Grey = no assessment

HISTORICAL TREND	PROJECTION
RAINFALL & rainfall hazards ³¹⁰	
- Interannual variability accounts for most of the variability experienced in Jamaica over the past decades. - There is no statistically significant trend in mean annual rainfall, however there is a noticeable increase in short-term variability. - Observations show an increase in the intensity and occurrence of extreme rainfall events between 1940-1910.	- Projections indicate consistent decreases in rainfall for Jamaica during JJA and MAM under the highest emissions scenario, with changes ranging from -72% to +12% for JJA and -59% to +51% by the 2090s. For other seasons, projections vary, but median values are consistently negative. Annual rainfall projections range from -65% to +22%, with median values between -6% and -14% by the 2090s. - Most model projections indicate a decrease in the proportion of total rainfall from heavy events, with changes ranging from -19% to +9% by the 2090s. - Maximum 1- and 5-day rainfalls in projections span a similar range of positive as negative changes, but ensemble median values tend to be negative.
AIR TEMPERATURES and temperature hazards ³¹¹	
Maximum, mean, and minimum temperatures show upward (linear) trend. Minimum temperatures are increasing faster ($-0.27^{\circ}\text{C}/\text{decade}$) than maximum temperatures ($-0.06^{\circ}\text{C}/\text{decade}$). Mean temperatures increasing at a rate of $0.16^{\circ}\text{C}/\text{decade}$. Daily temperature range has decreased.	- The mean annual temperature is projected to increase by 0.6 to 1.8°C between 2040 and 2100 under the SSP2-4.5 scenario, and by 0.7 to 3.5°C by the end of the century under the SSP5-8.5 scenario³¹². - Annually, projections indicate that 'hot' days are projected to occur on 27-73% of days by the 2060s, and 30-98% of days by the 2090s. Days considered 'hot' by current climate standards for their season are projected to increase most rapidly in JJA, occurring on 59-100% of days of the season by the 2090s. - Nights that are considered 'hot' for the annual climate of 1970-99 are projected to occur on 29-71% of nights by the 2060s and 40-97% of nights by the 2090s. Nights that are hot for each season are projected to increase most rapidly in JJA, occur on 68-100% of nights in every season by the 2090s. - Projections show a significant decline in the frequency of cold days and nights, with such events becoming extremely rare, occurring on 0-2% of days annually by the 2090s, and disappearing entirely in many model projections.
SEA SURFACE TEMPERATURES and SST hazards ^{313, 314}	

- Compared to preindustrial levels, sea surface temperatures (SST) increased by approximately 0.6°C by 2020. Between 1982 and 2016, Jamaica's SST showed seasonal variations, ranging from 25°C-26.8°C in December-January to 28.6°C-29.6°C in July-August, aligning with Caribbean averages.³¹⁵
- Sea surface temperatures (SST) are projected to increase by 0.6-1.71°C between 2040 and 2100 compared to the 2020 level (27.78°C) under the SSP2-4.5 scenario. Under the SSP5-8.5 scenario, SST is expected to rise by 0.67-3.18°C over the same period.

SEA LEVEL RISE and SLR hazards

- Sea levels measured at Port Royal, Jamaica, indicate an increase which has been estimated at 1.66 mm/year over a 17.8-year span which indicate a rise consistent with the global average³¹⁶.
- Projected sea level rise near the coast of Jamaica is expected to range from 6-8 mm/yr under SSP4.5 for 2050-2100, and 8-13 mm/yr under SSP5-8.5 scenarios.³¹⁷

HURRICANE and windspeed hazards

- Increase in category 4 and 5 hurricanes: rainfall intensity, associated peak wind intensities, mean rainfall for same period
- Tropical storms and hurricanes near Jamaica occur most often between **August and October**, with peak activity in **August (25 events)** and **September (21 events)**. August has the highest number of hurricanes, while tropical storms are most frequent in September³¹⁸.
- Hurricane intensity will increase, along with associated extreme precipitation and flooding³¹⁹.
- No change or slight decrease in frequency of hurricanes.
- +5% to +25% increase in hurricane rainfall rates.
- Median change in the proportion of very intense storms (categories 4 and 5) of +13%³²⁰.

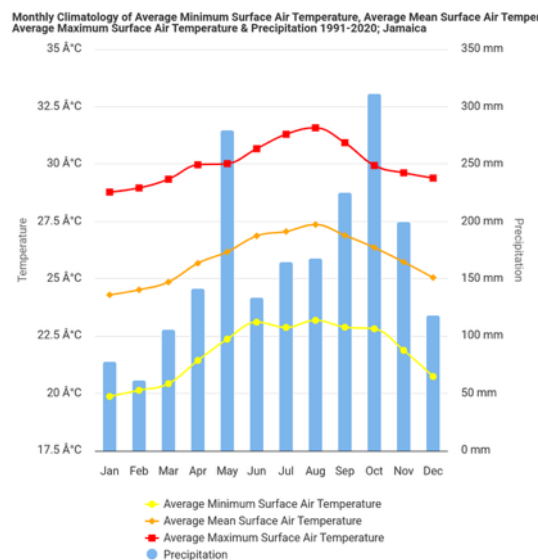


Figure 83 Monthly Climatology Jamaica

Observed Temperature & Projected Temperature

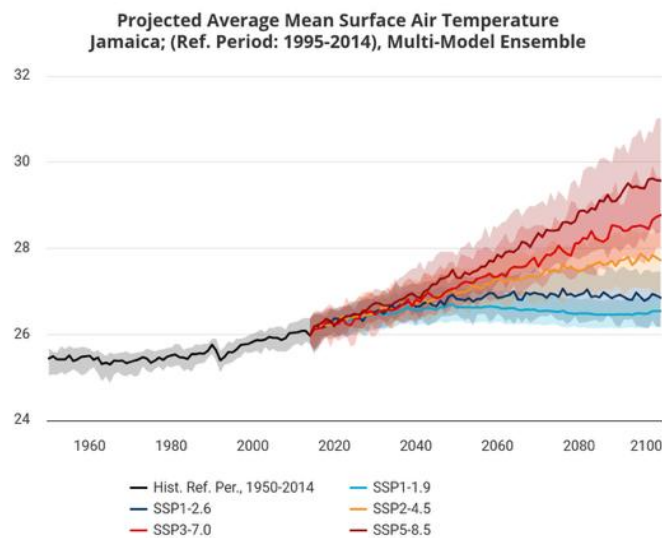


Figure 84 Mean temperature change - Jamaica³²¹

Average maximum temperatures peak during the summer months, reaching over 32.5°C in July and August, while minimum temperatures remain around 20°C during the cooler months, such as January: Temperatures follow a unimodal pattern, with the highest values during the summer months of June to September and the lowest during December to March. The annual range of mean monthly temperatures is relatively small, from 23.2°C to 26.3°C in the early 1900s to 23.0°C to 27.1°C in recent decades (1990-2019). Maximum daytime temperatures can reach up to 31°C during the hottest months, while nighttime minimums can drop as low as 18.4°C during the coolest months. This seasonal variation reflects the influence of Jamaica's tropical climate and solar insolation patterns³²².

Projections for Jamaica indicate a significant rise in temperatures across all scenarios. Similar increases are expected for minimum and maximum temperatures, with changes reaching 1.53°C by the 2050s and 3.10-3.12°C by century's end: Regional projections show that southern parishes could experience warming of 1.44-1.71°C by the 2030s, 1.65-2.31°C by the 2050s, and up to 3.75°C by the end of the century, while northern parishes could see slightly higher increases of up to 3.89°C. High-emission scenarios suggest localized temperature increases of up to 3.9°C in specific rainfall zones, with Regional Climate Models (RCMs) projecting slightly higher warming than Global Climate Models (GCMs) due to their finer resolution. These projections emphasize the potential for substantial warming, particularly under high-emission scenarios³²³.

Observed Precipitation & Projected Precipitation

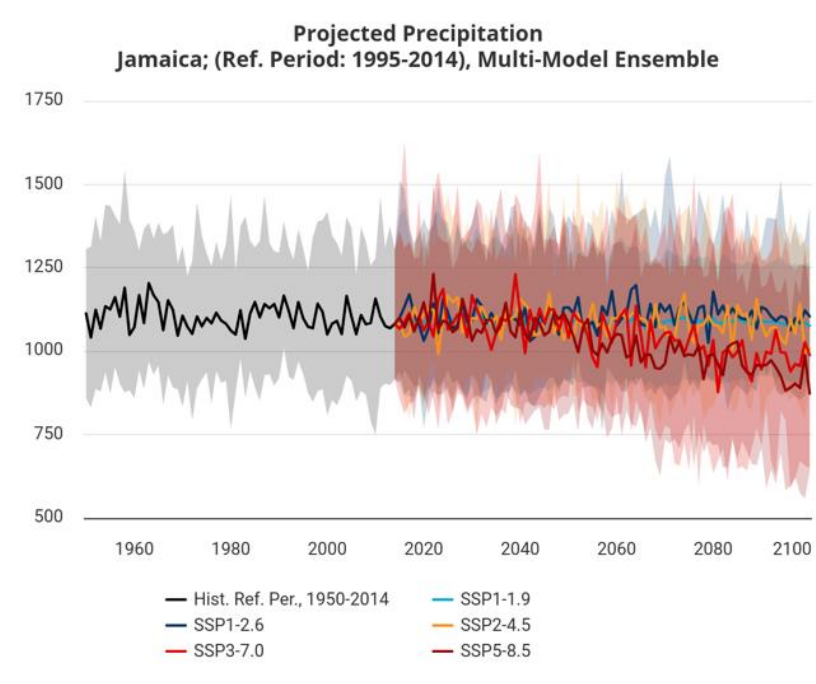


Figure 85 Mean Projected Precipitation change - Jamaica³²⁴

Jamaica's rainfall patterns are characterized by significant year-to-year variability, with strong fluctuations between wet and dry years. This variability is linked to phenomena such as El Niño/La Niña, which have also contributed to increased rainfall variability since the late 1990s. Recent prolonged droughts, such as those in 2004/5, 2009/10, and 2014/15, highlight the importance of considering this variability in planning rather than relying solely on long-term averages. Over the past century, there is a slight downward trend in rainfall, but it is not statistically significant, meaning there is no conclusive evidence that Jamaica is becoming wetter or drier³²⁵.

In addition to inter-annual changes, there is decadal variability, with periods of wetter or drier conditions influenced in part by the Atlantic Multidecadal Oscillation (AMO): The western, coastal, and interior rainfall zones show strong decadal correlations, likely driven by large-scale climatic factors, while the eastern zone appears independent, with drivers that are not fully understood.

Analysis of rainfall extremes indicates increasing trends in total wet-day precipitation, rainfall on the wettest days, maximum one- and five-day rainfall, heavy rainfall events, and rainfall intensity: At the same time, there is a decreasing trend in the number of consecutive dry days, suggesting more frequent interruptions between dry spells. These patterns emphasize the dynamic and complex nature of Jamaica's rainfall, requiring adaptive and informed decision-making.

Rainfall projections for Jamaica indicate a significant drying trend, with annual rainfall expected to decrease by up to 4% by the 2030s, 9% by the 2050s, and 21% by the end of the century under the highest emissions scenario: This drying is driven primarily by reductions in late wet season rainfall, particularly in the southern and eastern regions, where declines could reach up to 35% by century's end. While small increases (1-4%) in dry season rainfall are projected, they are insufficient to offset overall losses. Projections also suggest increases in extreme rainfall events, such as daily and 5-day maximum rainfall during June and December, alongside longer dry spells, particularly in March and October. These changes underscore the growing variability in rainfall patterns and the importance of adaptive water resource management³²⁶.

Sea level Change

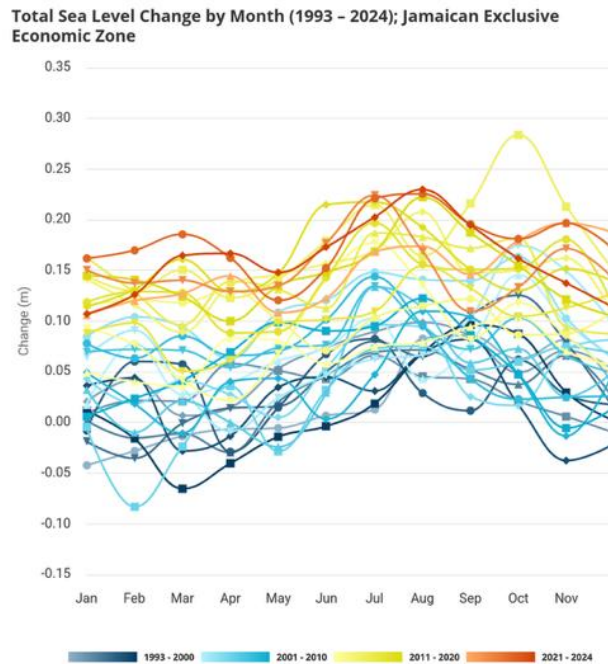


Figure 86 Sea Level Change - 1993- 2024

The rate of sea-level rise in the Caribbean is consistent with the global average, with measurements at the Port Royal Marine Laboratory in Jamaica indicating an annual increase of approximately 1.66 mm over a 17.8-year period. Projections for Jamaica suggest that by mid-century, mean sea levels will rise by 0.39-0.40 m across both coasts, increasing further to 0.87-0.90 m by the end of the century. Generally, the difference between north and south coast projections is approximately 0.01 m (1 cm). The IPCC highlights that a mean sea-level rise of 0.5 m could significantly amplify the frequency of extreme sea-level events, increasing occurrences by a factor of more than 10, depending on the region³²⁷.

Sea Surface Temperature

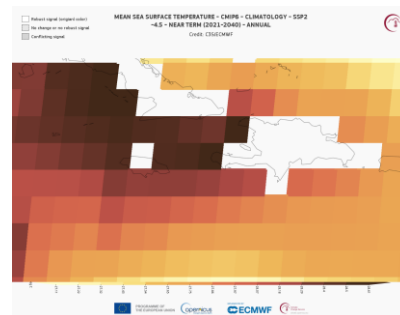
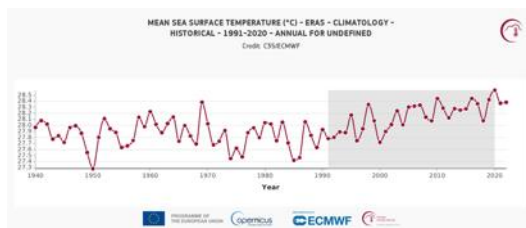


Figure 87 Mean SST 1991 - 2020 Jamaica

Figure 88 Mean SST SSP2-4.5 Near Term

After 1990, there is a notable and sustained increase in SSTs, as highlighted by the shaded section in the graph. By 2020, SST reached approximately 28.5°C, marking a significant increase from mid-20th century levels. The overall trajectory suggests persistent warming, aligning with global climate change projections.

Hurricane and windspeed hazards:

Simulated Relative Frequency (Percent) of Cyclone Types for Global, North Atlantic Ocean, Jamaican Exclusive Economic Zone, Jamaica (landfalls); CHAZ; Historical (1951-2014) and Projected SSP2-4.5 (2035-2064)

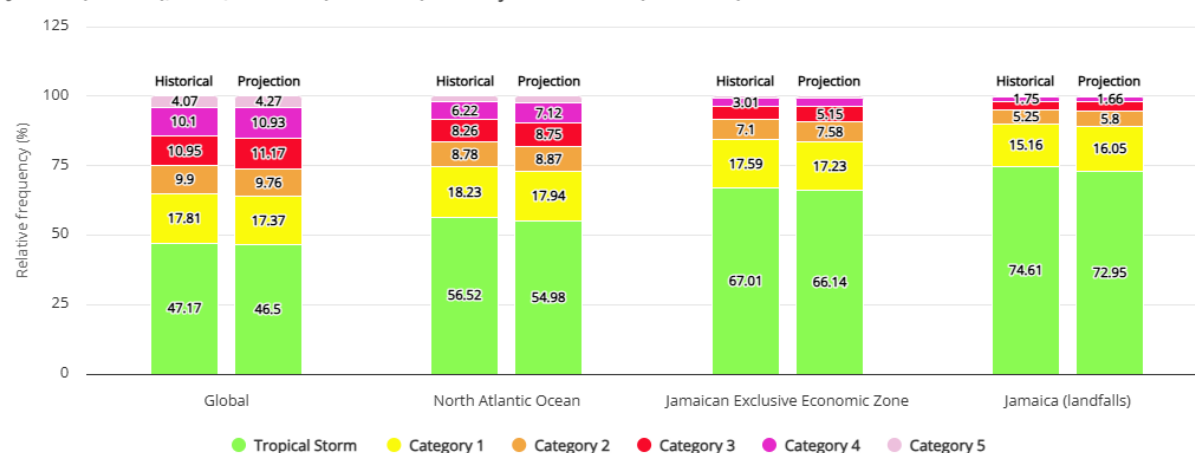


Figure 89 - Simulated relative frequency of cyclone types for Jamaica (Historical & Projected)³²⁸

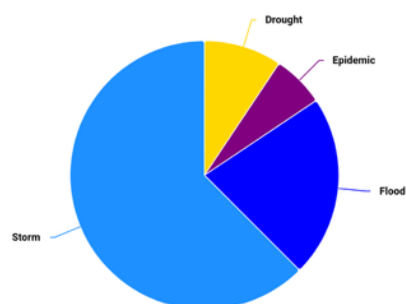
It can be seen that tropical storms make landfall in Jamaica more frequently than in the Global and North Atlantic Ocean figures. Historically, tropical storms accounted for 74.61% of cyclone activity in Jamaica, significantly higher than the North Atlantic Ocean (56.52%) and Global (47.17%) averages. Projections indicate a slight decrease to 72.95%, yet this remains notably higher than the comparative regions, emphasizing Jamaica's continued exposure to tropical storms. Similarly, for hurricanes (Category 1-5), the relative frequency of storms entering Jamaica's Exclusive Economic Zone (EEZ) is higher compared to the Global and North Atlantic Ocean averages. While Category 1 hurricanes are projected to decrease slightly from 17.59% to 17.23%, stronger storms such as Category 3 and 4 are expected to rise from 7.1% to 7.58% and 3.01% to 5.15%, respectively. This suggests that while tropical storms continue to dominate, Jamaica remains vulnerable to high-intensity storms, with projections indicating a persistent risk of severe weather events. Additionally, the minor reduction in tropical storms and the increase in stronger hurricanes upon landfall highlight the need for enhanced disaster preparedness and resilience planning.

The predictability of future tropical cyclones comes with significant uncertainties due to multiple factors. These include differences among climate models, the complexity of tropical cyclone processes, and regional variations in cyclone formation, behavior, and dispersal. However, World Bank estimations based on the Columbia HAZard Model project that tropical cyclones in Jamaica will continue to occur at a relatively high frequency, with the proportion of Category 1 storms showing a slight decrease, while stronger hurricanes (Categories 3-5) are projected to rise.

3.5.1 Exposure to extreme Events

Jamaica faces significant exposure to natural hazards, including hurricanes, floods, droughts, and seismic activity, exacerbated by its geographic location. Since the 1950s, the frequency and intensity of hurricanes have increased, particularly Category 4 and 5 storms, with 25 named storms passing within 200 km of the country.

Average Annual Natural Hazard Occurrence for 1980-2020



Key Natural Hazard Statistics for 1980-2020

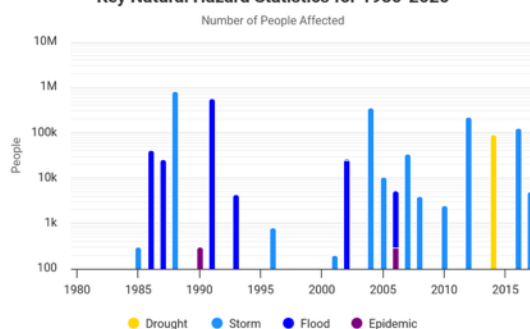


Figure 90 Jamaica hazard Occurrence
Figure 91 Jamaica Key Hazard Statistics

Hurricane Beryl in 2024 caused severe economic damage, particularly to the agriculture and fisheries sectors, with losses exceeding \$5.7 billion and affecting over 48,850 farmers. In the fisheries sector alone, losses reached \$1 billion, devastating coastal livelihoods. Forestry has also been impacted by wildfires, such as the 2021 blaze in the Blue Mountain Forest Reserve, which destroyed 13 hectares of forest³²⁹.

Jamaica's infrastructure remains vulnerable, with past storms and floods causing damages equivalent to 2%-6% of GDP. Hurricane Beryl damaged 82 health facilities, with costs reaching J\$1.8 billion, while previous tropical cyclones between 2000-2012 incurred infrastructure losses of US\$584 million for roads and US\$48 million for electricity³³⁰. Despite these challenges, the tourism sector has demonstrated resilience, recovering quickly from Hurricane Beryl with minimal long-term disruptions. Jamaica's ability to adapt and rebuild highlights both its vulnerability and resilience in addressing the persistent threats posed by extreme weather events and climate change³³¹.

Hurricane Matthew, which impacted the Greater Antilles in October 2016, led to the evacuation of 3,500 residents in Jamaica, particularly from the parishes of St. Thomas and Portland³³². The storm caused widespread disruption, including flooding in southeastern and eastern parishes, as well as temporary closures of schools, government offices, and transportation systems. Airports, including Montego Bay (Sangster International) and Kingston (Norman Manley), ceased operations as hurricane warnings were issued. While the immediate impacts were felt across the island, over time, the effects have been largely mitigated, with recovery efforts restoring normalcy in most affected areas³³³.

Additionally rising sea levels have significantly contributed to coastal erosion at Hellshire Beach in St. Catherine, Jamaica. Over the past five years, the beach has lost up to 10 meters of shoreline, and its natural convex shape has straightened. This erosion is primarily driven by sea level rise, alongside powerful waves from extreme weather events like Hurricane Dean, coral reef degradation, and the loss of seagrass beds and damaged groyne structures, which have weakened shoreline stability³³⁴.

Table 23 Climate hazards risk in Jamaica (source: WB Think Hazard)

River flood	Urban flood	Coastal flood	Landslide	Cyclone	Wildfire	Earthquake	Extreme heat	Tsunami	Water Scarcity
High	High	High	High	High	High	Medium	Medium	Low	Low

3.6 Saint Lucia

Saint Lucia has a tropical maritime climate throughout the year with some relief from the high temperatures and humidity being offered by the easterly (trade) winds that blow from the northeast. Although it rains during every month of the year, there is a well-defined rainy or wet season that occurs between June and November. Precipitation during the wet season comes mainly from tropical waves, depressions, storms and hurricanes, which occur frequently over this region owing to its geographical location within the Atlantic hurricane belt. The tropical cyclone season typically lasts from June until November.

Table 24: St Lucia historic and projected climate

KEY: Green = statistically significant. Grey = no assessment

HISTORICAL TREND	PROJECTION
RAINFALL & rainfall hazards³³⁵	
Since 1960, St. Lucia's mean rainfall has risen by 16.1 mm per month (6.1%) per decade during September to November, though this change isn't statistically significant. Meanwhile, rainfall has decreased by about 9.0 mm per month (3.2%) per decade during June to August.	- Projections from various models generally agree that St. Lucia's mean annual rainfall will decrease. By the 2090s, changes range from a 56% decrease to a 15% increase, with median estimates showing decreases of 10% to 22% annually. Most models also suggest a reduction in the share of rainfall from heavy events, ranging from a 26% decrease to a 6% increase. - Model projections suggest that maximum 1-day and 5-day rainfall amounts are likely to decrease. By the 2090s, 5-day maximum rainfall is projected to change by -31 mm to +13 mm.
AIR TEMPERATURES and temperature hazards	
Mean annual temperature in St Lucia has increased by around 0.7°C since 1960, at an average rate of 0.16°C per decade.	- The mean annual temperature in St. Lucia is projected to rise by 0.5-2.1°C from 2040 - 2100 under the SSP2-4.5 scenario and 0.63-3.6°C by the (2040-2100) under the SSP5-8.5 scenario. Temperature projections for the 2090s show a variation of approximately 1-2°C within a single emissions scenario. Warming is expected to occur consistently year-round, with slightly faster increases during the cooler seasons (DJF and SON). - Projections suggest that "hot" days will occur more frequently, making up 28-67% of the year by the 2060s and 37-100% by the 2090s. - Nights classified as "hot" based on the 1970-1999 climate are projected to occur on 28-68% of nights by the 2060s and 37-99% by the 2090s. The largest increase is expected in SON, where "hot" nights are projected to occur on 79-100% of nights in every season by the 2090s.
SEA SURFACE TEMPERATURES and SST hazards^{336, 337}	

- The island's location in the Atlantic Ocean/Caribbean Sea means that the ambient sea surface temperature average is about 26.7 °C at any time and it's a 0.6 °C increased when compared to the preindustrial level.
- Sea surface temperatures in St. Lucia are projected to rise by 1.18-2.16 °C under the SSP2-4.5 scenario and up to 1.21-3.40 °C under the SSP5-8.5 scenario, posing significant risks to the island's coral reefs and marine ecosystems.

SEA LEVEL RISE and SLR hazards

- Data from the nearby Fort-de-France tide gauge station in Martinique indicate a consistent rise in sea levels since 1976, averaging 2.7 mm per year over the full record and 7 mm per year from 2005 to 2016³³⁸.
- By 2050, total sea level rise is projected to rise from 0.20 m under the SSP2-4.5 scenario and 0.22 m under the SSP5-8.5 scenario.³³⁹.

HURRICANE and windspeed hazards

- St. Lucia lies on the southern edge of the Atlantic hurricane belt and is rarely, but occasionally, affected by hurricanes which occur throughout August, September and October³⁴⁰.
- From 1951 to 2010, 20 tropical storms and hurricanes passed by St. Lucia and the maximum wind speed recorded was 130 knots, and the minimum was 40 knots.
- Hurricane intensity will increase, along with associated extreme precipitation and flooding³⁴¹.
- No change or slight decrease in frequency of hurricanes.
- +5% to +25% increase in hurricane rainfall rates.
- Median change in the proportion of very intense storms (categories 4 and 5) of +13%.

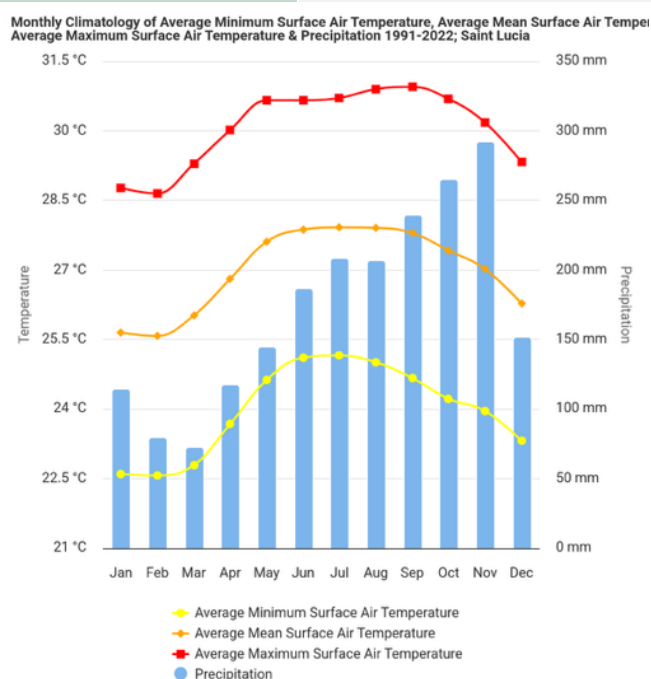


Figure 92 Monthly Climatology - St Lucia

Observed Temperature & Projected Temperature

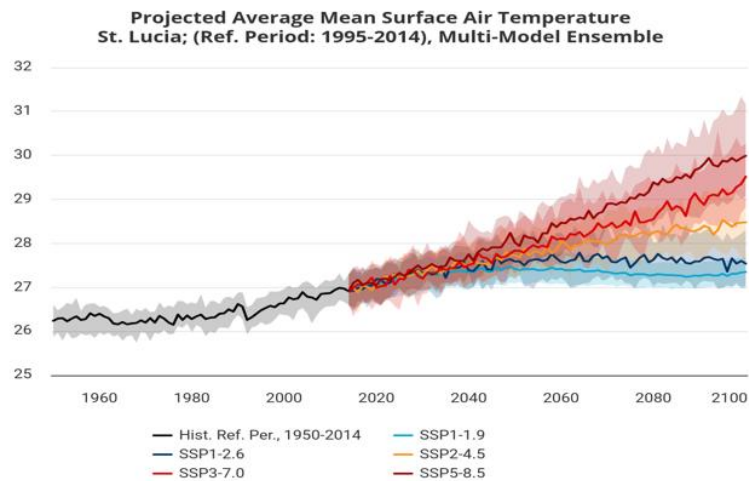


Figure 93 Projected Temperature

The island's average temperature is 27°C (79°F) with 75% relative humidity: Saint Lucia is located within the northeast Trade Wind belt, experiencing an easterly flow of warm, moist air. Daily temperatures range from 23.3°C to 30.9°C, with cooler months between December and March and warmer months between May and September.

Since 1960, the mean annual temperature has increased by approximately 0.7°C at an average rate of 0.16°C per decade: Monthly maximum and minimum temperatures have risen at rates of 0.025°C/month and 0.026°C/year, respectively. Additionally, there has been an increase in warm days and nights alongside a decrease in cooler ones, though limited daily data makes identifying trends in extremes challenging.

Temperature Projections indicate uniform warming throughout the year, with slightly faster increases in cooler seasons (September to November and December to February): By 2060, 28-68% of all days and nights are expected to be classified as "hot," increasing to 37-100% by the century's end, while "cold" days and nights are projected to become nearly non-existent³⁴². The northern part of the island is expected to warm more than the southern regions³⁴³.

Observed Precipitation & projected Precipitation³⁴⁴

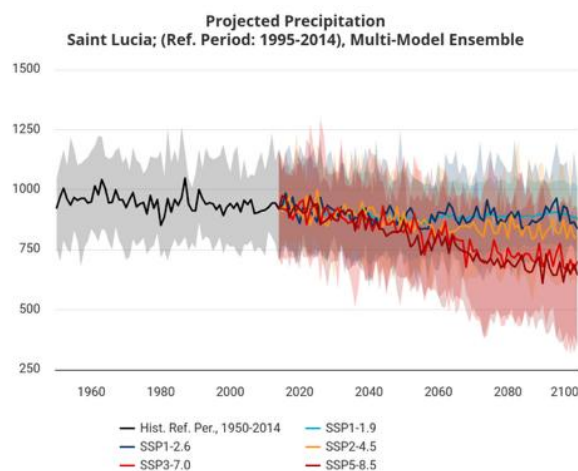


Figure 94 Projected Precipitation

Saint Lucia's precipitation follows a unimodal pattern with two distinct periods. The rainy season, typically from June to November: It is influenced by the northerly migration of the Inter-Tropical Convergence Zone (ITCZ) and various tropical weather disturbances, including waves, depressions, storms, and hurricanes. During this period, rainfall can reach up to 256 mm in a single month. The drier season occurs between December and May, with average monthly rainfall around 103 mm. February and March are the driest months, with average rainfall of 75.5 mm and 72.7 mm, respectively. The driest area on the island is Vieux Fort in the south, receiving less than 947 mm of rainfall annually. **Rainfall is projected to decrease slightly and become more variable leading to intense rains and flooding as well as droughts.**

Sea Level Change

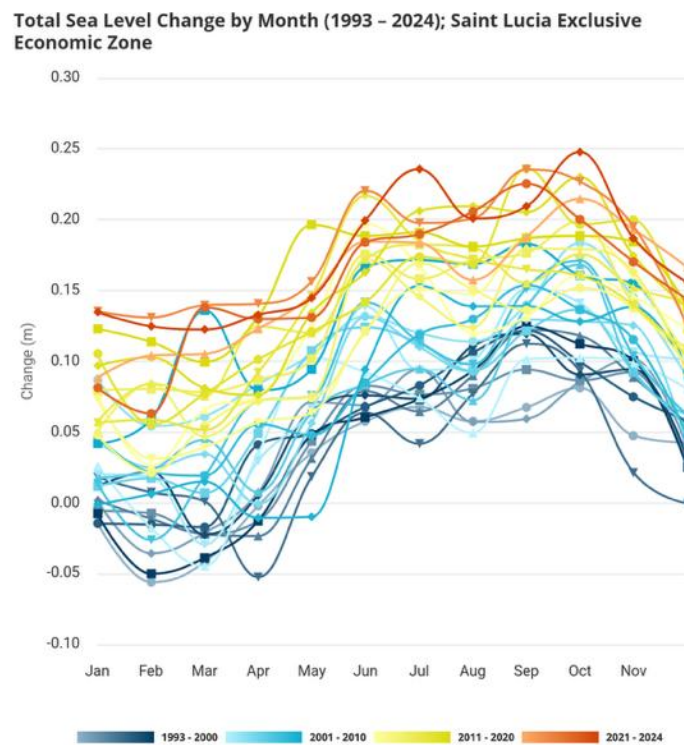


Figure 95 Sea Level Change

From 2005 to 2016, sea levels at this station increased by an average of 7 mm per year, while the average across the full available record is 2.7 mm per year: Saint Lucia has limited long-term sea level monitoring data, as measurements only began in 1998. However, regional data from the Fort-de-France tide gauge station in Martinique indicates a steady rise in sea levels since 1976, despite gaps in the dataset, these observations align with global trends of rising sea levels over the past century.

Projections indicate significant future impacts on Saint Lucia due to sea level rise combined with storm effects: By 2050, under RCP 4.5, a 50-year extreme sea level (ESL) combined with a hurricane could inundate approximately 130 meters of the eastern edge of the island's runway. By 2100, under RCP 8.5, a 100-year ESL could inundate about 380 meters. Additionally, sea level rise coupled with storm-induced ESLs is expected to severely impact the island's beaches, with projections suggesting complete erosion of at least 20% and complete flooding of 31% of all beaches under a combined ESL of 1.56 m by 2100. Such changes pose significant risks to coastal infrastructure, tourism assets, and the island's natural landscapes³⁴⁵.

Hurricane and windspeed hazards:

Simulated Relative Frequency (Percent) of Cyclone Types for Global, North Atlantic Ocean, Saint Lucia Exclusive Economic Zone, Saint Lucia (landfalls); CHAZ; Historical (1951-2014) and Projected SSP2-4.5 (2035-2064)

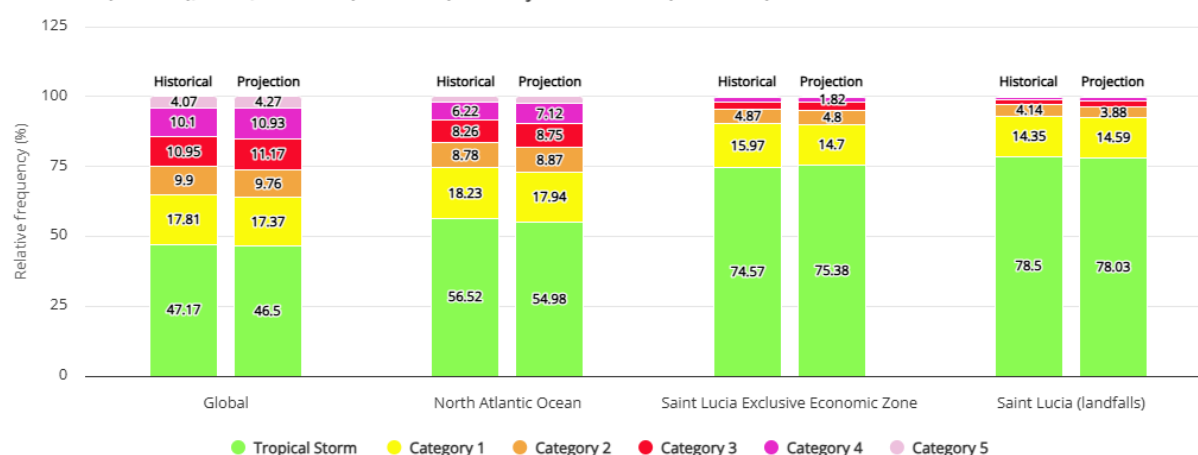


Figure 96 - Simulated relative frequency of cyclone types for Saint Lucia (Historical & Projected)³⁴⁶

Tropical storms make landfall in Saint Lucia more frequently than in the Global and North Atlantic Ocean figures. Historically, tropical storms accounted for 78.5% of cyclone activity in Saint Lucia, significantly higher than the North Atlantic Ocean (56.52%) and Global (47.17%) averages. Projections indicate a slight decrease to 78.03%, yet this remains notably higher than the comparative regions, emphasizing Saint Lucia's continued exposure to tropical storms. Similarly, for hurricanes (Category 1-5), the relative frequency of storms entering Saint Lucia's Exclusive Economic Zone (EEZ) is higher compared to the Global and North Atlantic Ocean averages. While Category 1 hurricanes are projected to decrease slightly from 15.97% to 14.7%, the frequency of stronger storms like Category 3 is expected to increase marginally from 4.87% to 4.8%. This indicates that while tropical storms remain predominant, Saint Lucia faces persistent exposure to high-intensity storms, highlighting the importance of strengthening disaster preparedness and resilience.

The predictability of future tropical cyclones comes with significant uncertainties due to multiple factors. These include differences among climate models, the complexity of tropical cyclone processes, and regional variations in cyclone formation, behavior, and dispersal. However, World Bank estimations based on the Columbia HAZard Model project that tropical cyclones in Saint Lucia will continue to occur at a relatively high frequency, with the proportion of Category 1 storms slightly decreasing, while the occurrence of stronger hurricanes (Categories 3-5) is expected to remain steady.

3.6.1 Exposure to climate hazards by country geography

As a SIDS, Saint Lucia is exposed to extreme weather events, such as hurricanes and is vulnerable to volcanic and seismic occurrences. Between 1760 and 2021, 226 disasters and emergencies have been recorded - with thousands of people indirectly affected³⁴⁷. Given its exposure and vulnerability to climate change and related disasters, Saint Lucia is ranked 129 out of 192 on the world risk index³⁴⁸. While this ranking may seem to give the impression of low vulnerability, it is undeniable that the island is exposed and vulnerable to extreme weather events. The impact of the COVID-19 pandemic on the national economy has further exacerbated the country's vulnerability to climate change and related disasters. With ongoing climate change, it is recognised that the impact of related extreme events would undermine human security and sustainable development. As such, mainstreaming the HSA in national development planning, CCA and DRM policies and strategies would help to address the risks to the well-being of vulnerable populations in the context of environmental migration and disaster displacement in Saint Lucia.

Increases in the frequency and intensity of extreme weather and climate events, such as heavy rainfall, strong winds, drought and high sea temperatures and levels have been experienced and documented within the National Climate Adaptation Policy (2016): These and other events have claimed lives, caused severe damage to infrastructure and other economic assets and adversely impacted livelihoods. Some of the greatest negative impacts being experienced along coastal areas are due to storms and hurricanes. Increased rainfall has led to massive soil erosion in inland upland areas, dislodging solid waste and the leaching of biological and chemical materials into streams and rivers. Therefore, reefs and other coastal areas become inundated with sediment, plastics, bacterial, industrial and agro-chemical pollutants. A single extreme climate event can have huge economic costs, such as Hurricane Tomas which cost 43.4% of Saint Lucia's GDP in 2010³⁴⁹, or the extreme storm of Christmas 2013, which led to floods, landslides, and the loss of six lives.

The agriculture sector is particularly impacted: In St. Lucia the agricultural sector experienced losses of XCD 7 million during Hurricane Beryl and significant damage to bananas (XCD 3.4 million) and plantains (XCD 2.2 million). Hurricane Tomas in 2010 caused XCD 151.8 million (USD 56.2 million) in agricultural losses, devastating banana production, while the 2010-2011 drought led to a 15% decline in banana exports³⁵⁰.

The forestry sector has also been hit hard, particularly during the 2013 floods, which caused landslides, damaged tourism trails, and disrupted watershed resources, with direct losses of US\$200,000. There is an urgent need to improve monitoring systems to manage these risks effectively³⁵¹.

In tourism, natural hazards have caused damage to infrastructure, landscaping, and beach assets: Sea-level rise poses an ongoing threat, with research showing that 30% of coastal properties could face flooding, and all beach resorts are at risk of erosion³⁵².

The infrastructure sector has sustained significant losses: The 2013 flood alone caused \$72.3 million USD in transportation damages, while Hurricane Matthew in 2016 left 70% of the population without electricity. Hurricane Tomas also caused \$2 million USD in damage to health facilities³⁵³.

Saint Lucia's vulnerability to hurricanes, floods, and droughts has resulted in significant losses across agriculture, forestry, tourism, infrastructure, and health. Recovery efforts continue, with a focus on building resilience and improving disaster risk management to mitigate future impacts: According to the State of the Caribbean Climate Report (2020)³⁵⁴, 24 storms named storms have passed within 200 km of the country, between 1980 and 2016. Zone 5 recorded the largest number of category 1 storms (10) and experienced 7 category 4 storms. No category 5 storms were experienced in Zone 5.

Table 25 - Summary Effects of Flood in US\$ Million. Source: GFDRR, 2013

Sector	Damage	Losses
Social		
Housing	2.15	2.05
Health	0.80	0.19
Education	0.24	0.13
Productive		

Agriculture	9.21	3.71
Tourism	0.0	2.11
Commerce	0.4	NE
Infrastructure		
Water & Sanitation	2.30	4.10
Transportation	68.80	3.10
Electricity	NE	NE
Telecomm	0.12	0.41
Total	80.03	19.85

Table 26: Climate hazards risk in St Lucia (source: WB Think Hazard)

Coastal flood	Earthquake	Landslide	Tsunami	Volcano	Extreme heat	Urban flood	River flood	Wildfire
Medium	Medium	Medium	Medium	Medium	Medium	Low	Very Low	Very Low

4. Sectoral Vulnerabilities and Potential Impacts

4.1 Vulnerability across CABRIC countries

This section provides information on the vulnerability ranking and status of the 7 target countries in relation to the three core themes: food & water insecurity; health; and ecosystem resilience: In this section vulnerability across the CABRIC countries is assessed from , as well as other relevant secondary literature from Water Mission, the Perry Institute for Marine Science, Ocean+Habitats and the Pan-American Health Organisation. Vulnerability databases include the World Bank Country portal, the Global Forest Watch and Relief Web. The World Risk Index underscores the Caribbean's significant vulnerability to disaster risk, with a vulnerability score of **13.41** and a lack of adaptive capacities measured at **41.57**, highlighting the region's challenges in mitigating and responding to disasters effectively³⁵⁵.

The ND GAIN index places all countries in the CABRIC programme between an overall score of **0.38 (Grenada) to 0.46 (Belize)**: Regarding the measuring of the vulnerability indicators, the ND-GAIN's methodology specifies that those closest to 0.0 is represented as having a low vulnerability score. This means they are less vulnerable to climate change. From the table below, the most vulnerable in Column 1 is both the Bahamas and Belize.

The preliminary Multi Vulnerability Index ranks all except Jamaica over the median MVI of **52.80**: The United Nations is working with SIDS on the development and implementation of a Multidimensional Vulnerability Index (MVI), although this is at a preparatory stage it emphasizes the structural vulnerability and resilience as key metrics of overall vulnerability.

Table 27 Sectoral vulnerability rankings by country³⁵⁶

Country	ND Index Overall score & Global Vulnerability Ranking (2022)	Food Vulnerability (2022)	Water Vulnerability (2022)	Health Vulnerability (2022)	Ecosystem Vulnerability (2022)	Multi Vulnerability Index (UN-LDC) ⁵
Bahamas	0.46 (115 th)	0.52	-	0.44	0.33	59.9
Belize	0.46 (123 rd)	0.47	0.36	0.42	0.57	53
Grenada	0.39 (73 rd)	0.60	0.25	0.46	0.36	61.7
Jamaica	0.42 (92 nd)	0.46	0.33	0.49	0.39	49.6
St. Lucia	0.38 (65 th)	0.56	-	0.59	0.36	66.5

⁵<https://www.un.org/ohrlls/content/mvi-preliminary-country-scores>

4.2 Bahamas

4.2.1 Food & Water Insecurity

The Bahamas has a moderate vulnerability to El Niño as the country tends to experience more hydrological threats due to its geographical positioning: From an agricultural standpoint, with the increase in temperature and due the nations' unavailability of arable land, rainfed crops such as corn, sweet potato and cassava, as well as other agricultural commodities like lemons, tomatoes and mangoes will face greater heat stress and will be affected by longer drought periods. This was clear from 2016 when Bahamian farmers sought to find heat tolerant tomato varieties as this specific crop had been failing to grow in sufficient quantities due to the hot climate.³⁵⁷

Increases in temperature will cause the decline in freshwater resources more so in the southern Bahamian islands which experience more of a precipitation decline than in the north of the archipelago.³⁵⁸ With consideration to seawater reverse osmosis (SWRO), a desalinisation process that provides over 50% of the country's potable water supply, this is also likely to be affected by rising temperatures.³⁵⁹

While the Bahamas is expected to become warmer during its dry season, the country will also become wetter during its rainy season which will have major implications on food and water security: La Niña, a climactic pattern that describes the cooling of surface-ocean water, increases the intensity of floods, rainfall, typhoons which can cause soil erosion and saltwater intrusion. The oversaturation of crops can cause rotting making them vulnerable to pests due to nutrient leaching. The damage of Hurricane Dorian on the agricultural industry was estimated at USD10 million in which strong winds and salt-water intrusion destroyed not only greenhouses but perennial crops.³⁶⁰ Similarly, Hurricane Dorian destroyed almost 80% of the fishery sector (this includes conch centres and fish infrastructure) and caused USD75 million worth of damage to the Bahamas' spiny lobster fishery.³⁶¹ Lobster is a crucial food source in the Bahamas as not only does it account for 40% of the Bahamas' total exports but also 60% of the Bahamian islands' landings. With regards to freshwater systems, it was recorded that Hurricane Dorian created a 20ft storm surge which contaminated freshwater sources and wells creating almost eight times the level of salinity of normal seawater.³⁶²

According to the ND Gain Index, specific food and water insecurity challenges have been identified within the country. Items marked in red indicate the most critical scores identified through the ND Gain index related to the agriculture sector in the Bahamas.

Table 28 ND Gain Index scores for food and water security related indicators.

Indicator	Score
Food	0.516
Projected change of cereal yields	0.894
Projected population change	0.228
Food import dependency	0.356
Rural population	0.178
Agriculture capacity	0.928
Child malnutrition	-
Water	-

Projected change of annual runoff	0
Projected change of annual groundwater recharge	0.155
Fresh water withdrawal rate	-
Water dependency ratio	0
Dam capacity	-
Access to reliable drinking water	-

4.2.2 Health

Intense cyclones and tropical storms have a grave impact on sanitation as in the past flooding has led to the contamination of groundwater and soil with petroleum, sewage, agricultural pesticides and seawater: After Hurricane Dorian, Bahamians showed signs of gastrointestinal issues from the contaminated water which had been an accumulation of debris and animal corpses. Not only that, but stagnant water from the storm can be breeding grounds for mosquitoes giving rise to Zika, Dengue and Chikungunya.³⁶³ In September 2019, weeks after Dorian's landfall, it was reported there were multiple cases of conjunctivitis in one public health clinic and three cases of gastroenteritis, one case of dengue fever and numerous skin infections in Grand Bahama.³⁶⁴ Not only are communities physically affected by climate change, but it has a grave mental impact on its residents. As Hurricane Dorian displaced 10,000 people and left 76,000 affected, this enhanced the need for mental health and psychosocial support (MHPSS).³⁶⁵ It was recorded that over 3,000 children and 3,000 adults received MHPSS, over 500 calls were made to disaster helplines between March and September of 2020 from five Bahamian islands.

Rising temperatures increase cases of heat stress and climate-sensitive diseases. According to International Federation of Red Cross and Red Crescent Societies (IFRC), "Heat stress is an increasing problem in The Bahamas, and climate-sensitive water-borne and vector-borne diseases are on the rise." The Bahamas faces significant health vulnerabilities due to climate change, with rising temperatures contributing to heat-related illnesses, particularly among the elderly and economically disadvantaged. Climate-related water and food insecurity further exacerbates the country's health challenges, intersecting with a high prevalence of noncommunicable diseases (NCDs)³⁶⁶.

Extreme rainfall events and flooding increase the risk of water-borne diseases, such as cryptosporidiosis, while coastal healthcare facilities remain highly vulnerable to structural damage from saltwater exposure and inundation during hurricanes. Additionally, climate change indirectly affects agriculture, fisheries, food security, and economic stability, all of which have broader implications for public health in The Bahamas³⁶⁷.

The Bahamas faces significant health vulnerabilities due to climate change, worsened by unequal healthcare distribution across its islands. New Providence and Grand Bahama, the most populated islands, have better access to physicians (11.7 and 12.9 per 10,000) and nurses (33 and 32.3 per 10,000) with higher healthcare capacity scores of 0.367 and 0.444. In contrast, Abaco has only 1.2 physicians per 10,000 and a lower capacity score of 0.245. Harbour Island and Spanish Wells report no physicians or nurses, relying on limited clinic infrastructure³⁶⁸.

Table 29 Bahamas health care data by Islands

Islands	Health Care Capacity Score	Physicians per 10,000	Nurses & midwives per 10,000	Clinics per
---------	----------------------------	-----------------------	------------------------------	-------------

	(Center, 2021)	(Center, 2021)	(Center, 2021)	10,000 (Center, 2021)
New Providence	0.367	11.7	33	1.2
Grand Bahama	0.444	12.9	32.3	3.9
Abaco	0.245	1.2	13.4	6.4
Acklins	0.779	17.7	53.1	88.5
Andros	0.377	4	21.4	13.4
Berry Islands	0.498	12.4	24.8	12.4
Bimini	0.352	5	20.1	10.1
Cat Island	0.357	6.6	19.7	26.3
Crooked Island	0.318	0	30.3	60.6
Eleuthera	0.419	4.9	34.1	15.9
Exuma And Cays	0.365	2.9	33.2	10.1
Harbour Island	0.095	0	0	5.7
Inagua	0.301	11	11	11
Long Island	0.43	6.5	22.3	19.4
Mayaguana	0.75	0	72.2	108.3
Ragged Island	N.A	N.A	N.A	N.A
San Salvador	0.531	9.62	28.87	28.9
Rum Cay				
Spanish Wells	0.105	0	0	6.5

Many healthcare facilities are located in coastal areas, making them vulnerable to storm surges and saltwater damage during hurricanes. Islands with minimal access to healthcare are less equipped to manage climate-related health emergencies, particularly during extreme weather events. Additionally, indirect climate change impacts on agriculture, fisheries, and food security further strain health outcomes.

The table below summarizes health-related indicators identified from the ND-GAIN Index, highlighting potential vulnerabilities within the health sector in the Bahamas.

Table 30 ND Gain Index - Health Indicators

Indicator	Score
-----------	-------

Health	0.440
Projected change of deaths from climate change induced diseases	0.303
Projected change in vector-borne diseases	0.658
Dependency on external resource for health services	0.016
Slum population	-
Medical staff	0.784
Access to improved sanitation facilities	-

4.2.3 Ecosystem Vulnerability

The Bahamas' economic lifeline, tourism, is inextricably tied to the health of its ecosystems and maintenance of marine resources. With the increases in climate change threats, this jeopardises the very biomes needed not only to support the Bahamas' GDP, but to uphold the biodiversity levels of the country³⁶⁹: As its tropical marine climate is needed to support coral reefs, seagrass beds and mangroves, in the last few years with the increase in temperature, coastal habitats have seen a shift. With its expansive mangrove forests, the Bahamas holds the second largest such ecosystem in the Caribbean, trailing behind Cuba, and Andros harbouring 56% of the country's mangrove forests.³⁷⁰ However, 90% of mangroves were destroyed due to Hurricane Dorian and in 2016 Hurricane Irma destroyed 80%.³⁷¹ The vibrancy of marine species is a key indicator of the quality of mangroves. The Mangrove Report Card for The Bahamas (2022) showed that mangrove ecosystems surrounding New Providence Island displayed the lowest densities of commercially valued fish such as parrotfish which has likely been due to compromised water quality, and habitat degradation.³⁷² On the topic of animal species, heat stress can lead to the movement of animal species to cooler regions, potentially causing ecosystem imbalances. Through the reduction of dissolved oxygen levels in water bodies, this can negatively impact fish production and reproduction.

Deforestation and land degradation pose a threat to the islands' ecosystems. Based on the data from Global Forest Watch, between the years 2002 to 2023, the Bahamas saw a 14% decrease in humid primary forests; 78% decrease in tree cover between 2001-2023; and a total of 115 Visible Infrared Imaging Radiometer Suite (VIIRS) fire alerts in 2024 which is a considered high compared to previous years.³⁷³ The top 3 regions in the Bahamas that were responsible for 51% of the total tree cover loss were North Andros (5.03 kha), Cat Island (2.91 kha) and East Grand Bahama (2.37 kha).

The table below summarizes ecosystem-related indicators identified from the ND-GAIN Index, highlighting potential vulnerabilities faced by ecosystems sector in the Bahamas.

Table 31 ND GAIN Index - Ecosystem Scores

Indicator	Score
Ecosystem Services	0.333
Projected change of biome distribution	0

4.3 Belize

Belize is increasingly facing the harsh reality of climate change. With its reliance on natural resources, the country is particularly vulnerable to a range of climate hazards such as hurricanes and tropical, rise in sea level, flooding, drought, and coral bleaching.



According to the data, population density in Belize is heavily concentrated in the central and coastal districts, particularly in Belize City, while other districts, such as Toledo, have significantly lower populations. Poverty is most severe in Toledo, increasing its vulnerability to socioeconomic and climate-related risks. Districts like Belize, Stann Creek and Cayo benefit from better access to health facilities,

whereas areas, including Toledo, face limited healthcare availability, exacerbating their vulnerability. Belize also exhibits high availability of small-scale farmers, heightening their susceptibility to climate hazards affecting crop production and food security. Coastal districts generally have better access to piped water, while areas such as Toledo, face lower water security. A detailed discussion of the vulnerabilities associated with each indicator will follow next.

4.3.1 Food & Water Insecurity

El Niño, characterised by reduced rainfall and elevated temperatures, can compromise crop growth, particularly for rain-fed crops like corn, soybeans, and rice that are a staple in Belize: This could result in crop failures, subsequent food shortages, and increased input costs for poultry and livestock producers which may potentially lead to herd or flock reductions.³⁷⁴ With the increase in air temperature, this can shrink and spoil fruit, weaken trees, and invite pests and diseases. In the case of 2021, there was an outbreak of Asian Thrips pests which damaged the soybean crop causing further chaos to the food systems in Belize.³⁷⁵ Bananas, for example, can wither under dry conditions and higher temperatures can rush the ripening process, disrupting harvest plans. As northern parts of Belize form a portion of Central America's 'dry corridor', this causes further strife to agriculture in which droughts are annually expected. In 2019, Belize suffered from a severe drought which had a serious effect on agricultural production, the sugar industry in particular, losing approximately USD 38.5 million.³⁷⁶ With regards to water security, in a speech given by H.E. Carlos Fuller in March 2024, the UN Belize Representative, declared that in order for Belize to maintain operations during periods of low river flow, the largest bottling company had to draw water from Belize City's municipal supply due to the water security struggles in the dry season.³⁷⁷ This demonstrates that large corporations, not just local communities, can also crumble under the effects of a rising climate.

Belize's agricultural sector has suffered from losses due to La Niña effects: between 2000 and 2016 hurricanes and tropical storms caused over USD 232 million worth of agricultural damage and in February 2018 USD 1.9 million worth of damage was from flooding and excessive rain³⁷⁸: Category-1 Tropical Storm Lisa made landfall in Belize in 2022 destroying greenhouses, agriculture systems and crops. One farmer, Maria, noted how the storm wiped out 100% of their papaya yield which was their main source of income.³⁷⁹ Similarly, after Storm Lisa in November, the National Damage and Needs Assessment (DANA) noted that 93 rural communities were affected in total, destroying agriculture and crop infrastructure and plots.³⁸⁰ The areas mostly affected include crop zones of Belize, Orange Walk Districts and Cayo. Hurricanes and storms can devastate crops, damage infrastructure, and disrupt farming operations, leading to significant losses in agricultural yields and economic hardship for farmers. Similarly, such hydrological events can disrupt freshwater flows, causing contamination, water shortages and destruction to water infrastructure.

Table 32 ND GAIN Index - Food and Water related scores

Indicator	Score
Food	0.472
Projected change of cereal yields	0.978
Projected population change	0.377
Food import dependency	0.294
Rural population	0.578
Agriculture capacity	0.531
Child malnutrition	0.074
Water	0.362

Projected change of annual runoff	0.305
Projected change of annual groundwater recharge	0.204
Fresh water withdrawal rate	0.006
Water dependency ratio	0.298
Dam capacity	0.998
Access to reliable drinking water	-

4.3.2 Health

Since 2008, the Internal Displacement Monitoring Centre (IDMC) recorded seven major weather-related disasters in Belize, resulting in over 10,000 people being displaced³⁸¹: Due to this, there have been major implications regarding community health and sanitation. In 2022, the United Nations Belize conducted a survey on urban and rural households (HH) identifying on average which of those had access to sanitation facilities (2021 statistics):³⁸²

- HH with no toilet facilities (1,147 surveyed): 0.3% (U) and 1.5% (R).
- HH with no access to potable water (11,187 surveyed): 2% (U) and 15.5% (R).
- HH that use rivers, streams and ponds as a water source (2,348 surveyed): 0.1% (U) and 3.6% (R).

Health issues relating to food insecurity are also affecting the population of Belize: In 2020, it was recorded that 6% of Belize's population suffered from severe food insecurity, whilst 7.4% suffered from undernourishment.³⁸³ In the same survey conducted by UN Belize, with regards to food security, it has been identified that, on average:³⁸⁴

- HH that had no food to eat, one or more times during the year (13,266 surveyed): 10% (U) and 11% (R).
- HH that occasionally go to bed hungry (10,125 surveyed): 8% (U) and 8.5% (R).
- HH that from time to time go both day and night without food (6,239 surveyed): 5% (U) and 5.5% (R).

It is clear from this survey that those who situate in rural dwellings suffer from more health vulnerabilities with regards to food and water than those in urban areas. The most significant difference relates to the access to potable water which is essential for maintaining good health and preventing waterborne diseases. Leptospirosis, a blood infection caused by contaminated water and soil and infected animals, has been present in Belize as well as its neighbouring country Guatemala in recent times.

Belize faces significant health vulnerabilities due to rising extreme heat, which impacts both land and sea. According to an analysis by Stimson, the Total Number of Extreme Heat Events is classified as high risk, scoring 7.93. Meanwhile, Mortality Attributed to Heat is rated as medium risk (4.60). Extreme heat exacerbates underlying non-communicable diseases such as cardiovascular disease, diabetes, and asthma. This trend suggests that Belize's health system may come under increasing strain as extreme heat events become more frequent.³⁸⁵

Additionally, the health sector in Belize is highly vulnerable to waterborne diseases, particularly dengue. In 2022, Belize reported a cumulative incidence of 788.9 cases per 100,000 population, highlighting a growing public health concern. Between 2014 and 2023, dengue incidence fluctuated, ranging from 279.84 to 1,159.93 cases per 100,000 people, with the highest peak in 2022 and the lowest

in 2020. The persistent variation in dengue cases underscores Belize's susceptibility to vector-borne diseases, influenced by factors such as climate change, rainfall patterns, and water management.

The rise in dengue cases places increasing pressure on the healthcare system, straining resources and emphasizing the urgent need for enhanced prevention strategies, strengthened public health infrastructure, and improved water sanitation to mitigate the spread of these diseases.

Belize's healthcare infrastructure reveals significant vulnerabilities, particularly in the context of rising health risks due to climate change and extreme heat. The distribution of health facilities across districts underscores disparities in access to care, which could exacerbate health challenges in the coming years. In the Belize District, with 1 government hospital and 5 private hospitals, there is a notable lack of health posts, which limits primary care access, especially for rural communities. In Cayo District, despite having 8 health posts, the reliance on 4 government hospitals and 4 private hospitals indicates a heavy dependence on hospital-based care, potentially overstressing resources as healthcare demands rise. In contrast, Toledo District has a relatively high number of 20 health posts, but no private hospitals, leaving the district reliant on 5 health centers and a single government hospital. This creates a system with better access to primary care but limited specialized services. Other districts, such as Corozal, Orange Walk, and Stann Creek, show a mix of public and private hospitals, with varying numbers of health posts, highlighting a patchwork healthcare system across the country³⁸⁶.

Table 33 Health Care sector snapshot - Belize

Districts	Health Center 2022 (BELIZE, 2022)	Health Post 200 (BELIZE, 2022)	Hospitals Government (BELIZE, 2022)	Hospitals Private (BELIZE, 2022)
Belize	11	0	1	5
Cayo	4	8	2	4
Corozal	7	9	1	2
Orange Walk	4	15	1	3
Stann Creek	6	3	1	0
Toledo	5	20	1	0

Agriculture in Belize is highly vulnerable to heat and climate variability, with projections showing a 7% decrease in rainfall in the northern zone and 10% in the southern zone. This reduced rainfall, coupled with increased frequency of droughts and floods, threatens crop and livestock productivity. Additionally, temperatures are expected to rise by 1.3°C by the 2030s, increasing heat stress on plants and livestock⁶. This will disrupt agricultural systems, affecting both the health of agricultural workers and the well-being of livestock.

⁶ World Bank. (2019). *Belize - Climate smart agriculture country profile*. Retrieved from <https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/Belize%20-%20CSA%20Country%20Profile%20%28FINAL%29.pdf>

The table below summarizes health-related indicators identified from the ND-GAIN Index, highlighting potential vulnerabilities within the health sector in Belize. What is highlighted in red color denotes the worst scores.

Table 34 Health sector indicators - ND GAIN Index

Indicator	Score
Health	0.420
Projected change of deaths from climate change induced diseases	0.303
Projected change in vector-borne diseases	0.657
Dependency on external resource for health services	0.099
Slum population	0.159
Medical staff	0.882
Access to improved sanitation facilities	-

4.3.3 Ecosystem Vulnerability

The combined threats of rising sea levels and warming oceans are jeopardizing one of Belize's vital ecosystems, the Mesoamerican Reef, which has been suffering from severe coral bleaching and fishing: In 2022, the Healthy Reefs Initiative (HRI) declared its health status to be 'Poor' reaching a 2.3 rating out of 5, which was a 0.5 decrease from its 'Fair' rating back in 2018.³⁸⁷ This data has been verified through the conduction of assessments in 234 reef sites undertaken by a team of 77 surveyors representing 36 distinct organizations. Out of the four countries where the barrier reef dwells, Belize's coral reefs experienced the most decline, driven by a dramatic reduction of over 50% in both commercial and herbivorous fish populations, likely due to COVID-19 and weak climate enforcement measures. Furthermore, with regards to the overharvesting of marine life, Belize has open-access fishing regulations, and it has been noted that recreational fly-fishing in shallow mangrove areas is especially popular amongst fishermen and women.³⁸⁸ Overfishing depletes fish populations, disrupts marine ecosystems, and threatens the livelihoods of those who rely on fishing for food and income. Deforestation is another climate vulnerability as Belize suffered a total tree cover loss of 13% between 2002 and 2023; 13% loss in tree cover between 2001 and 2023; and in 2024, there was a total of 325 VIIRS alerts which is considered to be normal for the region.³⁸⁹ The top 2 regions in Belize that accounted for 58% of all tree cover loss was Cayo (105 kha) and Orange Walk (69.8 kha).

Table 35 ND GAIN Index scores for ecosystem services

Indicator	Score
Ecosystem Services	0.570
Projected change of biome distribution	0.659
Projected change of marine biodiversity	0.406
Natural capital dependency	0.763
Ecological footprint	0.445
Protected biome	0.356

Engagement in international
environmental conventions

0.794

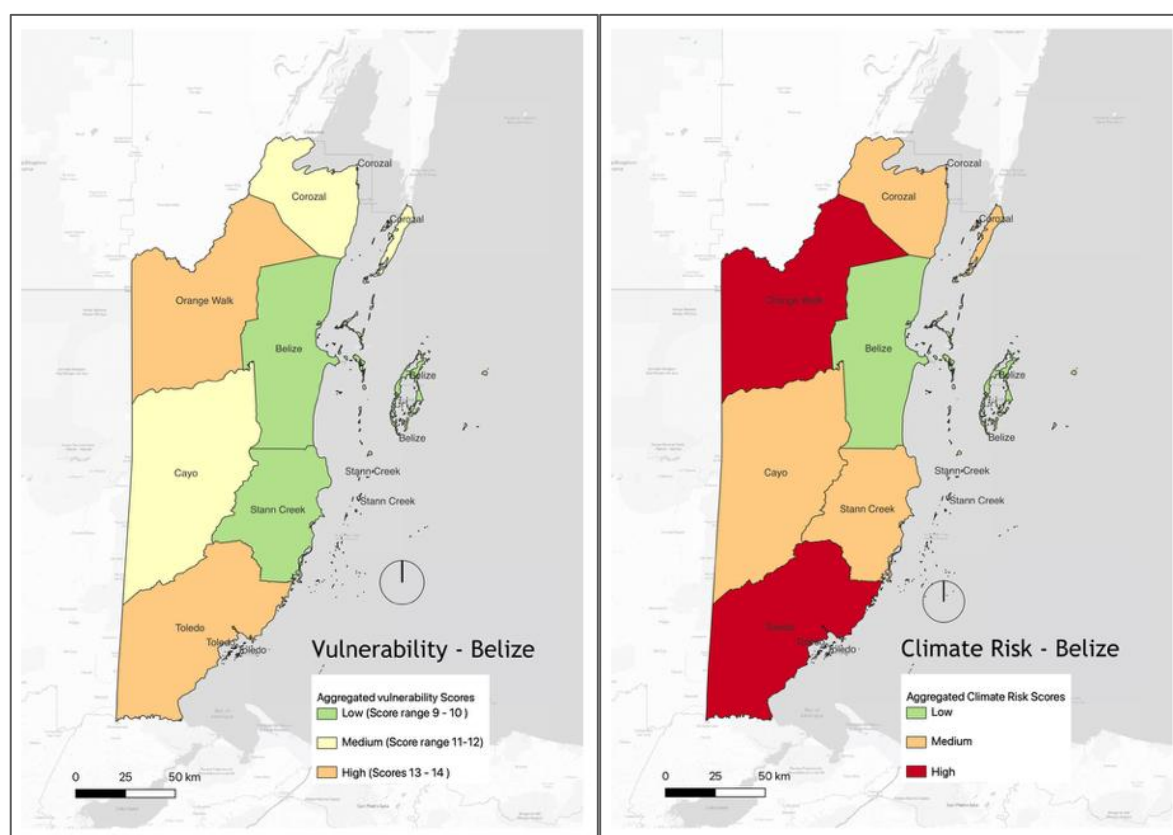


Figure 98 Climate Risk (Right)
Figure 99 Cumulative Vulnerability - Belize (Left)

A Multi Criteria Analysis (MCA) was conducted for Belize, using indicators from the maps in Figure 72, including poverty, health sector capacity, agricultural sector livelihoods and reliance, as well as water and food security, to evaluate climate risk across the country's districts. This analysis combined a composite of hazard exposure—encompassing various types of hazards discussed in Chapter 3—with a composite of vulnerability that incorporated all the indicators. The resulting climate risk map (Figure 72) identifies areas most exposed to climate hazards, highlighting Toledo district as having the highest climate risk, with Belize City, Cayo, Orange Walk and Corozal districts emerging as the next most vulnerable regions. The findings indicate that almost all districts in Belize experience medium to high climate risk based on the selected vulnerability indicators and hazard exposure. Belize City, as the country's capital and economic hub, demonstrates a moderate climate risk, however it is particularly concerning given its large population and critical administrative role.

4.4 Grenada

Grenada faces a range of climactic hazards that threaten its environment, economy, and people. With its low-lying coastal areas and dependence on tourism and agriculture, this makes it particularly vulnerable to the impacts of climate change.

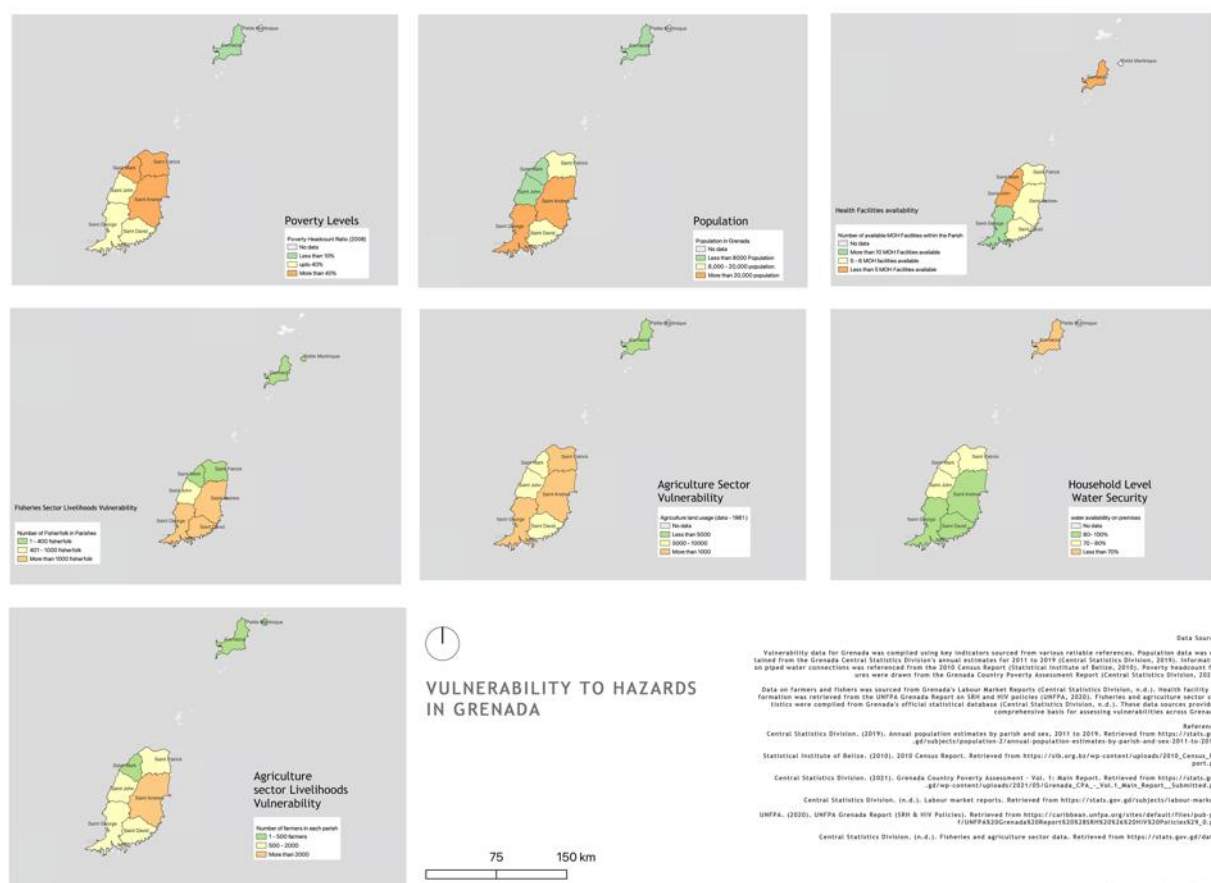


Figure 100 Vulnerability Indicators for Grenada

Grenada's parishes show notable variations in vulnerability across key indicators. Poverty levels are highest in St. Patrick, St. Mark, and St. Andrew, while St. George and Carriacou show significantly lower poverty rates. Population is concentrated in St. George and St. Andrew, while rural areas like St. Mark and St. John have much smaller populations, with less than 8,000 residents. Access to health facilities is most robust in St. George but remains limited in rural parishes and on Carriacou. St. Andrew relies heavily on agriculture, increasing its vulnerability to climate impacts, whereas Petit Martinique and Carriacou have minimal reliance on farming, likely due to the islands' small size and less favorable farming conditions. Household water security is highest in St. George, where over 90% of households have piped water connections, while areas like Petit Martinique and Carriacou face lower access. The data also reveals that St. John has the highest proportion of its population engaged in fishing activities, with 6.12% of the population classified as fisherfolk. This is followed by St. George, where 4.46% of the population are fisherfolk, reflecting the parish's significant reliance on the fishing industry. These disparities emphasize the need for tailored interventions for specific vulnerability areas of each parish.

4.4.1 Food & Water Insecurity

Grenada's major crops; banana, cocoa and nutmeg which tend to be planted on converted forest land are suffering from climate related pests and heat related challenges: In 2021, Grenada's Department of Agriculture, Water and the Environment (DAWE) noted that with the increase in temperature, there was a high infestation of scale insects which affected mangoes, plums and soursop, as well as other fruits and flora. Heat stress can bring further crop depletion which will have a major effect on crop farmers who depend on high agricultural yields for income.

The fishing industry constitutes a significant pillar of Grenada's economy, contributing to livelihoods, food security, and tourism, however in Grenada, with increasing global temperatures, climate change threatens this sector significantly: Fisherfolk have recorded seeing an increased scarcity of pelagic fish, changes in fish size, longer distances to travel to catch fish, shortage of bait, effects on spawning, and an overall decline in fish species.³⁹⁰

In May 2024, Grenada faced severe drought conditions not seen in the past 14 years causing the National Water and Sewerage Authority (NAWASA) to declare a national drought emergency: Water restriction measures had to be put in place, which included no hose watering or irrigation of gardens or grounds; 2) no hose washing vehicles and outside infrastructure: and 3) no filling swimming pools.³⁹¹ It is relevant to note that during the country's dry season, the demand for daily water exceeds the daily yield by 5,000 gallons.³⁹² Bush fires were also more frequent during this time and as such, have affected crop and vegetation plots.

Food security is further jeopardised by the effects of La Niña which was clear from the impacts of Category-4 Hurricane Beryl in 2024: Nearly 100% of Grenada's agricultural sector was destroyed, as well as wiping out livestock, which put immense pressure on Grenada's economy and food supplies needed to rebuild the community.³⁹³ Based on the most recent IFRC Operations Report November 2024, 44% of households confirmed that food security was of utmost importance following the disaster.³⁹⁴

La Nina's impact on the nations' water security is significant the Ministry of Climate Resilience, The Environment & Renewable Energy declared Grenada's water vulnerability to be medium-high, as 90% of Grenada's water supply comes from rainwater³⁹⁵: In addition saltwater intrusion into coastal groundwater aquifers caused by storms and cyclones can contaminate freshwater and deplete groundwater which can impact agriculture, disrupt ecosystems and wetlands. Hurricane Beryl impacted 28 water systems, and in Carriacou and Petite Martinique, two islands notably drier than Grenada's mainland, a water and desalination plant was destroyed. From the same IFRC Report as mentioned above, 67% of households recognised that water security was a priority.³⁹⁶

The table below summarizes food and water related indicators identified from the ND-GAIN Index, highlighting potential vulnerabilities within these sectors in Grenada.

Table 36 ND GAIN INDEX Scores - Grenada

Indicator	Score
Food	0.599
Projected change of cereal yields	0.954
Projected population change	0.126
Food import dependency	0.385
Rural population	0.680
Agriculture capacity	0.846
Child malnutrition	-
Water	0.247
Projected change of annual runoff	-
Projected change of annual groundwater recharge	0.071
Fresh water withdrawal rate	0.060
Water dependency ratio	0
Dam capacity	1.000
Access to reliable drinking water	0.102

4.4.2 Health

In Grenada, between 2000 and 2018, a total of 81,533 people have been affected by a single weather event which undoubtedly has had a major impact on the health of Grenadians: Focusing again on Hurricane Beryl, as over 95% of housing, assets and livelihoods had been affected, the need for psychological treatment was paramount. The Ministry of Education, UN Women and UNICEF are currently carrying out assessments in northern Grenada, as well as Martinique and Carriacou on the aid and needs of those affected. Furthermore, the Grenada government has also set up its gender-based violence and child protection hotline, as well as trauma therapy, 'return to happiness' program for children, and 'caring for carers' parental program. However, there is not a lot of documentation regarding the health impacts of climate change in Grenada.

Grenada is highly vulnerable to rising heat, with significant implications for its population and infrastructure. The "feels like" temperatures have already increased, and projections indicate this trend will continue, exacerbating health and environmental risks. Currently, 111 days per year experience temperatures above 80°F, and this is expected to rise to 121 days in the next 30 years. Similarly, the number of days exceeding 90°F is projected to increase from 39 days this year to 53 days in the coming decades.

The entire housing stock in Grenada is affected by a major heat factor, as 100% of homes experience significant exposure to high temperatures³⁹⁷. This exacerbates the risk of heat stress, dehydration, and heat-related illnesses, particularly in vulnerable populations such as the elderly and those with pre-existing health conditions. The growing frequency of extreme heat days will also put added pressure on public health systems. It has been confirmed that "hotter than usual" temperatures are contributing to an increase in hospitalizations for dehydration and sunburn in Grenada³⁹⁸.

Vector-borne diseases, such as dengue and chikungunya, also increase Grenada's vulnerability to climate change. These diseases have caused significant epidemics in the country, with outbreaks occurring between 2010 and 2016. The rise in temperatures and changing rainfall patterns create favorable conditions for the mosquitoes that transmit these diseases, further heightening the risk³⁹⁹.

The number of dengue cases in Grenada has fluctuated significantly over the years. In 2010, the incidence rate was 35.45 per 100,000 people, but by 2018, it had surged to 428.7 per 100,000 people. In 2023, the rate reached 550.88 per 100,000 people, confirming the rising trend in dengue cases despite some years showing varying numbers⁴⁰⁰. This increasing prevalence of vector-borne diseases places additional strain on the healthcare system.

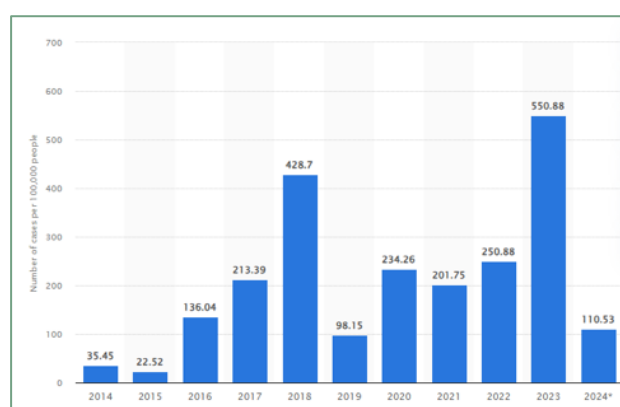


Figure 101 - Number of dengue cases in Grenada from 2014 to April 2024

According to the Government of Grenada, Grenada's health sector is highly vulnerable to climate change, particularly from hurricanes and flooding, which can disrupt essential healthcare services⁴⁰¹. The uneven distribution of health facilities exacerbates this vulnerability. For instance, St. George has

12 Ministry of Health (MoH) facilities, ensuring relatively better access to care, while areas such as St. John and St. Mark have only 3 and 2 facilities, respectively. Additionally, Carriacou has just 3 health centers, further limiting access during emergencies⁴⁰².

The table below summarizes health-related indicators identified from the ND-GAIN Index, highlighting potential vulnerabilities within the health sector in Belize hence highlighting that there's a growing concern over the spread of vector borne diseases and availability of medical staff.

Table 37 Health sector indicators - ND GAIN Index

Indicator	Score
Health	0.458
Projected change of deaths from climate change induced diseases	0.303
Projected change in vector-borne diseases	0.658
Dependency on external resource for health services	0.116
Slum population	-
Medical staff	0.755
Access to improved sanitation facilities	-

4.4.3 Ecosystem Vulnerability

Rising sea temperatures, ocean acidification and storm impact, along with pollution runoff and overfishing are contributing to degrading ecosystems and reducing biodiversity in Grenada: Marine ecosystems inhabit 164km of Grenada's coastline with mangroves constituting the largest area: 32.6%.⁴⁰³ From data collected by Ocean+ Habitats, in November 2023, out of 57 warm-water corals the most endangered were staghorn coral and elkhorn coral and from 8 cold-water coral species, the most endangered was the large ivory coral. It is also worth mentioning that Grenada has faced unusual sargassum (algae) surges in the past ten years, likely due to the increase in eutrophication, particularly from Telescope to Soubise which have affected biodiversity levels, causing less fish catches affecting fisherfolk income. Climate events like Hurricane Beryl caused damage to over 90% of Grenada's coastline due to debris and flooding and debris thus welcoming pollutants into marine ecosystems.⁴⁰⁴ Concerning the loss of forests and tree cover due to climate change and deforestation, it has been recorded that since 2001 and 2023 only 1.76 kha of tree cover has been lost and only 43 ha of forest has been destroyed by fires.⁴⁰⁵ The 2 regions most responsible for 51% of such losses was Saint Andrew (634 ha) and Saint David (272 ha).

The below table summarises the ecosystems services related indicators identified by ND GAIN Index and their respective scores. What is highlighted in red demarcates the worst score rates indicating the Grenada's lack of engagement in international environmental conventions.

Table 38 Ecosystem Services Indicator scores according to ND GAIN Index

Indicator	Score
Ecosystem Services	0.362
Projected change of biome distribution	-
Projected change of marine biodiversity	0.238
Natural capital dependency	0.055
Ecological footprint	0.202

Protected biome	0.494
Engagement in international environmental conventions	0.822

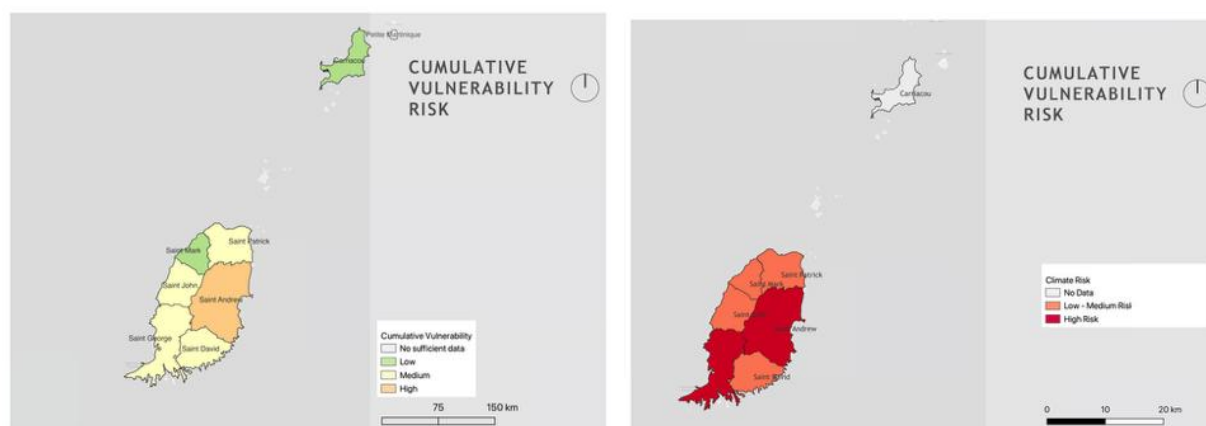


Figure 102 (Left) Composite map of vulnerability indicators
Figure 103 (Right) Climate Risk map

A multicriteria analysis was conducted using the indicators from the maps in (Figure 75 and 76), including poverty, health sector capacity, agricultural and fishery sector livelihoods and reliance, and water security, to assess climate risk across Grenada's parishes. This analysis involved combining a composite of hazard exposure, which included various types of hazards discussed in Chapter 3, with a composite of vulnerability, incorporating all the vulnerability indicators presented. The resulting climate risk map identifies areas most exposed to climate hazard events while also highlighting that St Andrew region to be the most vulnerable parish based on the selected vulnerability indicators.

The results indicate that the coastal parishes of St. Andrew and St. George exhibit higher vulnerability compared to other areas based on the selected indicators. However, when examining overall climate risk, additional parishes such as St. David, St. John, and St. Patrick emerge as medium-risk areas due to their combined vulnerabilities and significant hazard exposure. St. George Parish, which includes the capital city of St. George's, demonstrates a particularly high climate risk, a concerning finding given its critical role as the country's capital city.

4.5 Jamaica

Jamaica is facing a growing threat from the impacts of climate change as rising sea levels threaten coastal communities and infrastructure, while more intense hurricanes and storms cause widespread damage and disruption. Additionally, the changes in rainfall patterns lead to droughts and floods, impacting agriculture and water resources.

4.5.1 Food & Water Insecurity

Jamaica faces significant food security challenges, including diminished crop yields, heightened pest and disease pressure, and livestock stress: In 2023, it was noted that with the rise in temperatures brought an increase in pest invasions within crop and livestock, notable species included whiteflies, aphids, plant hoppers, mites, and thrips.⁴⁰⁶ In relation to one of Jamaica's most profitable crops, citrus fruits, in November 2024, one of Jamaica's leading citrus companies, *Trade Winds Citrus Limited*, faced fruit shortages and pest outbreaks, with production dropping from 650,000 in 2008 to 100,000 currently.⁴⁰⁷

This is just another example of the consequences climate change poses to major enterprises in the Caribbean, mirroring that of Belize. With regards to drought, most recently, in January to February 2024, six parishes faced drought-like conditions: Westmoreland and Hanover in the west; Clarendon and St. Elizabeth in the south; and St. Mary and Portland to the northeast. In response to this event, the National Water Commission had to increase water trucking to affected communities as well as upgrade the Roaring and Great River water systems to help the nation in the future. Jamaica's groundwater is the primary source of potable water for the country and freshwater resources are showing signs of impacts from droughts, sea-level rise and severe rainfall/storms. Droughts lessen the water available for community use, decreasing agricultural activity and development, while increasing incidents of disease transmission. Irrigated agriculture is estimated to utilize 75% of local water supply and competes against domestic use in times of water shortages.

Impact from La Niña events increases storm intensity and induces major damages on agricultural assets: In 2012, Hurricane Sandy devastated the eastern parishes, causing losses of 11 million in the agricultural sector.⁴⁰⁸ Decreased precipitation is a major threat to food security, as 75% of local water supplies are directed to agriculture, and drought can lead to loss of fertility in soil, soil degradation and losses of cattle and livestock. Unpredictable rain events can also cause losses to the agriculture sector, as evidenced in 2017 by a drop in 4.0% Real Value Added for Agriculture, Forestry and Fishing compared to 2016. The loss was incurred due to widespread above-normal rainfall across the island, resulting in large losses in crops and livestock. Rising temperatures will continue to impact meat quality and reproduction rates among poultry and goat/sheep farmers. In terms of Jamaica's major crops such as bananas, coffee, and sugarcane, these are particularly susceptible to hurricane-related risks: coffee production is adversely affected by berry loss, defoliation, and damage to coffee and shade trees; sugarcane growth is hindered by extended flooding associated with hurricanes; and citrus-growing regions are susceptible to sustained winds and soil erosion. Concerning water security, freshwater basins near the coastline are being inundated during storm surges and extreme weather events. Annually, 100 million cubic meters of groundwater, 10% of local supply, is lost due to saltwater intrusion.

The table below presents the ND-GAIN Index scores for Jamaica, focusing on food and water security.

Table 39 ND GAIN Scores for Agriculture and water security scores

Indicator	Score
Food	0.457
Projected change of cereal yields	0.946
Projected population change	0.106
Food import dependency	0.324
Rural population	0.463
Agriculture capacity	0.773
Child malnutrition	0.131
Water	0.331
Projected change of annual runoff	-
Projected change of annual groundwater recharge	0.217
Fresh water withdrawal rate	0.107
Water dependency ratio	0
Dam capacity	1.000

Access to reliable drinking water	-
-----------------------------------	---

4.5.2 Health

Jamaica has been facing health implications due to the rise in threat of climate change: Due to flooding, improper domestic sewerage systems have then contaminated rivers and groundwater supply with human faecal matter, increasing incidents of diseases and rendering the water supply unsuitable for use. Incidences of *E. coli* contamination are frequent in areas where human waste is improperly managed in households built within watersheds as well as those in poor communities living in floodplains and coastal areas. Water contamination can have serious health effects such as gastrointestinal illnesses, cholera, typhoid and skin diseases. On the opposite end of the spectrum, when there is a shortage of water, communities would then tend to suffer from dehydration and heat exhaustion. Dr. Alexander, a pediatric doctor, recalled that during periods of high heat, children are vulnerable to gastrointestinal illnesses and dehydration, 'It was very difficult...to recover fast from the illnesses', and as hospitals also suffered from water scarcity this meant patients could not get the medical aid they needed.⁴⁰⁹

The International Journal of Climatology reported that Jamaica is already experiencing rising heat-related illnesses, expected to worsen over the next 10 years⁴¹⁰. WADI Framework assessed Jamaica's vulnerability to dengue under past, present, and future climate conditions across three scenarios. Results indicated high to very high vulnerability in urban areas and residential locations. While the Blue Mountains showed low vulnerability in current scenarios, climate change, particularly under the RCP8.5 scenario for 2030, may alter this, promoting the spread of dengue in high-altitude regions⁴¹¹.

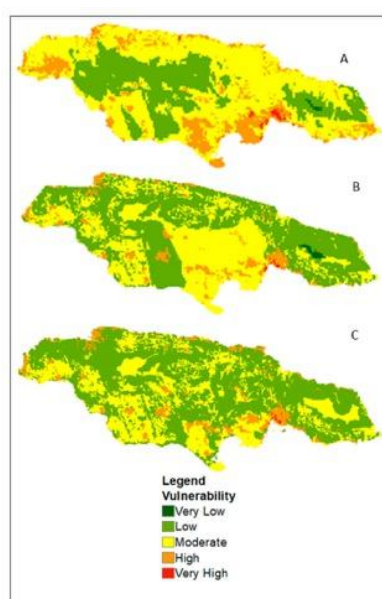


Figure 104 Dengue Vulnerability in Jamaica⁴¹²

The distribution of public health centres and hospitals in Jamaica reveals a significant disparity across the parishes, which could amplify vulnerability in areas with fewer healthcare facilities. For example, St Andrew, with 56 public health centres and hospitals, starkly contrasts with parishes like Manchester

and St Thomas, each having only 18 facilities⁷. This imbalance may result in limited access to healthcare services, particularly in underserved areas, making populations more vulnerable to health risks, especially in the face of environmental stressors such as climate change and vector-borne diseases.

Another significant factor is that hospitals and healthcare facilities in Jamaica have faced challenges with water scarcity during high heat periods, which exacerbates their vulnerability by hindering their ability to provide adequate care during critical times⁸.

Table 40 Public Health Centers count Jamaica in different parishes

Parish	Public Health Centres and Hospitals (Jamaica, 2016)
St Andrew	56
Kingston	
St Catherine	28
Clarendon	35
St James	23
Manchester	18
St Ann	26
St Elizabeth	25
Westmoreland	21
St Mary	32
St Thomas	18
Portland	20
Trelawny	20
Hanover	20

The ND-GAIN Index also highlights concerning scores for Jamaica, particularly in terms of medical staff availability and the spread of vector-borne diseases.

Table 41 ND GAIN Index Scores for Health sector in Jamaica

Indicator	Score
Health	0.489
Projected change of deaths from climate change induced diseases	0.303
Projected change in vector-borne diseases	0.658
Dependency on external resource for health services	0.048
Slum population	-
Medical staff	0.949
Access to improved sanitation facilities	-

⁷ Jamaica, G. o. (2016, June 23). *Public Health Centres and Hospitals*. Retrieved from Jamaica Open data: <https://www.data.gov.jm/dataset/health-facilities/resource/edc84af4-4b19-4b3b-8d7b-e527c9dd8273#view-graph:graphOptions:hooks:processOffset:bindEvents:graphOptions:hooks:processOffset:bindEvents:view-map:geomField:GeoJSON>

⁸ Baker Institute for Public Policy. (2021). *Jamaica's water insecurity*. Retrieved from <https://www.bakerinstitute.org/research/jamaicas-water-insecurity>

4.5.3 Ecosystem Vulnerability

The Jamaican economy and community livelihoods rely heavily on natural ecosystems in coastal, marine and terrestrial areas of the island, however these resources are being impacted by increased SST and storms: Healthy coral reefs, mangroves and seagrasses are critical to a healthy marine environment that will support local livelihoods as well as provide other ecosystem services such as shoreline protection, sediment trapping, flood control and carbon sequestration. Continued sea temperature increase will exacerbate incidences of coral bleaching, effectively weakening the ecosystem and resulting in habitat loss for reef fish. Damaged reefs are unable to withstand extreme weather events and no longer provide protection to shorelines from high energy storms. Major hurricanes that have impacted Jamaica have damaged much of the island reef systems over the past few decades and this contributes to the increased incident of beach erosion along Jamaican coastlines. A projected 0.5m sea-level rise will destroy 35% of nesting habitat for Jamaican sea turtles and other important shorebirds. Coral reefs and seagrasses are also weakened by sedimentation and pollutants originating from land-based sources and deposited into the marine environment through storm water and runoff. Mangrove forests serve to trap land-based sediment, however, are being impacted by land-based pollution, and receding as the sea level rises and saltwater inundates freshwater waterways.

Land degradation and deforestation is a considerable problem for Jamaica: Between the years 2002 and 2023, 4.4% of Jamaica's humid primary forests were lost; 7.4% of its total tree cover was also lost between 2001-2023; and there has been 20 VIIRS alerts in 2024 which is considered to be standard.⁴¹³ The top 3 regions that led to the decline of 53% of all tree cover loss between 2001 and 2023 was Saint Ann (6.96 kha), Saint Thomas (6.39 kha) and Clarendon (5.55 kha).

Table below shows a summary of ND GAIN Index scores for Jamaica in terms of ecosystem services vulnerability.

Table 42 ND GAIN Scores for Jamaica

Indicator	Score
Ecosystem Services	0.394
Projected change of biome distribution	0.447
Projected change of marine biodiversity	0.521
Natural capital dependency	0.114
Ecological footprint	0.270
Protected biome	0.309
Engagement in international environmental conventions	0.705

4.6 Saint Lucia

Saint Lucia is facing a myriad of climate threats such as rising sea levels, more intense hurricanes, changes in rainfall patterns, and ocean acidification. These impacts pose significant risks to the island's infrastructure, economy, and natural environment which will impact food and water security, the health of its communities and ecosystem resilience.

4.6.1 Food & Water Insecurity

Soil erosion which stems from inappropriate agricultural practices and development, inclusive of tourism and road construction, are significantly degrading agricultural lands: This is having negative consequences on water systems, both freshwater and coastal, due to the increased sedimentation load. In addition, indiscriminate land clearing, shifting cultivation, slash and burn practices and inappropriate soil and water conservation practices are further exacerbating the issue. Rainfall is the primary source of fresh water with 60% of the annual rainfall occurring between August to November. The majority of the rainfall flows to the sea with very little percolating and being stored as ground water due to the rugged topography and the absence of intermediate collection points such as ponds and lakes. In the dry season, the water available is due to river base flows as well as from limited dry season rainfall. The island tends to experience periods of drought especially in the southern region when the stream flows tend to fall below known historic base flows. As a result, the entire residual flow of the sub catchment is used for water supply leaving the downstream segment completely dry. With climate change, the island is experiencing greater variation in rainfall making it difficult to plan agricultural activities and impacting tourism.

La Niña events experienced by Saint Lucia, increases the risk and impact of landslides, floods, heavy rain and storm surges: In 2022, Saint Lucia suffered from a major flash flood and landslides that affected roughly 5,500 people in the north part of St Lucia, more specifically, in Assou Canal, Bexon, Marc, Beausejour, Grande-Riviere, Bois D'orange, and Corinth.⁴¹⁴ As the majority of the families were from low-income countries, this meant any agricultural plots or fishery equipment for example would have been difficult to rebuild without aid and support. This event caused soil to be oversaturated which can lead to anaerobic conditions, stunting crop growth, as well as nutrient loss and root rot. Due to the overflow caused by floods and storms, this affects Saint Lucia's water systems meaning contamination is likely. Torrential rainfall in September 2024 caused schools to shut in the southern region. Sanitation and water systems were jeopardised, placing many children and surrounding homes in a vulnerable position.

The ND-GAIN Index scores for Jamaica highlight several key factors related to food and water security. Notably, **dam capacity (1.000)** and **projected change in cereal yields (0.913)** are among the highest scores, suggesting strong infrastructure for water storage and potential resilience in crop production. **Agriculture capacity (0.835)** and **rural population (0.872)** also score high, indicating a significant reliance on agriculture and rural communities.

Table 43 ND GAIN Scores for Food and Water sectors in St Lucia.

Indicator	Score
Food	0.563
Projected change of cereal yields	0.913
Projected population change	0.167
Food import dependency	0.439
Rural population	0.872
Agriculture capacity	0.835
Child malnutrition	0.152
Water	-
Projected change of annual runoff	-

Projected change of annual groundwater recharge	-
Fresh water withdrawal rate	0.122
Water dependency ratio	0
Dam capacity	1.000
Access to reliable drinking water	-

4.6.2 Health

Between 2000 and 2018, the total number of those affected by a single-weather was 181,000 which have undoubtedly caused health consequences for the region⁴¹⁵. In Dennery North, an agricultural hub in Saint Lucia's Mabouya Valley and home to approximately 7,800 residents, they have faced water insecurity prohibiting those from carrying out household chores and drinking safe and sanitised water.⁴¹⁶ Residents have reported suffering from water-borne diseases like bilharzia and other related issues, however, there had been no other option for these communities as many could not afford to buy bottled water. Some members of the Dennery North community blame soil erosion from banana plantations and deforestation caused by storms and hurricanes for their lack of clean water. With regards to the flooding in 2022, it was noted by affected residents that stress and anxiety were high due to the loss of their assets and belongings. Additionally, with the rise in vector and water-borne diseases due to the stagnant water and heat, mosquito nets were distributed to 200 families to prevent the spread of disease.⁴¹⁷ Two years previous, there was an outbreak of dengue with 801 confirmed cases: 26% requiring hospitalisation and 4 deaths overall.⁴¹⁸

In 2024, Saint Lucia faced the impact of rising heat vulnerability as increasing temperatures and humidity which posed serious health risks. The Ministry of Health, Wellness, and Elderly Affairs issued a critical advisory, highlighting dangers like dehydration and heat-related complications, especially for infants, children, pregnant women, and the elderly⁴¹⁹. In response, the Ministry introduced urgent guidelines to help mitigate these risks, emphasizing hydration, limiting sun exposure, and recognizing signs of heat stress. These measures reflect growing concerns over climate change's impact on public health, underscoring the need for immediate action.

Saint Lucia's health sector is increasingly vulnerable to climate-driven risks, particularly the rise in vector-borne diseases. Dengue outbreaks surged in 2011 and 2013, followed by Chikungunya in 2014 and Zika in 2016, highlighting a troubling trend⁴²⁰. Dengue cases have shown significant yearly variation, with a peak in 2020 at 732.22 cases per 100,000 people – a stark increase compared to 2014 and 2016, which each reported over 100 cases⁴²¹. The continued rise in temperatures and shifting rainfall patterns create more favorable conditions for mosquito breeding, increasing the frequency and severity of these outbreaks. This growing health threat places immense pressure on Saint Lucia's healthcare system, demanding urgent attention to strengthen disease surveillance.

According to the report of Global Facility for Disaster Reduction and Recovery (GFDRR), most public assets, including critical infrastructure such as hospitals and schools, are not insured against natural disasters⁴²². This lack of coverage significantly heightens the health sector's vulnerability, as hospitals risk severe disruption, and schools – often used as emergency shelters during disasters may face prolonged recovery, reducing community resilience.

The Caribbean Institute for Meteorology and Hydrology highlights the growing vulnerability of Saint Lucia's agriculture sector to heat stress. Prolonged exposure to high temperatures leads to dehydration, which has been linked to chronic kidney disease among agricultural and construction workers⁴²³. Furthermore, heat stress is expected to elevate the risks of respiratory and cardiovascular diseases. The

agriculture sector, in particular, faces significant challenges due to higher temperatures and water stress, which threaten crop yields and overall productivity⁴²⁴. These climate-induced pressures underscore the urgent need for adaptive strategies to protect both public health and agricultural livelihoods in Saint Lucia.

Table 44 ND GAIN Index Scores - Health sector

Indicator	Score
Health	0.585
Projected change of deaths from climate change induced diseases	0.303
Projected change in vector-borne diseases	0.658
Dependency on external resource for health services	0.513
Slum population	-
Medical staff	0.867
Access to improved sanitation facilities	-

4.6.3 Ecosystem Vulnerability

The stability of beaches and shorelines, and coastal and marine ecosystems was identified as the primary issue to be addressed in Saint Lucia's climate change agenda: According to the report, sea-level rise is one of the greatest concerns for Saint Lucia, as it puts coastal areas and ports, livelihoods of those employed in fisheries, and ecosystems at risk. Pigeon Island, Pigeon Causeway, Rodney Bay and Soufrière have been identified as some of the most vulnerable to SLR. The report recommended that urgent attention must be given to the determination of hazard vulnerable coastlines and singled out the southern coastline of Saint Lucia as an example of such a place. Coastal stabilization on Pigeon Island to prevent and mitigate coastal erosion caused by climate change was identified as a priority project for implementation under the Strategic Programme for Climate Resilience (SPCR).

Many beaches, especially along the east coast, are suffering from sand mining and waste (tar balls and garbage) accumulation: As some of these beaches are in remote areas, surveillance activities by relevant enforcement agencies is difficult. Several efforts have been made to curb sand mining practices, including focusing on alternate aggregate sources such as pumice, importation of sand, and enactment of legislation; however, this has not curbed all of these activities. Furthermore, seagrass beds are common along Saint Lucia's coastline although the species diversity is low. Interspersed between seagrasses are benthic-rooted algae such as *Avrainvillea*, *Udotea*, *Penicillus*, *Halimeda*, *Amphiroa*, and *Caulerpa* species. Like coral reefs, these habitats have been subjected to stress resulting from silt-laden waters due to poor management of human and natural resources, and development. Recent studies indicated that the concentration in nutrient levels in Saint Lucia's coastal waters was too high to allow for coral reef regeneration.

Mangroves vulnerability to climate shocks have been increased due to charcoal & agricultural clearing and pollution: Mangrove systems in Saint Lucia play a vital role in coastal stability, and serve as fish breeding and nursery grounds, avifauna habitats, silt traps and nutrient exporters. There are four species of mangrove found in Saint Lucia: *Rhizophora mangle* (Red Mangrove), *Laguncularia racemosa* (White Mangrove), *Avicennia germinans* (Black Mangrove) and *Conocarpus erecta* (Buttonwood). Major threats include coastal development and clear-cutting for agriculture or charcoal production. Solid waste build-up and excess siltation in mangroves also negatively impact these systems, however, efforts have been made to prevent destruction of these coastal habitats, and several mangroves on the island were declared

marine reserves. However, monitoring and surveillance of activities within mangrove areas are difficult, since marine reserves have never been legally demarcated, and ownership often lies in private hands. In 2014, the Saint Lucia Forestry Department began island wide surveys of the spatial coverage, flora, fauna and threats to the mangrove forests in which some of the recommendations from these surveys included removal of garbage, restoration of mangrove areas, and development of site-specific management plans.

The ND-GAIN Index also highlights concerning scores for St Lucia.

Table 45 ND GAIN INDEX Scores for Ecosystem Services

Indicators	Score
Ecosystem Services	0.357
Projected change of biome distribution	-
Projected change of marine biodiversity	0.317
Natural capital dependency	0.001
Ecological footprint	0.271
Protected biome	-
Engagement in international environmental conventions	0.838

4.7 Summary of vulnerabilities and climate impacts in the wider Caribbean and CABRIC Countries

4.7.1 Agriculture Sector impacts

Table 46 observed and predicted impacts for agriculture sector

Impact Type	Observed Impacts	Predicted Impacts
Agricultural Production & Structural Changes	“Traditional exports” which include sugar, bananas and basic agricultural commodities have declined from 60 percent of agri-food exports in the early 1990s to less than 20 percent now. The main growth area has been exports of processed foods, including beverages, which increased from 10-15 percent to around 50 percent of agri-food exports now⁴²⁵ Saint Lucia Agriculture share to GDP - 2013 - 2.62% and 2023 - 0.92%⁴²⁶ Growth in agricultural productivity has been slow and the sector suffers from high trade	Due to climate change drying the region will become more drier and food security will be further questioned⁴³² Recent modelling indicates that the largest negative impact of climate change in Latin America and the Caribbean will be on sugar cane, followed by maize and cotton. Maize yield losses in the Caribbean due to climate change through 2030 are projected to be roughly 16.5 percent compared to a scenario without climate change⁴³³ Some crops will become scarce and require advanced irrigation systems due to reduced water availability, while others will surpass their critical

	costs and a low capacity to comply with modern food safety and quality standards⁴²⁷ The Caribbean has one of the highest levels of food insecurity in the world, with the prevalence of moderate or severe food insecurity as a percentage of the total population estimated at 58.8% (28.6 million individuals) as of 2023, a decline from 60.5% in 2022, but well above the global average of 28.9%⁴²⁸ The drought of 2010 and 2011 accounted for a reduction of 15% in banana exports during the first semester of 2010 alone⁴²⁹ More heavy rainfall and flooding will increase crop losses. Heavy rainfall events and flooding often causes soil erosion and in other cases waterlogged fields. Stephenson et al. (2014) showed that there has been an increase in daily rainfall intensity as reflected in records from 1986-2010, which meant that when rainfall occurred in the Caribbean, it tended to be heavier⁴³⁰ The impacts of recent storms [Ivan (2004); Irma and Maria (2017)] have demonstrated that most crops in the Caribbean cannot withstand the associated strong winds and rainfall. Some crops could be destroyed, while others will have longer recovery periods⁴³¹	temperature thresholds, resulting in lower growth and productivity⁴³⁴ In Belize, a projected 2°C temperature increase and a ±20% change in precipitation could lead to significant declines in crop yields, including 14-19% for dry beans, 10-14% for rice, 17-22% for maize, 12-17% for sugarcane, and 3-5% for citrus⁴³⁵
Post-Harvest Losses & Food Supply Chain	Latin America and the Caribbean accounts for 20% of the global amount of food that is lost from post-harvest up to, but excluding, the retail stage⁴³⁶ Quantitative losses in tree fruits during post-harvest operations in Jamaica is estimated at around 30-35% of the total annual production⁴³⁷ Improper packaging, rough handling and overloading of vehicles during transportation from production to consumption areas, account for approximately 20% of losses within the post-production chain⁴³⁸ 30% of Jamaica's agricultural output that gets lost each year because of a lack of post-harvest storage facilities as well as inadequate transportation to take products to market⁴³⁹	Logistics infrastructure for food products will become increasingly vulnerable to damage from extreme weather events, while rising temperatures will heighten the demand for air conditioning and refrigeration to preserve fresh food. These combined impacts will drive up food prices and threaten food security⁴⁴⁰

Climate Change Impacts on Livestock Farming	Lallo et al (2018) reported that Caribbean livestock (chickens, goats and pigs) are under considerable heat stress even in normal conditions and especially during the summer period⁴⁴¹	Projected temperature increases of 1.3°C by the 2030s will place greater stress on crops and livestock, disrupting agricultural systems, requiring shifts in management practices, and threatening food production in Belize⁴⁴² Heat stress in livestock leads to reduced food intake, slower growth, lower milk production, decreased reproduction rates, and higher mortality. These challenges, combined with climate-induced changes in pasture quality, declining nutrient availability, and a rise in livestock diseases, are expected to contribute to a decline in livestock production across the region⁴⁴³
Drought, Water Scarcity & Irrigation Challenges	Jamaica: With less than 10% of agricultural land irrigated and 80% of farmers relying on rainfed agriculture, prolonged droughts are severely impacting food production and water access⁴⁴⁴ Drought Vulnerability Index: Among Caribbean nations, Saint Lucia (11.38) and Belize (11) rank highest in drought vulnerability, while Jamaica (9.64) remains significantly at risk due to increasing water scarcity and extreme weather events.9.64⁴⁴⁵	The combined effect of higher temperatures, associated increase in evaporation, and less rainfall means that the Caribbean is likely to experience more intense and frequent droughts⁴⁴⁶ Increasing drought risk is projected for Caribbean SIDS over the next 100 years, with moderate to extreme drought conditions projected for increases in global temperatures at or above 1.5°C⁴⁴⁷ Droughts will reduce crop yield and threaten food security. The high reliance on open field rainfed crop production in the Caribbean, makes the sector particularly vulnerable to droughts⁴⁴⁸ A number of studies have projected climate change induced decreases in yields of crops grown in developing countries like the Caribbean, especially in rural areas⁴⁴⁹
Land Degradation & Soil Fertility	The land and water resources of the Caribbean region are being threatened by improper human practices. Deforestation and the intensive cultivation of short-term crops on steep slopes lead to soil erosion⁴⁵⁰	
Pest, Disease, and Invasive Species Risks	Invasive species, including pests and plant diseases, have caused severe economic losses and environmental damage in the Caribbean⁴⁵¹ Pink Hibiscus Mealybug and Red Palm Mite have had a devastating impact on Caribbean agriculture⁴⁵² Grenada reported annual losses of \$4.6 million, including \$1.1 million for control	Climate change is expected to intensify the impact of invasive species and extreme weather events on Caribbean biodiversity. Rising temperatures, shifting precipitation patterns, and more frequent extreme weather conditions will further disrupt ecosystems and threaten native species⁴⁵⁵

	efforts and the destruction of 38 hectares of Blue Mahoe forests⁴⁵³ Total economic losses in the Caribbean due to the mealybug were estimated at \$138 million, not including control costs and export losses⁴⁵⁴	
Socioeconomic Impacts on Farming Communities	Agriculture remains the main source of livelihood for the majority of the Caribbean's poor, with small-scale farming playing a dominant role in food production. Small farmers cultivate 55% of agricultural land, with 90% of their holdings being less than five acres, while family farms (small, medium, and large) contribute over 60% of the region's food supply. However, landless farm workers, who rely on wage labor, face even greater economic challenges. Despite variations in rural livelihoods, many structural issues persist, including limited access to education, healthcare, public utilities, housing, transportation, and communication services, further marginalizing agricultural communities⁴⁵⁶ A livelihood survey identified that out of those employed 37% lost their livelihoods⁴⁵⁷ Rural poverty in Belize stands at 43%, with smallholder farmers and agricultural workers making up the majority of those affected⁴⁵⁸	Climate change is expected to have severe impacts on small-scale farmers, threatening agricultural productivity and food security. Reduced water availability will force farmers to rely more on irrigation technology, while rising temperatures will push many crops beyond their critical heat tolerance, leading to lower yields. Saltwater intrusion, declining rainfall, and increased evaporation will further strain water resources, making farming even more challenging. These climate-driven stresses are compounded by local socio-economic factors⁴⁵⁹

4.7.2 Tourism Sector Impacts

Table 47 Observed and Future impact on tourism due to Climate Change

Climate Change Impact	Current Implications	Future Implications
Warmer Temperatures	Caribbean Heat Season - most heatwaves and the associated spikes in heat stress occur between April or May and October in the Caribbean⁴⁶⁰ As Caribbean temperatures continue to rise, the demand for cooling in the tourism sector is surging. Currently, air conditioning accounts for 55% of total electricity consumption in hotels⁴⁶¹	Beach-oriented tourists will be vulnerable to adverse health effects when exposed to higher-than-normal temperatures and humidity levels. Heat related health issues such as extreme sunburn, heat stroke, and dehydration can all ensue from such temperature increases. A rise in temperatures may also create an increased guest demand for more water-intensive hotel facilities such as showers, swimming pools and bars. This will pose a significant challenge in areas which are already water stressed⁴⁶²

More Frequent & Intense Storms	Hurricane Dorian, hurricane Irma, and hurricane Maria caused the largest average damage for firms at US\$ 3.25 million, US\$ 786,000 and US\$ 357,000 respectively ⁴⁶³	An average hurricane translates into a 2% loss in arrivals for the average destruction due to hurricanes, while in contrast the largest event caused up to a 20% reduction. Thus, hurricanes can have considerable negative impacts on tourism-dependent Caribbean economies ⁴⁶⁴
Changes in Precipitation & Evaporation	Several Caribbean countries, including Jamaica, Dominica, and St. Lucia, reported significantly lower than normal flows in many of their streams. In St. Lucia, the only large reservoir was depleted, threatening to run out of water within a short period potentially affecting more than 50% of the population and most of the tourism and business community¹ Belize's water and sanitation infrastructure and coastal facilities are currently stretched potentially affecting more than 50% of the population and most of the tourism and business community⁴⁶⁵ Belize's water and sanitation infrastructure and coastal facilities are currently stretched⁴⁶⁶	Saint Lucia - Through changes in temperature and in the amount, predictability and intensity of rainfall, climate change imperils the availability and provision of freshwater for domestic purposes, industry, agriculture, tourism, human health and even financial services ⁴⁶⁷
Increased Heavy Rainfall	The 2017 and 2021 Caribbean floods disrupted tourism by flooding hotels and blocking key roads. Many people from the informal settlements work in hotels, and the floods prevented them from going to work for several days or even weeks. The drainage problems also impacted tourism⁴⁶⁸ Extreme temperatures are associated with vector borne diseases such as the chikungunya virus. In 2014, the tourism industry in the region incurred significant economic losses with cancellation or reduction in tourism arrivals because of the Chikungunya Virus⁴⁶⁹ Jamaica - Heavy rainfall may lead to the displacement of visitors or cancellations of outdoor events which would incur revenue loss for the industry⁴⁷⁰	It was found that there will be significant impacts on the Saint Lucia beaches. In 2040, storm-induced ESLs of about 1 m combined with a moderate MSLR of about 0.2 m will result in the complete erosion and flooding of at least 11 % and 24 % of all island beaches, respectively. In 2100, superimposition of storm levels on the projected MSLRs could have devastating effects. A combined ESL of 1.56 m (e.g. a storm-induced extreme level of +1 m superimposed on a MSLR of 0.56 m -RCP4.5) could result in the complete erosion of at least 20 % and the complete flooding of at least 31 % of all beaches. Estimated results show that more than 4,000 people are expected to be affected by coastal flooding every year ⁴⁷¹
Sea Level Rise	Rising sea levels have intensified coastal erosion across the Caribbean, with Hellshire Beach in St. Catherine, Jamaica, being a notable example. A popular destination for locals and visitors from Kingston and Portmore, Hellshire Beach has lost up to 10 meters of shoreline over the past five years. The beach has also straightened, losing its natural convex shape. This erosion is likely driven by a combination of factors, including: (i) powerful waves from extreme weather events like Hurricane Dean in 2007, (ii) degradation of	Rising sea levels pose a significant threat to Caribbean tourism, with resort rebuilding costs projected to reach \$74 billion by 2080. In the Bahamas, annual tourism losses could surpass \$2.6 billion, while nearly 50% of Belize's tourist resorts face the risk of flooding. A one-meter sea-level rise could permanently submerge 4% of resorts, expose 30% of properties to flooding during major storms, and cause all coastal resorts to experience beach erosion, severely impacting their appeal and economic viability. By 2100, the region could lose 53% of its sandy beaches,

	coral reefs due to both natural and human activities, and (iii) environmental changes such as the loss of seagrass beds and damage to groyne structures that previously helped stabilize the shoreline⁴⁷² Portions of the shoreline of Grenville Bay, Grenada, have seen acute shoreline erosion and coastal flooding⁴⁷³	leading to a 30% reduction in hotel rooms and a 38% decline in tourism revenue⁴⁷⁴ In the Caribbean, sea level rise has been combined with elevation maps to estimate that 49-60% of tourist resort properties would be damaged⁴⁷⁵ Another estimate suggests that a 1-meter rise in sea level will lead to the loss of at least 16-multimillion-dollar tourism resorts across the Caribbean, with a replacement cost of over US\$1.6 billion and the livelihoods of thousands of employees and communities affected⁴⁷⁶
Rising Sea Temperatures	Caribbean - duration of marine heat waves in the area has increased from 36.5 days per year to 49.5 days per year⁴⁷⁷ Belize - Coral reef health has declined significantly over the last 40 years, with increased coral bleaching episodes and macro-algal growth, and is at the upper edge of its temperature tolerance⁴⁷⁸ Climate change is already having a negative impact on the tourism sector in the Caribbean, with temperature increases causing coral bleaching⁴⁷⁹ Warmer seas have led to the massive influx of Atlantic Sargasso in the Caribbean Sea, affecting countries like Barbados and Jamaica, covering white sandy beaches, emitting a pungent odour; and discolouring nearshore waters⁴⁸⁰ In 2005, extremely high sea surface temperatures in the Eastern Caribbean and North Atlantic led to a widespread coral bleaching event resulting in 90% of coral being affected in British Virgin Islands⁴⁸¹	Warmer sea temperatures threaten Belize's coral reefs, endangering its snorkelling and scuba diving tourism industry⁴⁸² In Saint Lucia, coral bleaching and reef degradation could cause economic losses of up to \$3.4 billion by 2050, impacting livelihoods, human health, and coastal protection⁴⁸³ Severe mass coral bleaching may occur in the Caribbean by 2074. Already, coral species have declined by 80% on Caribbean reefs due to ocean acidification and warmer sea surface temperatures⁴⁸⁴
Changes in Biodiversity	St. Lucia's natural assets, including forest reserves, wetlands, rangelands, barren areas, water ecosystems, and agricultural land, span over 600 square Kilometers. At least half of these areas are vulnerable to one or more environmental hazards. Notably, more than 50% of the island's wetlands face exposure to storm surges and flash floods⁴⁸⁵	The impacts of coastal erosion due to a 1-meter rise in sea level would lead to degradation or loss of 146 known sea turtle nesting areas across the Caribbean region⁴⁸⁶

4.7.3 Fisheries Sector Impacts

Table 48 observed and predicted impacts for fisheries sector

Impact	Observed Impacts	Predicted Impacts
Decreased Productivity of Climate-Vulnerable Species	Inland fisheries' contribution to total catches decreased by 7% in 2020⁴⁸⁷ Nassau grouper catch is limited (~5% of marine bony shore fishes threatened)⁴⁸⁸ Caribbean fisheries production declined by 40% (1990s-2010s) with 55% of commercial stocks overfished or depleted⁴⁸⁹ Tropical marine species, including yellowfin tuna, swordfish, and billfish, have narrow thermal tolerances and are already at their upper temperature limits⁴⁹⁰	Further reductions in fishery yields due to ocean warming; Decline in key species like flyingfish, snapper, and groupers⁴⁹¹ Rising SSTs will impact migration, spawning, larval survival, and recruitment, forcing species to relocate to cooler waters⁴⁹² Declining reef fish stocks are affecting small-scale fisheries in Belize and St. Lucia⁴⁹³
Decreased Quality & Fecundity, Increased Mortality in Aquaculture	Sargassum influx (since 2011) damaging fishing gear and vessels; Decomposing sargassum in Caribbean (St Lucia) coastal areas, releases hydrogen sulfide gas, creating strong odors that deter customers and reduce fish sales. Prolonged exposure has caused respiratory issues among market workers and consumers. Additionally, sargassum accumulation has blocked access to fish landing sites, delaying fresh catch deliveries and causing economic losses for small-scale fishers and vendors⁴⁹⁴	
Increased Post-Harvest Losses	Belize data indicates a need for CPUE monitoring, particularly for lobster and conch⁴⁹⁵	
Damage to Fisheries & Aquaculture Infrastructure	Hurricanes Joaquin (2015) and Dorian (2019) caused \$21.7M in fisheries losses in The Bahamas; Hurricane Beryl (2024) impacted over 11,200 fishers in Jamaica and Saint Lucia⁴⁹⁶	More frequent Category 4+ storms threatening fishing ports and boats; Sea-level rise affecting fish landing sites and markets⁴⁹⁷
Increased Vulnerability of Coastal Ecosystems	Sargassum mats blocking fish harbours and smothering coral reefs; Mass fish kills from reduced oxygen levels⁴⁹⁸ Jamaica's mangrove coverage declined from 15,000 hectares (1970s) to ~9,945 hectares (2020) Coral bleaching (2005, 2010) caused mass coral mortality in Caribbean SIDS (Belize, Barbados, St. Lucia, Grenada (2019), marine plastics caused USD \$2.3M - \$5.8M in damages to fisheries and coastal clean-ups⁴⁹⁹ Grenada's offshore pelagic fisheries, which landed 1,716 mt in 2012, are at risk as key fish stocks migrate northward out of reach of small-scale fishers⁵⁰⁰	Coral reef degradation leading to fewer fish spawning areas; Increased loss of mangroves and seagrass beds essential for fisheries⁵⁰³ Declining oxygen levels in deeper waters may push large pelagic species like tuna and billfish closer to the surface, increasing their catchability in the short term but threatening their long-term sustainability⁵⁰⁴ If large migratory fish stocks move beyond Grenada's EEZ, small-scale fishers will see significant declines in

	By 2006, up to 52% of corals had died in the Lesser Antilles following extreme bleaching events⁵⁰¹ Acidification has already been recorded in the Caribbean (1988-2012), with declining carbonate saturation levels⁵⁰² Rising sea surface temperatures are leading to the migration of Caribbean grazers like parrotfish to more temperate seas. These fish species can now be found in areas such as the Mediterranean Seas, Japan and Australia feeding on sea grasses and kelp forests. Caribbean coral reefs have also followed these fish populations and are replacing the sea grasses and kelp forests⁴³⁰	catch volumes, threatening their income and food security markets⁵⁰⁵ Changes in species availability will disrupt the post-harvest sector, including fish processing and exports to markets like the USA⁵⁰⁶ More frequent and severe storms will increase damage to fish habitats and natural barriers. Higher intensity storms which are projected for the Caribbean could result in greater damage to coral reefs, mangroves and seagrass beds^{507,430} Caribbean island nations like Belize, Guyana and Suriname with extensive mangrove vegetation, a 1 metre rise in sea level would lead to deterioration from accelerated coastal erosion⁵⁰⁸
Economic Impacts on Fishing Livelihoods	According to the Caribbean Food Security & Livelihoods Survey 49% of households engaged in fishing experienced job losses or reduced income in the past six months, compared to 37% for farming households and 40% for all survey respondents⁵⁰⁹ Jamaica's conch fishery, valued at \$3M annually, is at risk due to thinner shells and lower survival rates⁵¹⁰	Continued climate-driven disruptions in fisheries may lead to sustained economic instability, forcing more fishers out of work and increasing dependence on imported seafood⁵¹¹ 2,000 jobs in fishing and processing at risk if conch populations decline in Jamaica⁵¹² Foreign exchange earnings from conch exports could decrease, impacting fisheries management funding in Jamaica⁵¹³ Loss of coral reef health threatens additional employment in reef-dependent tourism industries⁵¹⁴

4.7.4 Health Sector Impacts

Table 49 Observed and Predicted Health sector impacts on Caribbean

Health Impact	Observed Impacts	Predicted Impacts
Heat related impacts	Jamaica, reported on heat-related illnesses already adversely affecting local populations, and expect these illnesses to become more frequent or severe over the next 10 years⁵¹⁵	As for climate projections, these foresee a further increase in the duration, intensity, and frequency of extreme heat events in the Caribbean region regardless of the future scenario, with

	Hotter than usual” temperatures as contributing to more hospitalizations for dehydration and sunburn in Grenada⁵¹⁶ Heat-related deaths in older adults increased by 103% in 2013-22 compared with 2000-09 in the Caribbean subregion⁵¹⁷	positive trends predicted for warm days and nights ⁵¹⁸
Food and Water Security	In the Caribbean subregion, approximately 1 in 49 people suffer from foodborne illnesses every year as a result of consuming contaminated food or water. During crowded events/places, this incidence rises to 1 in 11 people. More than 40% of cases occur in children⁵¹⁹ Food insecurity is a growing concern, with 6% of Belize’s population experiencing severe food insecurity and 7.4% suffering from undernourishment in 2020⁵²⁰ Mortality rate The Caribbean subregion had the highest rate of mortality associated with imbalanced diets, with 153 deaths per 100 000 population in 2019-21⁵²¹ Initial reports estimate that the agricultural sector in Jamaica is severely affected, impacting about 45,000 farmers, resulting in food shortages and financial strain⁵²²	
Healthcare System Strain	Limited access to clean drinking water and food security issues further strain health services, particularly in flood-affected regions⁵²³ Emergency response systems struggle to keep up with the increasing frequency of extreme weather events⁵²⁴ Hospitals and healthcare facilities in Jamaica have struggled with water scarcity during high heat periods⁵²⁵ Water shortages have placed additional strain on public health services, increasing the risk of health crises during climate-related disasters⁵²⁶	
Mental Health and Psychological Trauma	The psychological impact of Hurricane Dorian was significant, with 10,000 people displaced and 76,000 affected. The disaster highlighted the need for increased mental health and psychosocial support for affected communities⁵²⁷ Emerging evidence suggests that climate anxiety and related phenomena such as ecological grief may have substantial adverse effects on young people’s mental health⁵²⁸ In focus groups, Caribbean providers described rises in mosquito-borne, flood-related, heat-related, respiratory and mental illnesses, and attributed these to local impacts of climate change⁵²⁹	The need for psychological support will grow as climate-related disasters become more frequent and severe⁵³¹ Long-term mental health consequences of displacement and loss require increased funding for mental health services⁵³² Emerging evidence suggests that climate anxiety and related phenomena such as ecological grief may have substantial adverse effects on young people’s mental health⁵³³

	The Ministry of Education, UN Women, and UNICEF are assessing mental health aid needs in Grenada, Martinique, and Carriacou ⁵³⁰	
Public Health Risks in Emergency Shelters	Hurricane Beryl - Schools and community centers have been set up as emergency shelter centers. However, they are facing challenges such as overcrowding and inadequate facilities⁵³⁴ Belize's current 400 emergency shelters are largely inadequately equipped to accommodate persons with disabilities, lacking the necessary specialized care and accessibility features needed during crises. Many shelters are repurposed schools or multi-use buildings that were not originally designed for emergency housing, limiting their ability to serve individuals with disabilities effectively. However, only a handful, such as the Inspiration Centre and an educational facility in Belize City, are equipped to adequately serve persons with disabilities⁵³⁵ The primary healthcare infrastructure is aged, lacks proper maintenance, is vulnerable to natural hazards, and requires improvements. Most health facilities are aging, were built in the 1980s, and have experienced disasters from natural hazards⁵³⁶	
Respiratory Diseases	Grenada - The most common lower respiratory symptom associated with bush burning was dry cough (31.4%). The participants who engage in the practice of bush burning had a statistically significant, higher prevalence of sinusitis symptoms (OR: 2.1, CI 95%: 1.1-3.9) and had slightly higher prevalence of cough (OR: 1.6, CI 95%: 0.9-2.8). Prevalences of physician-diagnosed asthma and sinusitis were 12.3% and 31.2%, respectively. ⁵³⁷ Among people living in the Caribbean, an increase in respiratory diseases such as asthma has been linked to exposure to air pollutants resulting from natural events and especially human activities⁵³⁸ In epidemiological week (EW) 26 of 2024 in Jamaica, an increase in severe acute respiratory illness (SARI) cases has been observed above the epidemic threshold, coinciding with a marked increase in SARS-CoV-2 activity⁵³⁹ There has been an established link between the concentration of dust and the outbreak of asthma affecting children, which could lead to an overall increase of asthmatic cases in the Caribbean⁵⁴⁰	Poor waste disposal and pollution will continue to exacerbate respiratory diseases
Vector-Borne Diseases	Statistical analysis shows a positive association between precipitation, minimum temperature and dengue fever⁵⁴¹ Caribbean subregion is currently facing a significant increase in dengue cases, surpassing historical records. The subregion shows an increase of 342% compared to the same period in 2023, and an increase of 195% compared to the average of the last 5 years. In 2024, cases of DENV2 were recorded in Jamaica⁵⁴²	The spread of vector-borne diseases will increase as flooding and extreme rainfall provide ideal breeding conditions for mosquitoes⁵⁴³ Longer mosquito breeding seasons will heighten the prevalence of dengue and malaria outbreaks⁵⁴⁴ The Bahamas remains highly vulnerable to future outbreaks of dengue, chikungunya, and Zika⁵⁴⁵

4.7.5 Gender Specific Impacts

Table 50 Observed and Predicted GEDSI Impacts in the Caribbean

Health Impact	Observed Impacts	Predicted Impacts
Gender-Specific Health Risks	Women are more likely to seek medical attention at public healthcare centres and hospitals. Direct and indirect impacts on human health in Grenada from extreme weather events and natural hazards seem to have a greater toll on women⁵⁴⁶ Direct and indirect impacts on human health in Grenada from extreme weather events and natural hazards seem to have a greater toll on women⁵⁴⁷ Hurricane Maria in 2020 posed immense challenges for everyone, but pregnant women faced particularly unique hardships. Many experienced deep concerns for their baby's health and disruptions in maternal care, which created an added burden during an already vulnerable time⁵⁴⁸ Assessment of Hurricane Ivan's impact reports that nearly 12,500 children were at risk of folic acid deficiency due to the expected shortage of fruits and vegetables available to pregnant women. This would increase the risk for women accessing reproductive and sexual healthcare during disasters and emergency situations⁵⁴⁹	
Economic and Livelihood Disruptions	After Tropical Storm Erika in 2015, for example, around 40% of informal economic activities were disrupted, affecting 55% of the women engaged in such activities⁵⁵⁰ In Jamaica more than 50% of the population are single-parent, female-headed households, and more than 70% of households below the poverty line are also female-headed. This is an increasing concern as women tend to have higher levels of unemployment, lower income, and more responsibility to deal with household challenges during times of disasters⁵⁵¹ Disasters overburden women (especially in poor communities) to fulfil duties considered "women's work". These responsibilities include collecting water, caring for the infants and elderly, providing medical support and food, washing and cleaning in the house. They would be burdened with 'trying to get things back to normal' and get the children back to school⁵⁵² Majority (18.1 million) of the 19.6 million household workers across the Caribbean are women and they are particularly vulnerable to climate change because hurricane passage could result in the destruction of their workplace (the home)⁵⁵³ Across the Caribbean, women residing in rural areas are particularly vulnerable to climate change	Disasters and climate change can have a disproportionate impact on the tourism sector in Caribbean SIDS, particularly affecting women. Given that tourism in the region is highly feminized, it serves as a key source of employment for women, especially those in rural, coastal, and remote areas hence climate change could accelerate these impacts⁵⁵⁵

	because they have less opportunities to earn a living than their urban counterparts and experience higher levels of poverty ⁵⁵⁴	
Violence and Exploitation Risks	Caribbean - approximately three-quarters of all respondents (ranging from 63.1% to 72.5% for men and from 65.1% to 83.1% for women) reported being a victim of some form of violence, most perpetrated by a partner (59.0% for male victims and 66.7% for female victims)⁵⁵⁶ Women are at an increased risk of sexual violence in shelters. Furthermore, these shelters lack facilities to accommodate pregnant women and lactating mothers⁵⁵⁷ HIV rates increase among women in times of disasters, especially among those who engage in transactional sex as a survival strategy⁵⁵⁸ Women and children have the main responsibility for securing water supplies daily from springs or other sources. Significant commuting time/ work is spent performing these duties. This has implications for how they use their time which can be considerable because of the distances they have to travel to get water⁵⁵⁹	
Access to Healthcare and Support Services	Caribbean countries will need to urgently address gender gaps in disaster risk management to minimize disaster impacts and enhance recovery efforts⁵⁶⁰ Assessment of Hurricane Ivan's impact reports that nearly 12,500 children were at risk of folic acid deficiency due to the expected shortage of fruits and vegetables available to pregnant women. This would increase the risk for women accessing reproductive and sexual healthcare during disasters and emergency situations⁵⁶¹	A major challenge in developing solutions for indigenous communities in the Caribbean is the fact that these communities often face socioeconomic disadvantages. They are also often left out of policy conversations and decision making even though ultimately these very policies and decisions have serious implications for their way of life ⁵⁶²
Disability and Climate Vulnerability	Hurricane Beryl, 2024 - The most vulnerable groups to the impact of the hurricane are the elderly, children, people with disabilities, and those with chronic illnesses⁵⁶³ Belize's current 400 emergency shelters are largely inadequately equipped to accommodate persons with disabilities, lacking the necessary specialized care and accessibility features needed during crises. Many shelters are repurposed schools or multi-use buildings that were not originally designed for emergency housing, limiting their ability to serve individuals with disabilities effectively. However, only a handful, such as the Inspiration Centre and an educational facility in Belize City, are equipped to adequately serve persons with disabilities⁵⁶⁴	Without significant improvements in accessibility and infrastructure, persons with disabilities will continue to face severe challenges during emergencies. The limited number of adequately equipped shelters, such as the Inspiration Centre and an educational facility in Belize City, means that many individuals may struggle to find safe and accessible refuge, increasing their vulnerability in disaster situations ⁵⁶⁵
Social Inclusion and Climate Adaptation	People with disabilities (PWDs) are most at risk during any kind of disaster given their heavy dependency on others for all forms of support. Lesbian, gay, bisexual, transgender, queer (LGBTQ+) persons also face significant discrimination within the Jamaican population including in disaster situations ⁵⁶⁶	

	Caribbean - Only Seven countries have a national gender policy or plan, while six others are in the process of developing one. Countries that have established policies include Belize, Dominica, Grenada, Guyana, Jamaica, Suriname, and Bahamas, St Lucia developed a GAP very recently in 2024 ⁵⁶⁷	
Displacement and Migration	DMC reported before Hurricane Dorian (2019) that 5.9% of Bahamas' population will be annually displaced by hurricanes. Hurricane Dorian destroyed nearly half the homes on Great Abaco and Grand Bahamas islands. The 2017 Atlantic Hurricane Season also demonstrates the extent of displacement risk in the Caribbean; three major hurricanes of the season - Harvey, Irma, and Maria - displaced approximately 3 million people in a single month ⁵⁶⁸	Specifically, in Latin America and the Caribbean (LAC) internal climate migrants could reach 17.1 million by 2050 under the pessimistic reference scenario, representing 2.6% of the region's population ⁵⁶⁹ The Caribbean region is particularly at risk in relation to climate-induced migration. The ten countries and territories worldwide with the highest average annual internal displacement per capita are all small island developing states (SIDS), the top six of which are located in the Caribbean ⁵⁷⁰
Disaster Preparedness and Response	Women's organizations, and other CSOs, NGOs and LAs which address critical issues affecting women, children, the elderly, minority groups, and people with disabilities are not fully involved in the policy-making process of DRM and climate change ⁵⁷¹ Caribbean countries will need to urgently address gender gaps in disaster risk management to minimize disaster impacts and enhance recovery efforts ⁵⁷²	
As an exposure of poor population on extreme events	The poor face disproportionate exposure to flooding, with rates coming to 9.4% in St. Lucia. ⁵⁷³	In the future, household poverty in the Caribbean could become even more precarious, as poorer residents often settle in disaster-prone areas where housing is more affordable—such as unstable, deforested hillsides and eroding riverbanks. This trend is likely to intensify risks, exposing vulnerable populations to greater dangers from extreme weather events ⁵⁷⁴ Climate change will lead to up to a 300 % increase in extreme poverty in Latin America and the Caribbean (LAC) by 2030 ⁵⁷⁵

5. Stakeholder landscape & capacity

5.1 State Agencies

This section describes state agencies within CABRIC Caribbean states, specifically looking into their roles, personnel and functions in relation to the core themes of Food & water security, Health & EWS, and Ecosystem Resilience. The information presented below is developed from the data provided on each government website. The second section outlines the various NGOs and CSOs present in each nation, and the third section details each country's involvement in the SGP.

5.1.1 Bahamas

The Ministry of Environment and Natural Resources (MENR): Within the MENR features the Department of Environmental Planning and Protection, Department of Forestry, as well as the Department of Environmental Health Services. Its Minister is Vaughn Miller, the Minister of State for the Environment is Zane Lightbourne, and the Permanent Secretary is David Davis.⁵⁷⁶ MENR also places its focus on conservation management, wild animal and bird protection, sustainable energy, landfills and forestry.

Ministry of Public Service: Situated within Central Government, the Ministry of Public Service was formed under the authority of Article 77 of the Constitution. This article grants the government the power to establish ministries, allocate responsibilities to ministers, and ensure their effective functioning. The Cabinet Office and the Ministry of Finance are the other key coordinating agencies. These three entities are crucial for successful implementation of government programs.⁵⁷⁷ Its current Minister is the Hon. Brensil D. Rolle.

Ministry of Youth, Sports and Culture: The Ministry of Youth, Sports and Culture champions the development of young people aged 16-24 with its core mission encompassing economic, physical, cultural, spiritual, and social well-being at the national level. The Ministry also spearheads the development and implementation of youth, sports, and cultural policies and plans. The Hon. Charles T. Maynard is its Minister.⁵⁷⁸

Ministry of Agriculture and Marine Resources (MAMR): The MAMR has multiple departments within its portfolio such as the Bahamas Agricultural Health and Food Safety Authority (BAHFSA), Agricultural Lands, and the Bahamas Agricultural and Industrial Corporation. Its Minister is the Honourable Clay Glennford Sweeting who monitors agriculture and food production, public markets, fisheries and the Bahamas Agriculture and Marine Science Institute, to specify just a few.⁵⁷⁹ The MAMR also maintains connections with major donors such as FAO, the Inter-American Institute for Cooperation on Agriculture (IICA) and CARICOM. Its administration team comprises 5 personnel and the Ministry itself can be found in East Bay Street, Nassau.

Ministry of Disaster Preparedness, Management and Reconstruction (DPMR): Following the aftermath of Hurricane Dorian in 2019, the Bahamian government passed legislation which ordered the establishment of the Disaster Reconstruction Authority (DRA) and the new Ministry of Disaster Preparedness, Management and Reconstruction was born. This was set up to not only address the capacity needs of recovery efforts, but also to increase the country's resilience against future climate disasters. This ministry has administrative oversight regarding DRM initiatives, as well as monitoring and reporting. The nation's national budget of 2019/2020 allowed for 1.5 million USD to be invested into the DPMR.⁵⁸⁰

Ministry of Health and Wellness: The Technical Directorate of the Ministry consists of the Director of Nursing, the Director of Public Health, and the Chief Medical Officer. The Chief Medical Officer provides technical health advice to both the Minister and the Permanent Secretary; the Director of Public Health is responsible for its Department and provides expert advice to the Permanent Secretary on all matters pertaining to public health; lastly, the Director of Nursing provides nursing expertise to the Permanent Secretary. Additionally, the Public Hospitals Authority, a quasi-government body, is responsible concerning the management of Bahamas public hospitals most notably the Princess Margaret Hospital (PMH), Sandilands Rehabilitation Centre (SRC) and Rand Memorial Hospital (RAND). This ministry is also based in Nassau.

Department of Social Services: The Department of Social Services offers a range of services including food and financial assistance, counseling, advocacy, education, empowerment, health and wellness support, shelter and housing options, and protection and safety services in the Bahamas.⁵⁸¹

Department of Gender and Family Affairs: Addresses the nation's social challenges through programs that foster education, training, employment, and social justice for all genders.

5.1.2 Belize

Ministry of Sustainable Development, Climate Change & Disaster Risk Management: The Ministry is made up of several departments (51 personnel) such as the Sustainable Development Unit, National Meteorological Service, National Biodiversity Office, The National Climate Change Office, Department of the Environment, and the Forestry Department, with its director being Victor Alegria.⁵⁸² In March 2024, the Ministry passed a bill regarding the National Protected Areas Systems Act. The purpose of this Act is to establish a NPA system; promote conservation of Belize's protected areas; ensure genetic diversity; ensure provisions of ecosystem services and goods; and promote collaboration between archaeological reserves and nature-based areas.⁵⁸³ With regards to technical climate committees, Belize has their own National Climate Change Committee which has 1 representative and meets on a quarterly basis.

Ministry of Health and Wellness: The Minister of Health and Wellness in Belize is the Honourable Kevin Bernard, and various service areas include the Drug Inspectorate Unit, Public Health, Nursing, Vector Control, Dental, Mental Health and Nutrition.⁵⁸⁴

Ministry of Agriculture, Food Security & Enterprise: The Honourable Jose Abelardo Mai is its Minister, who aims to increase agricultural productivity and investments in Belize. In 2023, the Ministry met with FAO for the draft National Agriculture and Food Policy, bringing together private and public sector entities. This policy aimed to promote development and revenue in the agriculture sector and derives from the Medium-Term Development Strategy 2022-2026. The policy has several initiatives to diversify agriculture in Belize: blue economy; MSMEs for sovereignty and food security; rural development; and expanding their export opportunities.⁵⁸⁵

Ministry of Rural Transformation, Community Development, Labour & Local Government: This Ministry is split into three departments, the first being the Department of Rural Transformation which is led by Ms Elsa Cardinez, with 5 Rural Community Development Officers, who oversees activities related to wastewater and rural water systems, mechanical systems and electrical & as well as Village council governance and Water Boards.⁵⁸⁶ Secondly, the Department of Labor is led by the Labour Commissioner Ms Risella Dominguez and 18 other personnel who are Employment and Labour Officers. Its core focuses surround employment rights, occupational health and safety, social protection and child labor. Lastly, the Department of Local Government maintains oversight regarding village councils, trade licensing and alcaldes. It is led by Clifford King alongside 2 other Officers.

Ministry of Human Development, Families and Indigenous Peoples' Affairs: Partnering with relevant stakeholders to advance social justice and equity through policy development and program implementation, enabling self-sufficiency and responsible citizenship.

Department of Youth Services: This department focuses on enhancing and supporting the youth of Belize.

The National Women's Commission: The commission acts as an advisor to the government on matters concerning women with its creation stemming from the government's commitment to fulfilling international obligations. This commitment began in 1975 when Belize took part in the United Nations First World Conference on Women in Mexico City, with the aim of enhancing the lives of Belizean women and girls.⁵⁸⁷

Women and Family Support Department: Founded in 1978, the Women's Department champions women's empowerment, offering training, school-based education, support groups, and community outreach to address domestic violence and broader women's issues in Belize.⁵⁸⁸

5.1.3 Grenada

Ministry of National Security, Home Affairs, Public Administration, Information and Disaster Management: The Honourable Dickon Mitchell leads the Ministry and the National Disaster Management Agency (NaDMA) is a department within this Ministry which is responsible for disaster-related activities in Grenada, Carriacou and Petite Martinique.

Ministry of Economic Development, Planning, Tourism, Creative Economy, Culture, Agriculture and Lands, Forestry, Marine Resources and Cooperatives: There are three leaders within this rather large department. The Honourable Lennox J. Andrews is responsible for Economic Development, Planning, Agriculture and Lands, Forestry, Marine Resources, and Cooperatives; Senator Hon. Adrain A. Thomas leads Tourism, the Creative Economy, and Culture; and Senator Hon. Quinc Britton is the Parliamentary Secretary within the Ministry of Tourism, the Creative Economy, and Culture in which he assists the Minister for Culture.⁵⁸⁹

Ministry of Climate Resilience, The Environment & Renewable Energy: The Ministry, led by the Honourable Ms Hon. Kerryne Z. James, has engaged in partnerships with major regional and international funders such as the Caribbean Biodiversity Fund and NDC Partnerships. This Ministry aims to build Grenada's resilience in response to hazardous events, trends and or any other climate challenges. With regards to Grenada's technical climate change committee, the country has a National Climate Change Committee containing 13 government members and 4 subcommittees that can nominate other members including CSOs and which meets on a monthly basis.

Ministry of Health, Wellness & Religious Affairs: This Ministry is led by two individuals: the Honourable Delma Thomas who is the Minister for Mental Health, Wellness, and Religious Affairs; and the Honourable Philip A. Telesford who is the Minister of Health. In March 2024, Telesford signed an agreement with AFYA Foundation, a US-based charity that donates unused medical supplies such as bandages and surgical equipment to developing nations.⁵⁹⁰ The Ministry also offers multiple training programmes such as Clinical Medical Assistant training and Hemodialysis Technician training.

Ministry of Social & Community Development, Housing and Gender Affairs: It is led by the Hon. Gloria A. Thomas which deals with social protection programmes; disaster risk management / reduction; education; gender; health; housing and infrastructure.⁵⁹¹

5.1.4 Jamaica

Ministry of Agriculture, Fisheries and Mining: This Ministry has 12 agencies and departments which include the Agro-Investment Corporation, Coconut Industry Board, Rural Agricultural Development Authority and Jamaica Dairy Development Board as well as a National Fisheries Authority that centres their work on aquaculture and marine capture fisheries. It is also made of 6 divisions: Research & Development; Veterinary Services; Plant Quarantine; Public Gardens; Agricultural Land Management; Mines Geology. It is led by the Honourable Floyd Green (Minister of Agriculture), Fisheries and Mining and the Honourable Franklin Witter (Minister of State).⁵⁹²

Ministry of Health and Wellness: The Minister of Health and Wellness is the Honourable Dr Christopher Tufton who is supported by 12 other personnel, composed of Principal Medical Officer & National Epidemiologist, Director, Emergency, Disaster Management & Special Services, Director, Health Promotion & Protection, and others. The Ministry created the *Vision for Health 2030: Ten Year Strategic Plan 2019-2030*, a detailed agenda to improve health in the country and it features 6 main strategic goals:⁵⁹³

- SG 1 Safeguarding access to equitable, comprehensive and quality healthcare.
- SG 2 The stewardship capacity of the Ministry of Health is strengthened to improve leadership and governance to achieve universal access to health and universal health coverage.
- SG 3 Increased and improves health financing with equity and efficiency.
- SG 4 Ensuring human resources for health in sufficient numbers and competencies.
- SG 5 Social participation and inter-sectoral collaborations to address the social determinants of health.
- SG 6 Making reliable and modern infrastructure available for Health Service Delivery.

Ministry of Local Government and Community Development: There are multiple functions and roles within Jamaica's Ministry of Local Government and Community Development, these include: Disaster Preparedness and Emergency Management; Local Sustainable Development Planning; Minor water Supplies and Social waters; Rural Development and Rural Water.⁵⁹⁴ The Honourable Desmond McKenzie is the current Minister who is supported by two state ministers. The Ministry performs its tasks through 5 agencies such as the Jamaica Fire Brigade and the Office of Disaster Preparedness and Emergency Management, as well as 14 local authorities. Regarding technical committees for climate change, Jamaica has two:

- The Climate Change Advisory Board, which has 7 members from the spheres of CSOs, youth and academia who meet quarterly.
- The Hazard Risk Reduction and Adaptation to Climate Change (HRRACC) which is a thematic working group with a mix of state and non-state organisation which include CSOs. This group meets when needed.

Ministry of Education, Skills, Youth and Information: The Hon. Dana Morris Dixon is its Minister, in which it currently implements the Jamaican government's mandate to provide quality education and training for all citizens, fostering individual and national growth. As one of Jamaica's largest public entities, the organization currently comprises 11 agencies, six Regional Offices, and a central office with approximately 40 units organized into five divisions.⁵⁹⁵

Ministry of Culture, Gender, Entertainment and Sport: This Ministry is responsible for pursuing gender equality, as well as ...The following agencies also make up this Ministry: Jamaica Cultural Development Commission; Women's Centre of Jamaica Foundation; and Sports Development Foundation. The Hon. Olivia 'Babsy' Grange is the Minister.

Ministry of Labour and Social Security: Fosters strong labor-management partnerships and provides comprehensive social safety nets that empower individuals and families, while cultivating a culture of hardwork.⁵⁹⁶ Such agencies that make up this Ministry are: disaster relief management; child labour; and employment agencies unit. The Hon. Parnell P. Charles Jr is currently its Minister.

Bureau of Gender Affairs: The Bureau advocates for women's rights within the government. Recognizing the systemic barriers of patriarchy and sexism, the Bureau works to mobilize government action and empower women by carrying out research and policy development, public education and training and project planning and monitoring.⁵⁹⁷

5.1.5 St. Lucia

Ministry of Agriculture, Fisheries, Food Security and Rural Development: The Department of Agriculture, Fisheries and Natural Resources is a branch of the Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources, and Cooperatives.⁵⁹⁸ Its role is to promote national income from forestry, agriculture and fisheries to improve food and water security for St Lucia. Dr Auria King Cenac is the Director of Agricultural Services. This department focuses on 4 key areas: Agricultural Services, Cooperatives, Fisheries, and Forestry. Other divisions include Corporate Planning, Research & Development, Water Resource Management, Agriculture & Engineering Services, and Veterinary & Livestock Services. The Minister is the Honourable Alfred Prospere. Concerning Saint Lucia's technical climate change committee, the country has a National Climate Change Committee, who meet quarterly, made up of CSOs such as the Saint Lucia National Trust who are invited to participate in various NCCC meetings with the government and private sector groups.

Ministry of Health, Wellness, and Elderly Affairs: The Ministry of Health, Wellness and Elderly Affairs is made up of 17 departments, some of these include the Corporate Planning Unit, Environmental Health, Infectious Diseases, and Nutrition Unit.⁵⁹⁹ The Ministry provides scholarship opportunities, as well as Public health certificates and mass casualty plans for St Lucians. The Honourable Moses Jn Baptiste is its designated Minister.

Ministry of Education, Sustainable Development, Innovation, Science, Technology and Vocational Training: This Ministry contains 35 departments such as the Biodiversity Unit, the Sustainable Development & Environment Division and the United Nations Educational Scientific and Cultural Organization. The Department has recently published the *Environmental and Social Management Framework (ESMF) for the Caribbean Efficient and Green-Energy Buildings Project* in 2023 which details its objective to boost energy efficiency and renewable energy adoption in Eastern Caribbean public buildings. The Minister is the Honourable Shawn Andrey Edward.⁶⁰⁰

Department of Gender Relations, Gender: The Division of Gender Affairs is a unit within two government entities: the Ministry of the Public Service, Home Affairs, Labour and Gender Affairs, and the Department of the Public Service and Gender Affairs which promotes gender equality by fostering inclusive policies and programs that enable women's full participation and benefit from national development.

5.2 CSO, NGO and LA landscape

NGOs, CSOs, LAs are envisaged as the project proponent to the CABRIC EDA facility. Their presence is an indication of social concerns, and as they are essential to the programme this section provides a summary of the main actors. The following sections shows a summary of the types of CSOs, NGOs and LAs present in each country.

5.2.1 Bahamas

Table 51 outlines the major NGOs, CSOs, LAs in the Bahamas.

Table 51 NGOs, CSOs and LAs in The Bahamas

NGO and CSO	Country	Theme	Category
Bahamian Environment Foundation	Bahamas	Water and Marine	Non-Governmental Organization
Bahamas Reef Environment Educational Foundation (BREEF)	Bahamas	Water and Marine	Academic and Research Institute
Bahamas Sportfishing & Conservation Association	Bahamas	Water and Marine	Non-Governmental Organization
Moore Charitable Foundation	Bahamas	Water and Marine	Private
Perry Institute For Marine Science	Bahamas	Water and Marine	Academic and Research Institute
Bahamas Marine Ecocentre (Little Darby Island) charity	Bahamas	Water and Marine	Academic and Research Institute
Friends of the Environment Abaco	Bahamas	Water and Marine	Non-Governmental Organization
Bahamas National Trust	Bahamas	Water and Marine	Non-Governmental Organization
YME Bahamas & Cat Island Conservation Institute	Bahamas	Water and Marine	Academic and Research Institute
Waterkeepers Bahamas	Bahamas	Water and Marine	Community-based Organisation
National Fisheries Association of the Bahamas	Bahamas	Water and Marine	Resource User Groups
Bahamas Sportfishing Conservation Association	Bahamas	Water and Marine	Non-Governmental Organization
Bonefish & Tarpon Trust	Bahamas	Water and Marine	Non-Governmental Organization
The Elizabeth Harbour Conservation Partnership	Bahamas	Water and Marine	Community-based Organisation
Bahamas Protected Areas Fund	Bahamas	Water and Marine	National Conservation Trust Fund
Bahamas Maritime Authority (BMA)	Bahamas	Water and Marine	Professional bodies
Pacific Disaster Center	Bahamas	Disaster Management	Private
Information Technology Disaster Relief Centre (ITDRC)	Bahamas	Disaster Management	Academic and Research Institute
Disaster Arborist Response Team	Bahamas	Disaster Management	Non-Governmental Organization
Disaster Risk Management (DRM) Authority	Bahamas	Disaster Management	Professional Bodies
Bahamas Air Sea Rescue Association	Bahamas	Disaster Management	Professional Bodies
Restore Bahamas	Bahamas	Ecosystems	Business-led Initiative
Bahamas Protect Areas Fund	Bahamas	Ecosystems	National Conservation Trust Fund
Agricultural Development Organisation Bahamas	Bahamas	Ecosystems	Non-Governmental Organization

FRIENDS of the Environment	Bahamas	Ecosystems	Community-based Organisation
San Sal Living Jewels	Bahamas	Ecosystems	Community-based Organisation
Many Hands for Abaco	Bahamas	Ecosystems	Non-Governmental Organization
The Bahamas Network of Rural Women Producers	Bahamas	Ecosystems	Community-based Organisation
Abaco Rescue Fund	Bahamas	Ecosystems	National Conservation Trust Fund
Bahamas Mangrove Alliance	Bahamas	Ecosystems	Professional bodies
Synergy Bahamas	Bahamas	Sustainable Development	Academic and Research Institute
Jennings Environmental, Safety & Security	Bahamas	Sustainable Development	Private
Agriculture and Applied Sciences Consultants	Bahamas	Sustainable Development	Private
Science and Perspective	Bahamas	Sustainable Development	Private
Grand Bahamas Resilience Center	Bahamas	Sustainable Development	Non-Governmental Organization
One Eleuthera Foundation (OEF)	Bahamas	Sustainable Development	Community-based Organisation
Bahamas Environment, Science and Technology (BEST) Commission	Bahamas	Sustainable Development	Professional bodies
Bahamas Urban Youth Development Center	Bahamas	Social Development	Community-based Organisation
Caribbean Youth Environment Network (CYEN) Bahamas	Bahamas	Social Development	Community-based Organisation
Restore Bahamas	Bahamas	Social Development	Private
Caribbean Women in Leadership (CIWiL) Bahamas	Bahamas	Social Development	Non-Governmental Organization
Equality Bahamas	Bahamas	Social Development	Community-based Organisation
Bridge of Hope Bahamas	Bahamas	Social Development	Non-Governmental Organization
Women United	Bahamas	Social Development	Civil Society Organization
STRAW Inc. Center for Young Women	Bahamas	Social Development	Community-based Organisation
The DMarco Foundation	Bahamas	Social Development	Non-Governmental Organization
Bahamas Red Cross	Bahamas	Social Development	National Society
Human Rights Bahamas	Bahamas	Social Development	Non-Governmental Organization
Bahamas Association for the Physically Disabled	Bahamas	Social Development	Resource User Groups
ORG Bahamas Foundation	Bahamas	Social Development	Civil Society Organization
Community Counselling & Assessment Centre	Bahamas	Social Development	Academic and Research Institute
Government and Public Policy Institute Bahamas	Bahamas	Social Development	Academic and Research Institute

Bahamas NGO Investment Ltd	Bahamas	Social Development	Private
The Bahamas Development Bank	Bahamas	Social Development	Financial Institutions
Lend a Hand Bahamas	Bahamas	Social Development	Community-based Organisation
Hands For Hunger	Bahamas	Social Development	Community-based Organisation
Bahamas Lotus	Bahamas	Social Development	Community-based Organisation
Many Hands for Abaco	Bahamas	Social Development	Community-based Organisation
The Bahamas Agriculture and Marine Science Institute (BAMSI)	Bahamas	Water and Marine / Ecosystems	Academic and Research Institute
University of The Bahamas	Bahamas	Social Development	Academic and Research Institute
St. John's University (Bahamas Campus)	Bahamas	Social Development	Academic and Research Institute
Bahamas Baptist Community College (BBCC)	Bahamas	Social Development	Academic and Research Institute
University of The Bahamas Research & Innovation (UBRI)	Bahamas	Social Development	Academic and Research Institute
Cape Eleuthera Institute	Bahamas	Social Development	Academic and Research Institute
RCANB Every Child Counts School	Bahamas	Social Development	Academic and Research Institute

LAs

Local Government:

The Hon Clay Glennford Sweeting, Minister of Works and Family Island Affairs - This division contains 30 Family Island Administrators of levels I - IV.

There are a total of 33 local government districts: 13 two-schedule districts, which are subdivided into 41 town areas and 19 unitary districts.

- The Bahamas Association of Local Government Authorities (BALGA)⁶⁰¹

5.2.2 Belize

Table 52 details the various NGOs, CSOs, LAs in Belize.

Table 52 NGOs, CSOs and LAs in Belize

NGO and CSO	Country	Theme	Category
-------------	---------	-------	----------

Southern Environmental Association (SEA)	Belize	Water and Marine	Professional bodies
Turneffe Atoll Marine Reserve (Turneffe Atoll Sustainability Association)	Belize	Water and Marine	Non-Governmental Organization
WCS Belize	Belize	Water and Marine	Non-Governmental Organization
Coalition for Sustainable Fisheries	Belize	Water and Marine	Community-based Organisation
Belize Mesoamerican Reef Fund (MARFund)	Belize	Water and Marine	National Conservation Trust Fund
Healthy Reef Initiative	Belize	Water and Marine	Academic and Research
Sarteneja Alliance for Conservation and Development	Belize	Water and Marine	Non-Governmental Organization
Turneffe Atoll Sustainability Association	Belize	Water and Marine	Non-Governmental Organization
Coastal Zone Management Institute	Belize	Water and Marine	Academic and Research Institute
Oceana in Belize	Belize	Water and Marine	Non-Governmental Organization
Monkey River Watershed Association	Belize	Water and Marine	Community-based Organisation
National Fishermen Cooperative Association Ltd.	Belize	Water and Marine	Resource User Groups
Belize Fishermen Cooperative Association Ltd	Belize	Water and Marine	Resource User Groups
Caribena Producers Cooperative society Ltd.	Belize	Water and Marine	Private
Coastal Zone Management Authority & Institute	Belize	Water and Marine	Professional bodies
Belize Federation of Fishers	Belize	Water and Marine	Community-based Organisation
Belize Red Cross	Belize	Disaster Management	Non-Governmental Organization
City Emergency Management Organization	Belize	Disaster Management	Professional bodies
Monkey Bay Wildlife Sanctuary	Belize	Ecosystems	Community-based Organisation
Belize Foundation for Research and Environmental Education (BFREE)	Belize	Ecosystems	Academic and Research Institute
The Nature Conservancy	Belize	Ecosystems	Non-Governmental Organization
Community Baboon Sanctuary Women's Conservation Group	Belize	Ecosystems	Community-based Organisation
Belize Indigenous Alliance for Collective Resilience	Belize	Ecosystems	Community-based Organisation
Friends for Conservation and Development	Belize	Ecosystems	Non-Governmental Organization
WWF Belize	Belize	Ecosystems	Non-Governmental Organization
Sarstoon Temash Institute for Indigenous Management (SATIIM)	Belize	Ecosystems	Non-Governmental Organization
Ya'axche Conservation Trust	Belize	Ecosystems	National Conservation Trust Fund
Fragments of Hope	Belize	Ecosystems	Community-based Organisation

Belize Audubon Society	Belize	Ecosystems	Non-Governmental Organization
Corozal Sustainable Futures Initiative	Belize	Ecosystems	Non-Governmental Organization
Association of Protected Areas Management Organizations	Belize	Ecosystems	Umbrella Organisation of NGOs and CSOs
Belize Maya Forest Trust	Belize	Ecosystems	National Conservation Trust Fund
Belize Agricultural Health Authority	Belize	Ecosystems	Professional bodies
Toledo Institute for Development and Environment	Belize	Sustainable Development	Non-Governmental Organization
Belize Network of NGOs	Belize	Sustainable Development	Umbrella Organisation of NGOs and CSOs
Environmental Defence Fund	Belize	Sustainable Development	National Conservation Trust Fund
University of Belize Environmental Research Institute	Belize	Sustainable Development	Academic and Research Institute
Belize TREC (Tropical Research and Education Center)	Belize	Sustainable Development	Academic and Research Institute
Sugar Industry Research & Development Institute	Belize	Sustainable Development	Academic and Research Institute
The Toucan Ridge Ecology and Education Society (TREES)	Belize	Sustainable Development	Academic and Research Institute
Steadfast Tourism and Conservation Association	Belize	Sustainable Development	Community-based Organisation
Plenty International (Belize) Limited	Belize	Sustainable Development	Non-Governmental Organization
Itzamna Society	Belize	Sustainable Development	Non-Governmental Organization
Caribbean Youth Environment Network (CYEN) Belize	Belize	Social Development	Community-based Organisation
Youth Enhancement Services	Belize	Social Development	Non-Governmental Organization
Productive Organisation for Women in Action	Belize	Social Development	Community-based Organisation
PETAL	Belize	Social Development	Non-Governmental Organization
National Garifuna Council	Belize	Social Development	Non-Governmental Organization
Julian Cho Society Belize	Belize	Social Development	Non-Governmental Organization
Help For Progress, Belize	Belize	Social Development	Community-based Organisation
The Love Foundation	Belize	Social Development	Community-based Organisation
Word Of Life Belize Office	Belize	Social Development	Community-based Organisation
Children's Cup Belize Office	Belize	Social Development	Community-based Organisation
University of Belize	Belize	Social Development	Academic and Research Institute

Belize Vector and Ecology Center	Belize	Social Development	Academic and Research Institute
Central America Health Sciences University	Belize	Social Development	Academic and Research Institute
Belize Adventist Junior College	Belize	Social Development	Academic and Research Institute
Belize Credit union League	Belize	Social Development	A Co-operative
Sarstoon Temash Institute for indigenous Management	Belize	Social Development	Non-Governmental Organization

LAs

There are seven town and two city municipalities, 181 village councils, and 12 community councils. Additionally, there are 84 alcaldes (formalised traditional governance practiced by the Indigenous Maya in Toledo District).⁶⁰²

For example, the village councils within the Ministry of Rural Transformation (Community Development, Labour and Local Government Dept), are responsible for:⁶⁰³

- Care and maintenance of the public properties within the village
- Assets and properties of the council

Concerning specific village council elections held between the 15th June to 6th July 2025 alone⁶⁰⁴, they were held in:

- **Toledo District:** Aguacate; San Benito Poite; Jalacte; Saint Elena; Mabilha; Blue Creek; San Vicente; Jordan; Santa Cruz; Santa Teresa; Indian Creek; Big Falls; Crique Jute; San Antonia; Mafredi; Silver Creek; Golden Stream; Pueblo Viejo; San Miguel; Medina Bank; Jacintoville; San Jose; San Pedro Columbia; laguna; Yemeri Grive;
- **Belize District:** Caye Caulker; Ladyville; Scotland Halfmoon; Flowers Bank; Bermudian Landing; Rancho Dolores; Lord's Bank; Hattievill; Lucky Strike; Rockstone Pond; Santana; Western Paradise; Maskall; Mahogany Heights;
- **Orange Walk District:** San Felipe; Guinea Grass; Indian Church; San Carlos; Fire Burn; San Lazaro; Trinidad; August Pine Ridge; Yo Creek
- **Cayo District:** Bullet Tree Falls; Buena Vista; Georgeville; Duck Run III; Camalote; Roaring Creek; San Jose Succotz; El Progreso; Santa Familia; San Antonio; Esperanza; Cotton Tree; Frank's Eddy; St Matthews; More Tomorrow; Ontario; Teakettle; Selena;
- **Corozal District:** San Pedro Buena Vista; Cristo Bay

5.2.3 Grenada

Table 53 outlines the main NGOs, CSOs, LAs in Grenada.

Table 53 CSOs, NGOs and LAs in Grenada

NGO and CSO	Country	Theme	Category
Petite Martinique Fishermen's Co-operative	Grenada	Water and Marine	Community-based Organisation

St. John's Fishermen Association	Grenada	Water and Marine	Resource User Groups
St. Andrew's Fishermen Association	Grenada	Water and Marine	Resource User Groups
Southern Fishermen Association	Grenada	Water and Marine	Resource User Groups
Duquesne Fishermen Cooperative	Grenada	Water and Marine	Community-based Organisation
Grenada Coral Reef Foundation	Grenada	Water and Marine	Non-Governmental Organization
KIDO Foundation	Grenada	Water and Marine	Non-Governmental Organization
National Water and Sewerage Authority	Grenada	Water and Marine	Professional bodies
National Disaster Management Agency	Grenada	Disaster Management	Professional bodies
Youth Emergency Action Committee (YEAC)	Grenada	Disaster Management	Community-based Organisation
Grenada Fund for Conservation (GFC)	Grenada	Ecosystems	Non-Governmental Organization
Grenada Environmental Ambassadors Inc	Grenada	Ecosystems	Community-based Organisation
Kipaji Inc Carriacou	Grenada	Ecosystems	Non-Governmental Organization
Caribbean Agricultural Research And Development Institute	Grenada	Ecosystems	Academic and Research Institute
Best Practices Farmers Movement	Grenada	Ecosystems	Non-Governmental Organization
Agency for Rural Transformation (ART)	Grenada	Ecosystems	Non-Governmental Organization
Carriacou Farmers Association	Grenada	Ecosystems	Resource User Groups
Grenada Community Development Agency (GRENCODA)	Grenada	Ecosystems	Non-Governmental Organization
Grenada Network of Rural Women Producers	Grenada	Ecosystems	Non-Governmental Organization
Grenada Land Actors	Grenada	Ecosystems	Non-Governmental Organization
Genesis Agro-processing Co-operative	Grenada	Ecosystems	Community-based Organisation
Friends of the Earth-Grenada	Grenada	Ecosystems	Non-Governmental Organization
North East Farmers Organisation	Grenada	Ecosystems	Community-based Organisation
Sandy's Family Farm Catering Services	Grenada	Ecosystems	Private
Grenada Sustainable Development Trust Fund	Grenada	Ecosystems	National Conservation Trust Fund
Kipaji Development Initiative	Grenada	Ecosystems	Community-based Organisation
Grenada Cocoa Association	Grenada	Ecosystems	A Co-operative
Grenada Organic Agricultural Movement	Grenada	Ecosystems	Non-Governmental Organization
Grenada Co-operative Nutmeg Association	Grenada	Ecosystems	A Co-operative

Grenada Green Group	Grenada	Sustainable Development	Community-based Organisation
Caribbean Green Energy Ltd	Grenada	Sustainable Development	Private
Windward Islands Research & Education Foundation (WINDREF)	Grenada	Sustainable Development	Academic and Research Institute
Southern Electrical	Grenada	Sustainable Development	Private
Grenada Sustainable Development Council	Grenada	Sustainable Development	Professional bodies
Sustainable Grenada Inc (Sus Gren)	Grenada	Sustainable Development	Non-Governmental Organization
Caribbean climate network Grenada Chapter	Grenada	Sustainable Development	Community-based Organisation
Caribbean Youth Environment Network (CYEN Grenada)	Grenada	Social Development	Non-Governmental Organization
Adult & Teen Challenge	Grenada	Social Development	Community-based Organisation
GRENEED	Grenada	Social Development	Non-Governmental Organization
Leo Club, St, George's	Grenada	Social Development	Community-based Organisation
St. Patrick's Youth Organisation (SPYO)	Grenada	Social Development	Community-based Organisation
Youth Emergency Action Committee (YEAC)	Grenada	Social Development	Community-based Organisation
Hesperian Health Guides	Grenada	Social Development	Non-Governmental Organization
National Council for The Disabled	Grenada	Social Development	Professional bodies
Grenada Red Cross Society	Grenada	Social Development	Non-Governmental Organization
Grenada Human Rights Group	Grenada	Social Development	Non-Governmental Organization
Clozier Climate Smart Lifestyles	Grenada	Social Development	Community-based Organisation
St. Patrick's Environmental & Community Tourism Org. (SPECTO)	Grenada	Social Development	Community-based Organisation
St. Andrew's Dev. Org. (SADO)	Grenada	Social Development	Non-Governmental Organization
Petite Martinique Women in Action	Grenada	Social Development	Community-based Organisation
Soroptomist International Grenada	Grenada	Social Development	Community-based Organisation
Grenada National Organisation of Women	Grenada	Social Development	Umbrella Organisation of NGOs and CSOs
Willie Redhead Foundation	Grenada	Social Development	Non-Governmental Organization
Inter Agency Group of Development Organisations	Grenada	Social Development	Umbrella Organisation of NGOs and CSOs
Youth With A Mission Grenada	Grenada	Social Development	Community-based Organisation

GrenCHAP Inc.	Grenada	Social Development	Community-based Organisation
Elvira's Garden Community Centre	Grenada	Social Development	Community-based Organisation
St. George's University	Grenada	Social Development	Academic and Research Institute
Grenada Chamber of Industry and Commerce	Grenada	Social Development	Professional bodies
Birchgrove Credit Union	Grenada	Social Development	A Co-operative
North West Development Authority	Grenada	Social Development	Private

LAs

Grenada has a Ministry of Carriacou & Petite Martinique Affairs and Local Government⁶⁰⁵

5.2.4 Jamaica

Table 54 showcases the NGOs, CSOs, LAs present in Jamaica.

Table 54 CSOs ,NGOs, LAs in Jamaica

NGO and CSO	Country	Theme	Category
International Seabed Authority	Jamaica	Water and Marine	International intergovernmental organization
Jamaica Environmental Trust	Jamaica	Water and Marine	National Conservation Trust Fund
National Environmental Societies Trust	Jamaica	Water and Marine	National Conservation Trust Fund
Negril Coral Reef Preservation Society	Jamaica	Water and Marine	Non-Governmental Organization
Negril Environmental Protection Trust	Jamaica	Water and Marine	National Conservation Trust Fund
Caribbean Coastal Area Management Foundation	Jamaica	Water and Marine	Non-Governmental Organization
Jamaica Fishermen's Cooperative Union	Jamaica	Water and Marine	A Co-operative
Port Royal Fisher Folks Friendly Society	Jamaica	Water and Marine	Community-based Organisation
Water Resources Authority	Jamaica	Water and Marine	Professional bodies
National Fisheries Authority	Jamaica	Water and Marine	Professional bodies
Breds Treasure Beach Foundation	Jamaica	Water and Marine	Community-based Organisation

Office of Disaster Preparedness and Emergency Management	Jamaica	Disaster Management	Professional bodies
Jamaica Environment Trust	Jamaica	Ecosystems	National Conservation Trust Fund
National Conservation Trust Fund	Jamaica	Ecosystems	National Conservation Trust Fund
Environmental Foundation of Jamaica	Jamaica	Ecosystems	Non-Governmental Organization
Negril area Environmental Protection Trust	Jamaica	Ecosystems	National Conservation Trust Fund
The Nature Conservancy	Jamaica	Ecosystems	Non-Governmental Organization
Jamaica National Heritage Trust	Jamaica	Ecosystems	National Conservation Trust Fund
Mafoota Agricultural Cooperative Society	Jamaica	Ecosystems	Community-based Organisation
National Environment and Planning Agency	Jamaica	Ecosystems	Professional bodies
Rural Agricultural Development Authority	Jamaica	Ecosystems	Professional bodies
Jamaica Greenhouse Growers' Association	Jamaica	Ecosystems	Resource User Groups
Reddington Farmers	Jamaica	Ecosystems	Community-based Organisation
Local Initiative Facility for the Environment (LIFE)	Jamaica	Sustainable Development	Civil Society Organisation
Making An Impact All-together	Jamaica	Sustainable Development	Community-based Organisation
The Sustainable Livelihood Network Ltd	Jamaica	Sustainable Development	Non-Governmental Organization
GoldenEye Foundation	Jamaica	Sustainable Development	Community-based Organisation
Windsor Research Center	Jamaica	Sustainable Development	Academic and Research Institute
Bodles Agricultural Research Station	Jamaica	Sustainable Development	Academic and Research Institute
I-SEED Youths	Jamaica	Sustainable Development	Community-based Organisation
Women's Media Watch (WMW) Jamaica	Jamaica	Social Development	Non-Governmental Organization
Empowered to Soar Foundation	Jamaica	Social Development	Community-based Organisation
WE- CHANGE	Jamaica	Social Development	Community-based Organisation
Women's Resources & Outreach Centre	Jamaica	Social Development	Non-Governmental Organization
Woman Incorporated	Jamaica	Social Development	Non-Governmental Organization
Her Flow Foundation	Jamaica	Social Development	Community-based Organisation
Yamaye Guani Taino Peoples	Jamaica	Social Development	Community-based Organisation
Combined Disabilities Association	Jamaica	Social Development	Non-Governmental Organization
Jamaica Association for the Deaf	Jamaica	Social Development	Non-Governmental Organization

St. Catherine Community Development Agency	Jamaica	Social Development	Non-Governmental Organization
Caribbean Vulnerable Communities Coalition	Jamaica	Social Development	Non-Governmental Organization
Jamaica Social Investment Fund	Jamaica	Social Development	National Conservation Trust Fund
Climate Finance Access Network	Jamaica	Social Development	International Initiative
INMED	Jamaica	Social Development	Non-Governmental Organization
Jamaica Youth Advocacy Network (JYAN)	Jamaica	Social Development	Non-Governmental Organization
Youth Awareness And Peace Development	Jamaica	Social Development	Non-Governmental Organization
Jamaica Federation for Lesbian And Gays (J-FLAG)	Jamaica	Social Development	Non-Governmental Organization
Jamaica Red Cross	Jamaica	Social Development	Non-Governmental Organization
Aspirar Jamaica	Jamaica	Social Development	Community-based Organisation
Dream Jamaica	Jamaica	Social Development	Community-based Organisation
Advancing Youths of Jamaica	Jamaica	Social Development	Community-based Organisation
United Way Of Jamaica	Jamaica	Social Development	Community-based Organisation
Food For The Poor Jamaica	Jamaica	Social Development	Community-based Organisation
Mustard Seed Communities Jacob's Ladder	Jamaica	Social Development	Community-based Organisation
One Jamaica Foundation Ltd	Jamaica	Social Development	Community-based Organisation
Youth Arise Jamaica	Jamaica	Social Development	Community-based Organisation
University of Technology (UTech), Jamaica	Jamaica	Social Development / Sustainable Development	Academic and Research Institute
Caribbean Institute for Health Research	Jamaica	Social Development	Academic and Research Institute
Jamaica Scientific Research Institute (JaSciRes) Ltd	Jamaica	Social Development / Sustainable Development	Academic and Research Institute
Discovery Bay Marine Lab, UWI	Jamaica	Social Development / Sustainable Development	Academic and Research Institute
Environmental Research Laboratory (UWI)	Jamaica	Social Development / Sustainable Development	Academic and Research Institute
College of Agriculture, Science and Education	Jamaica	Sustainable Development	Academic and Research Institute
International Centre for Environmental and Nuclear Sciences	Jamaica	Social Development / Sustainable Development	Academic and Research Institute

The Sustainable Livelihood Network Limited	Jamaica	Social Development / Sustainable Development	Community-based Organisation
International University of the Caribbean	Jamaica	Social Development	Academic and Research Institute
Northern Caribbean University	Jamaica	Social Development	Academic and Research Institute
University of the West Indies	Jamaica	Social Development	Academic and Research Institute
Environmental Health Foundation	Jamaica	Social Development	Private
Greater Portmore joint Council	Jamaica	Social Development	Professional bodies
Central Jamaica Social Development Initiative	Jamaica	Social Development	Non-Governmental Organization

LAs

The Ministry of Local Government and Community Development oversees 13 local authorities, and the Hon Desmond McKenzie is its Minister. Local authorities in Jamaica consists of 12 municipal corporations and a second-tier municipal council, Portmore Municipal Council, which can be found in the parish of St Catherine.⁶⁰⁶ Other parish councils include the St James Parish Council and Clarendon Parish Council.⁹

- The Association of Local Government Authorities of Jamaica

5.2.5 St. Lucia

Table 55 shows the main NGOs, CSOs, LAs in St Lucia.

Table 55 CSOs, NGOs and LAs in Saint Lucia

NGO and CSO	Country	Theme	Category
Castries Fishermen's Co-operative Society	Saint Lucia	Water and Marine	Community-based Organisation
Anse La Raye Fishermen's Cooperative Society	Saint Lucia	Water and Marine	Community-based Organisation
Goodwill Fishermen's Cooperative Society	Saint Lucia	Water and Marine	Community-based Organisation
Laborie Fishers and Consumers Cooperative	Saint Lucia	Water and Marine	Community-based Organisation
St. Lucia Fisherfolk Cooperative Society	Saint Lucia	Water and Marine	Community-based Organisation
Soufriere Marine Management Association Inc	Saint Lucia	Water and Marine	Resource User Groups

⁹ JSIF. (2025). [Parish Councils](#)

St. Lucia National Trust	Saint Lucia	Water and Marine	National Conservation Trust Fund
Praslin Sea Moss Farmers Association	Saint Lucia	Water and Marine	Resource User Groups
Saint Lucia Divers Association	Saint Lucia	Water and Marine	Resource User Groups
Waterways (formerly Caribbean SEA- Student Environmental)	Saint Lucia	Water and Marine	Community-based Organisation
Water and Sewerage Company Inc.	Saint Lucia	Water and Marine	Professional bodies
National Utilities Regulatory Commission	Saint Lucia	Water and Marine	Professional bodies
Division of Maritime Affairs	Saint Lucia	Water and Marine	Professional bodies
Anse La Raye Disaster Preparedness Committee	Saint Lucia	Disaster Management	Community-based Organisation
Gros Islet Disaster Preparedness committee	Saint Lucia	Disaster Management	Community-based Organisation
Saint Lucia Crisis Centre	Saint Lucia	Disaster Management	Non-Governmental Organization
Youth Emergency Action Committee (YEAC)	Saint Lucia	Disaster Management	Community-based Organisation
Saint Lucia National Conservation Fund (SLUNCF)	Saint Lucia	Ecosystems	National Conservation Trust Fund
National Conservation Fund	Saint Lucia	Ecosystems	National Conservation Trust Fund
Saint Lucia National Trust	Saint Lucia	Ecosystems	National Conservation Trust Fund
Caribbean Biodiversity Fund Saint Lucia	Saint Lucia	Ecosystems	National Conservation Trust Fund
Helen's Daughters	Saint Lucia	Ecosystems	Non-Governmental Organization
Iyanola Apiculture Collective	Saint Lucia	Ecosystems	Non-Governmental Organization
Aupicon Charcoal and Agricultural Producer	Saint Lucia	Ecosystems	Community-based Organisation
InterAmerican Institute for Co-operation in Agriculture	Saint Lucia	Ecosystems	Non-Governmental Organization
Beausoliel Sustainable Agricultural Business Group	Saint Lucia	Ecosystems	Non-Governmental Organization
Belle Vue Farmers' Cooperative	Saint Lucia	Ecosystems	Community-based Organisation
Farmers with Disabilities Beekeeping Association	Saint Lucia	Ecosystems	Resource User Groups
Mille Fleur Honey Producers Cooperative Limited	Saint Lucia	Ecosystems	Community-based Organisation
Saint Lucia Network of Rural Women Producers	Saint Lucia	Ecosystems	Community-based Organisation

Canabelle Cooperative Society Ltd	Saint Lucia	Ecosystems	Community-based Organisation
Dennerly/ Mabouya Valley Development Foundation (DMVDF) Incorporated	Saint Lucia	Sustainable Development	Non-Governmental Organization
International Institute for Sustainable Development	Saint Lucia	Sustainable Development	Academic and Research Institute
Sir Arthur Lewis Community College (Vaughan A. Lewis Institute for Research and Innovation (VALIRI)	Saint Lucia	Sustainable Development	Academic and Research Institute
The National Council Of And For Persons With Disabilities	Saint Lucia	Social Development	Umbrella Organisation of NGOs and CSOs
St. Lucia Blind Welfare Association	Saint Lucia	Social Development	Non-Governmental Organization
Girls Of A Feather St. Lucia Inc.	Saint Lucia	Social Development	Community-based Organisation
Caribbean Association for Feminist Research and Action	Saint Lucia	Social Development	Non-Governmental Organization
Upton Gardens Girls Centre	Saint Lucia	Social Development	Community-based Organisation
CIWiL Saint Lucia	Saint Lucia	Social Development	Community-based Organisation
National Youth Council	Saint Lucia	Social Development	Non-Governmental Organization
Babonneau Youth Synergy	Saint Lucia	Social Development	Community-based Organisation
Saint Lucia Agricultural Forum for Youth	Saint Lucia	Social Development	Non-Governmental Organization
Caribbean Youth Environment Network	Saint Lucia	Social Development	Non-Governmental Organization
Centre For Adolescent Renewal (CARE) Empowerment	Saint Lucia	Social Development	Community-based Organisation
Youth Empowerment Leading to Positivity	Saint Lucia	Social Development	Community-based Organisation
CYEN St Lucia	Saint Lucia	Social Development	Non-Governmental Organization
Allbiz Ltd	Saint Lucia	Social Development	Private
Choiseul Association of Craft and Heritage Tourism (CATCH)	Saint Lucia	Social Development	Community-based Organisation
Fond St. Jacques Development Committee	Saint Lucia	Social Development	Community-based Organisation
Holistic Empowerment & Development Center	Saint Lucia	Social Development	Community-based Organisation
Laborie Development Foundation	Saint Lucia	Social Development	Community-based Organisation
Sir Arthur Lewis Community College	Saint Lucia	Social Development	Academic and Research Institute
Saint Lucia Civil Service Workers Multi Purpose Cooperative Society	Saint Lucia	Social Development	Community-based Organisation
Soufriere Regional Development Foundation	Saint Lucia	Social Development	Non-Governmental Organization
Vieux Fort Community Enhancement Foundation	Saint Lucia	Social Development	Community-based Organisation

Southern Tourist Development Corporation	Saint Lucia	Social Development	Non-Governmental Organization
St. Lucia Social Development Fund	Saint Lucia	Social Development	National Conservation Trust Fund
Choiseul Cooperative Credit Union	Saint Lucia	Social Development	A Co-operative
Dennerly Community Co-operative Credit Union	Saint Lucia	Social Development	A Co-operative
ELKS City of Castries Co-operative Credit Union	Saint Lucia	Social Development	A Co-operative
Laborie Credit Union	Saint Lucia	Social Development	A Co-operative
Saint Lucia Civil Service Cooperative Credit Union / Jannou Credit Union	Saint Lucia	Social Development	A Co-operative
Saint Lucia Cooperative League	Saint Lucia	Social Development	A Co-operative
West Coast Co-operative Credit Union	Saint Lucia	Social Development	A Co-operative
St. Lucia Manufacturers Association	Saint Lucia	Social Development	Private
St. Lucia Industrial and Small Business Association (SLISBA)	Saint Lucia	Social Development	Umbrella Organisation service organisations
St. Lucia Coalition of Services	Saint Lucia	Social Development	Umbrella Organisation service organisations
Child Development & Guidance Centre	Saint Lucia	Social Development	Community-based Organisation
Thrive and Strive Foundation	Saint Lucia	Social Development	Community-based Organisation
Folk Research Centre	Saint Lucia	Social Development	Community-based Organisation
University of the West Indies	Saint Lucia	Social Development	Academic and Research Institute
Monroe College Saint Lucia Campus	Saint Lucia	Social Development	Academic and Research Institute
Kennedy University	Saint Lucia	Social Development	Academic and Research Institute
Spartan Health Sciences University	Saint Lucia	Social Development	Academic and Research Institute
Fondes St Jacques Development Committee	Saint Lucia	Social Development	Community-based Organisation

LAs

There are 10 administrative quarters within Saint Lucia, which consist of 15 constituency councils.⁶⁰⁷

Some village councils include:⁶⁰⁸

- Canaries Town Council

- Castries Town Council
- Choiseul Town Council
- Laborie Town Council
- Gros Islet Town Council
- Dennery Town Council
- Micoud Town Council
- Vieux For Town Council
- Soufriere Town Council

5.3 CANARI

The Caribbean Natural Resources Institute (CANARI) is a non-profit technical institute, created in 1989 and evolved from the University of Michigan's School of Natural Resources and the 1976 initiative of the Rockefeller Brothers Fund, with an impressive history exceeding thirty years, dedicated to research, policy advocacy, and capacity building initiatives aimed at fostering participatory natural resource governance within the Caribbean region. CANARI's main office is currently in Trinidad and Tobago, whilst also being registered as a non-profit organisation in United States Virgin Islands and Saint Lucia.⁶⁰⁹ CANARI's mission is to advance stakeholder engagement and collaboration in managing renewable resources across the Caribbean. Its programs and strategies are guided by this mission, working at local, national, and regional levels, as well as internationally, to advocate for sustainable development. Concerning its governance structure, CANARI has elected Board members each of whom are designated as 'Elected Partners', as well as an Executive Director designated as a 'Managing Partner'. Senior technical staff can also be appointed as 'Staff Partners'. All Partners are legally designated as Directors and bear collective responsibility for the Institute's governance and the prudent utilisation of its financial resources.

CANARI has two central thematic programme themes that focus that form the nucleus of CANARI's work: the first is Coastal and Marine Livelihoods and Governance; and the second being Forests, Livelihoods and Governance. Concerning the former, the programme focus has always been to enhance livelihoods and alleviate poverty by fostering sustainable coastal and marine resource management, strengthening governance systems, and encouraging collaboration among stakeholders.⁶¹⁰ There is currently 8 projects ongoing and 13 past projects. With regards to the latter, similarly, the programme's goal has been to improve livelihoods and reduce poverty by promoting and facilitating sustainable forest use and governance.⁶¹¹ CANARI has at present 6 ongoing projects, and 19 past assignments.

Furthermore, CANARI also have 4 Issue Programmes: The first one surrounds Civil Society and Governance had been built upon three decades of successful work with fisherfolk, community-based organizations, and national/regional NGOs, via mentoring, capacity building and training.⁶¹² There are currently 5 ongoing projects, and 9 past projects. The second programme focuses on Climate Change and Disaster Risk Reduction which aims to build stakeholder capacity to protect themselves against climate hazards.⁶¹³ Currently, there are 8 ongoing projects and 18 past work. The third programme is about Green Economy which focuses on the enhancement of small and micro-enterprises towards a more sustainable economy.⁶¹⁴ There are 7 ongoing projects and 9 past projects. The last programme's theme surrounds Rural Livelihoods which empowers rural communities to build sustainable livelihoods through natural resource management. There are 3 ongoing projects and 13 past projects.⁶¹⁵

In 2021, CANARI released its *Strategic Plan 2021-2030* which aimed to address finding the right opportunities concerning the sustainable issues the Caribbean faces; Caribbean solutions to Caribbean problems which outline their ten-year strategy which includes:⁶¹⁶

- Engagement of stakeholders across sectors.
- Long-term collaborative partnerships.
- The root causes of vulnerabilities.
- Integration of community enterprises into the natural resource management discourse.
- Support for participatory management for environmental governance.

And lastly, the Plan highlights specific focus points on how CANARI be equipped for the task to achieve their strategy by 2030.

1. Enhancing partnerships and decentralising operations.

2. Increasing international presence and engagement.
3. Strengthening internal participatory governance.
4. Achieving sustainable finance.
5. Innovating in communication and engagement.

CANARI's strategic response

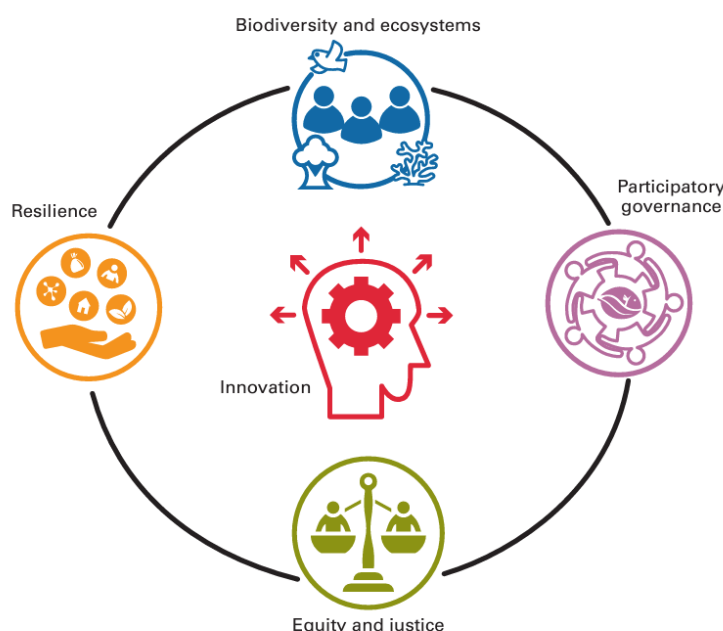


Figure 105 Key elements of CANARI's strategic response

5.4CSO and NGO Capacity Assessments

This section explores both CANARI's project experience regarding CSO stakeholder engagement, as well as other relevant CSO and NGO capacity related assessments. This is to provide useful insights into the capacity needs of those within the key CARICOM nations. It is worth mentioning that in a Scoping Report, produced by CANARI and the GCF in 2021, it examined existing mechanisms for stakeholder participation in climate decision-making as well as the current CSO status of accessing climate finance, and reiterates that CSOs often bridge the gap between communities and governments, acting as not-for-profit advocates and amplifying local voices.⁶¹⁷ That is why this section highlights not only CANARI's insight but how valuable it is for CSOs to be able to be at the forefront of the climate change discussion.

Firstly, in 2020-2022, CANARI acted as the GCF Readiness Delivery Partner regarding the GCF-funded project, "Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance" (2020-2022). The aim of this was to enhance CSO capacity to access climate funding and delivery of mitigation and adaptation projects in Antigua and Barbuda, **Belize**, **Grenada**, **Jamaica**, Saint Kitts and Nevis, **Saint Lucia** and Suriname.⁶¹⁸ A capacity needs survey was more broad, carried out in 14 CARICOM countries, which out of 123 participants, Jamaica was the most represented (19%), followed by Grenada (16%), Suriname (12%), St Kitts and Nevis (11%), Belize (8%), Dominican Republic (7%), Antigua & Barbuda (6%), Saint Lucia (4%), Trinidad and Tobago (4%), Haiti (3%), SVG (2%), Dominica (2%), Guyana (2%) and the Bahamas (1%). 65% of respondents were women and 50% of respondents had a Masters-level Degree. CANARI collaborated with the countries' NDAs and has a network of National Coordinators and CS liaisons across the seven Caribbean nations that support stakeholder engagement. Based on the CANARI 2022 survey of CSO capacity needs the assessment featured an extensive outline of where CSOs in the seven Caribbean

nations	needs	further	support:	619
	• Stakeholder Approaches and Partnerships: 60% of respondents concluded that stakeholder analysis was of a high/medium priority; 74% considered stakeholder engagement to be a high/medium priority; and 74% viewed partnerships to be a high/medium priority. • Climate Finance Landscape Awareness: 88% were aware of the GEF with 52% having accessed its funds; 84% had knowledge of USAID with only 24% having access to its funds; and 81% were aware of the GCF with only 3% with access to its funding. The lowest level of awareness and access that surrounded major funders was the AF (33% understanding, 4% access) and FCDO UK (28% knowledge, 4% access). • Challenges faced in accessing finance: 78% of participants have a lack of knowledge on different climate funds and processes; 65% respondents noted human resources availability; lack of technical skills represented 58%; and 29% noted lack of project management-related skills. • Climate Change: 58% of the respondents recognised climate change adaptation planning as high; 51% saw climate change mitigation as a high priority; and 59% respondents rated nature-based solutions as their top priority. • Management interventions: 77% respondents listed conservation planning and management as a high or medium priority; 70% participants stated that tools for protected area management are of high or medium priority; 79% of respondents prioritized the implementation of the sustainable livelihoods project as high or medium. • Outreach and public awareness: 46% of participants prioritized outreach and public awareness; 29% stated that it is medium priority; Policy analysis is a high priority for 37% of respondents; 35% rate it as medium priority; 60% of participants prioritized equipment as high, while 16% considered it medium priority. • Gender-based training: 43% of respondents had attended gender-based training events, a larger proportion (57%) had not. Furthermore, with regards to CSOs' experience in collecting and analyzing sex-disaggregated data, this is varied, with 35% having low experience, 31% medium, 22% none, and only 12% high. • Indigenous Peoples: while 39% of participants indicated their organisations had processes to fully inform Indigenous peoples, 61% did not.			

More specifically, regarding the capacity challenges faced by CSOs in Belize, respondents from the Community Baboon Sanctuary Women's Conservation Group noted that innovative technologies and financing solutions are essential for successful project implementation, and strengthening capacity for cost-benefit analysis of natural resource management and development choices should also be a consideration.⁶²⁰ CSOs in Jamaica have voiced their capacity concerns in the survey carried out by CANARI in 2022. The Local Initiative Facility for the Environment (LIFE) required support in developing organisational sustainability plans. Overall, from CANARI's assessment, CSOs in the fourteen CARICOM nations need 1) further knowledge on climate funds and qualification criteria; 2) Further guidance on technical skills such as feasibility study writing and M&E; 3) broader training in concerning organisational development such as budget and planning development; 4) Capacity building on implementing and creating climate projects; 5) Access knowledge networks; and 6) Expertise development on topics such as adaptation and gender.

In 2018, CANARI carried out a similar assessment, this time for a project titled, 'Powering Innovations in Civil Society and Enterprises for Sustainability in the Caribbean (PISCES)' in collaboration with the Environmental Awareness Group (EAG), Caribbean Coastal Area Management Foundation (C-CAM) (2017-2022), the Saint Lucia National Trust (SLNT) and Sustainable Grenadines Inc (SusGren), Caribbean Network of Fisherfolk Organisations (CNFO), and the Fondation pour la Protection de la Biodiversité Marine (FoProBiM).⁶²¹ The nations involved in this assessment included Dominica, Grenada, Haiti, Jamaica, Saint

Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago. The CSOs in question were organisations focused on marine conservation and governance. From this assessment and training carried out by CANARI to the relevant CSOs and mentors who were a part of this project, the results showed that there needs to be strengthened Board and management capacity; stronger leadership; improvement of policy documents; improvement of administrative systems; hiring key staff; enhanced capacity for fundraising; and better stakeholder engagement and partnership building. The overall lessons learned concerning the strengthening of CSO organisation was: 1) Building organisational capacity is a complex, ongoing process; 2) A multifaceted approach enhances capacity building; 3) Small grants can accelerate capacity building; 4) ICT competencies and CSO resources must be strengthened; 5) Securing the commitment and support of a CSO's Board and management is essential for effective and lasting capacity building; and 6) Conflict resolution is essential for sustainable capacity building.

More recently, as the Regional Implementation Team, CANARI is involved in the 'Critical Ecosystem Partnership Fund (CEPF) Caribbean Hotspot Project Phase II' (2021-2026) in Antigua and Barbuda, the Bahamas, Dominica Republic, Haiti, Jamaica, Saint Lucia and Saint Vincent and the Grenadines, following a successful Phase 1 in 2010-2016.⁶²² The project's goal is to empower civil society as co-managers and stewards of globally important biodiversity through capacity building, training and grant making. More categorically, Phase 2 targets CSOs that operate in and around the 32 Key Biodiversity Areas as well as seven conservation corridors. This project is financed through the Critical Ecosystem Partnership Fund Caribbean Hotspot Project (World Bank), with the Government of Japan providing funding. In terms of carrying out the multi-sectoral and actor partnerships, the Collaborative Social Accountability Team (CSAT) (hosted in the Dominican Republic) and the Integrated Health Outreach (IOH) (based in Antigua & Barbuda) is leading this in Antigua & Barbuda, Dominican Republic, Jamaica, and Saint Lucia.⁶²³ From there, the experience and training provided by the CSAT and IOH, CANARI will then lead the remaining nations of the Bahamas, Haiti, and SVG.

5.5 GEF Small Grants Programme & other Trust Funds

This is important to review the existing on-granting landscape to CSOs, NGOs and LAs in each of the countries to establish a niche for CABRIC that supports existing flows of finance. In a review of the existing GEF SGP across the CABRIC nations. It is clear Biodiversity has received the highest flow of finance and developed the highest number of projects, Table 56. Climate change has the second next amount; however, it is over half the level of finance as conservation / biodiversity projects. Climate change adaptation has only 10 projects across the countries.

Table 56 Summary of SPG project focus and financing

Topic	Total Amount of Projects	Total Amount of GEF and non-GEF project financing (USD)*
Climate Change	171 (20%)	6,538,608
Land Degradation	151 (18%)	5,884,748
Biodiversity	380 (45%)	14,711,869
Capacity Development	58 (7%)	2,288,513
Climate Change Adaptation	10 (1%)	326,930

International Waters	35 (4%)	1,307,722
Chemicals and Waste	30 (4%)	1,307,722
Multifocal Area	10 (1%)	326,930
	Total 845	Total 32,693,042

*dividing the project percentage by the total financing amount

5.5.1 Bahamas

a) GEF SGP

The SGP began assisting the Bahamas in 2011 and as of 2024, has supported a total of 81 GEF projects, committing USD 2,586,052 to its project support.⁶²⁴ The total amount of co-financing has also amounted to USD 3,240,813. The main project focus areas are Climate Change (56%); Biodiversity (22%); Capacity Development (13%); Land Degradation (6%); and International Waters (1%). According to the Bahamas' Small Grants Programme Results (FY 2017-2023), for seven years the SGP has organised training within project grants regarding specific technical issues and has promoted peer-to-peer learning.⁶²⁵ Moreover, in the same time period, SGP has used the NSC gender checklist to approve projects. In relation to the years spent deploying strategies to enhance community livelihoods in the Bahamas, between 2017-2023, five years were spent increasing access to technology and income diversification. The areas where greater deployment of strategies is needed (strategies only deployed for one year) surrounds strengthening grantee networks, supporting women-focused networks, introducing targets on the proportion of projects to focus on gender, mainstreaming gender in community projects, and increasing access to infrastructure. The UNDP has an in-country office in the Bahamas's capital city of Nassau.

Some of the SGP Projects in the Bahamas include:⁶²⁶

- Empowering Young People through the Bahamas Youth SDG Platform (ongoing, grant amount USD 27,000).
- Bahamas Country Programme Strategy Development (completed, USD 24,700).
- GEF SGP Bahamas Knowledge Management Fair (completed, USD 50,000).
- Creating an Energy Efficient Sustainable School Community at Bahamas Academy (completed, USD 31,000).
- The Green Initiative at the University of The Bahamas (completed, USD 15,000).

b) Bahamas Trust Funds

The NCTF in the Bahamas is the Bahamas Protected Area Fund (BPAF) which was set up in 2014 by the Act of Parliament seeking to ensure the long-term financial sustainability of the Bahamas' protected areas.⁶²⁷ The Board of BPAF was constituted in 2015 and it comprises a maximum of 11 members, 5 of whom are appointed by the Government, one each by the Bahamas National Trust and TNC, and 4 by the Board itself. Its board members are appointed to serve a four-year term. The management of protected areas, as stipulated by the Act, entails activities such as research, education, and conservation. BPAF's partners include TNC, the Ministry of Environment and Housing, Caribbean Challenge Initiative, and the Caribbean Biodiversity Fund and in 2022, the BPAF received BZD 243,288 in donations, and disbursed BZD 840,378. The Bahamas National Protected Areas System comprises areas under the jurisdiction of the Bahamas National Trust (BNT), designated forest reserves, protected and conservation forests, PAs established under the Fisheries Resources Act, Clifton Heritage Park, and Wild Bird PAs. BPAF project experience includes the Mission for Mangroves initiative which immerses visitors in a transformative eco-tour, helping to heal Grand Bahama's marine ecosystems and strengthen its

coastal communities. In 2021, following the aftermath of Hurricane Dorian, the BPAF set up the first call for proposals regarding the CBF Hurricane Dorian Recovery Grant which implemented three small grant projects:⁶²⁸

1. In collaboration with the Bahamas National Trust (BNT), 'Rebounding from Hurricane Dorian, the Abaco National Parks Road to Recovery' (15 months duration, \$99,997.80);
2. In partnership with Bahamas Undersea Research Foundation, 'Post-Dorian Damage Assessments and Strategic Restoration of Mangrove shorelines of the Little Bahama Bank' (12 months, \$100,000);
3. Working alongside the University of The Bahamas, the project was titled, 'Establishment of a Seedling Nursery and Replanting for Forest Recovery and Restoration on Grand Bahama' (15 months, \$99,987.28)

The seven projects listed under the second call for proposals were:

1. In collaboration with Friends of the Environment (FRIENDS), 'Improving sustainability and building resilience at Forest Heights Academy (FHA) - Marsh Harbour, Abaco through the installation of a solar photovoltaic system with batteries' (12 months, \$95,534);
2. Jointly with Bahamas Marine Mammal Research Organisation (BMMRO), 'Saving Abaco's Dolphins after Hurricane Dorian' (12 months, \$24,348);
3. In association with Forestry Unit - Ministry of Environment (FU), 'Strengthening of Forests Through Groundwater Restoration (SOFTGR)' (12 months, \$98,900);
4. Working alongside the University of The Bahamas (UB), 'Solarizing the UB-North (Grand Bahamas), Marine and Environments Science Field Station, formerly the UB-North Main (Easter) Campus' (6 months, \$100,000);
5. In partnership with Disaster Reconstruction Authority (DRA), 'Hurricane Dorian Small and Medium Marine Debris Removal on Man-O-War Abaco' (12 months, \$100,000);
6. Developed with Bahamas National Trust (BNT), 'Restoring and Building Climate Resilience at Rand Nature Centre (RNC)' (13 months, \$99,992);
7. Teaming up with Waterkeepers Bahamas (WKB), 'Mangroves Harvesting and Replanting Project Dover's Sound, Grand Bahama' (14 months, \$100,000).

5.5.2 Belize

a) GEF SGP / UNDP

The SGP has provided support to Belize since 1993 and as of 2024, has supported a total of 260 GEF projects committing USD 7,630,171 to its project pipeline.⁶²⁹ It has also supported 49 non-GEF projects, reaching USD 1,450,474 in grants. The total amount of co-financing is USD 11,568,206. The current project portfolio in Belize includes: Biodiversity (77%); Capacity Development (6%); Land Degradation (6%); Climate Change (6%); International Waters (5%); Climate Change Adaptation (1%); and Chemicals and Waste (0.4%). According to the Small Grants Programme Results Report 2017-2023 in Belize, seven years has been spent connecting grantees with government services, NGOs/INGOs, academia or research centers as well as development agencies. Peer-to-peer learning was also carried out within those seven years.⁶³⁰ With regards to gender mainstreaming, over the 7-year reporting, connecting national-level female-led group projects with regional and global networks as well as offering support concerning the creation of national level women organisations. The SGP used the NSC gender checklist and partnered with gender organisations in Belize. Lastly, to improve livelihoods, over a seven year span, the SGP increased access to infrastructure and diversified income. The specific focus points where deployment of strategies need to be strengthened (strategies only deployed for one year) is improving access to health facilities.

The UNDP has an in-country office in Belize's capital of Belmopan.

Some of the SGP Projects in Belize include:⁶³¹

- Strengthen the Institutional Capacity of the Belize Fishermen Cooperative Association (completed, grant amount USD 5,000).
- Construction of Lorena Stoves for Rural Belize (completed, USD 1,000).
- Sustainable Development of Panulirus Argus in Belize by Determination of Maturity Ogives and Fecundity (completed, USD 14,000).
- Updating of the Baseline Assessment for the Belize Barrier Reef Reserve System World Heritage Site (completed, USD 50,000).
- Green Wave Belize (completed, USD 6,250).

b) Belize Conservation Trust Fund

The main NCTF in Belize was the Belize Fund for a Sustainable Future (Belize Fund) for marine conservation: It was created in 2022, and currently has 5 government members and 5 non-government members. The Belize Fund, a key component of the groundbreaking Blue Loan Agreement signed in November 2021 (between TNC and the Government of Belize), will unlock BZ \$360 million over 20 years to revolutionize marine conservation in Belize.⁶³² The Belize Fund set up the Grants Awards Program (GAP) and the Government Strategic Allocation (GSA) were launched in the same year of its creation. Firstly, the GAP is guided by four (4) broad thematic Areas: protection for biodiversity; sustainable fisheries; climate resilience; and blue business innovation. The Belize Fund has invested BZD \$18 million in marine conservation, awarding BZD \$3.08 million in 2022-2023 and BZD \$2.6 million in 2023-2024 to 12 non-government entities through the GAP. The projects under the GAP include:

1. 'Full Circle Belize: Biodiversity Guardians against Plastic Pollution' with Humana People to People Belize, in Riversdale and Seine Bight (27 Months, BZD \$515,860.00);
2. 'Improving enforcement and science through innovation in Gladden Spit & Silk Cayes Marine Reserve and Laughing Bird Caye National Park' with Southern Environmental Association in Gladden Spit & Silk Cayes Marine Reserve and Laughing Bird Caye National Park (24 Months, \$750,000.00);
3. 'Enhancing Sustainable Fisheries Management for Sharks and Finfish through Collaborative Community-Based Data Collection' with Wildlife Conservation Society Belize in Belize Barrier Reef System (26 Months, \$800,000);
4. 'Protection and Conservation of Commercial Species and Fish Spawning Aggregation Sites in Sapodilla Cayes Marine Reserve' with Toledo Institute for Development and Environment in Sapodilla Cayes Marine Reserve (36 Months, \$696,598.34). Since 2022 they have raised a total of \$6,251,182.64 BZD.

Secondly, each fiscal year, a minimum of BZD \$3.2 million (representing 40% of the allocated budget) is invested in government programs dedicated to environmental conservation. This financial commitment, known as the GSA is structured around eight key milestones. These milestones include: 1) Expand Biodiversity Protection Zones to 11.57% of the Ocean; 2) Designate Public Lands within the BBRRS as Mangrove Reserves; 3) Belize initiates Marine Spatial Plan process; 4) Expand Biodiversity Protection Zones to 25% of the Ocean; 5) Implementation of ICZMP; 6) Complete Biodiversity Protection Zones, MSP signed in to law and implemented; 7) At least 3 IUCN Green List Applications Submitted; 8) Approved Management Plans for Biodiversity Protection Zones. The GSA funded projects include: the Blue Bond & Finance Permanence Unit which has BZD \$11,692,815 of financing and \$4,673,875 of co-financing. The Blue Bond has numerous achievements under its belt which comprises of \$18 million of funds approved; 14 projects approved; 14 MPA's supported; 40 coastal communities reached; and 66 persons trained.

Another NTF in Belize is PACT Belize, created in 1956, which has invested over US \$32.34 million in 103 protected areas, 21 forests and nature reserves, 15 bird and wildlife sanctuaries, and 18 national

parks.⁶³³ It has 7 Board of Director members which comprises of those from the public, private and NGO sectors. This fund carries out three types of investments:

1. **Targeted investments:** These investments are the primary means of fulfilling PACT's Primary Funding Priority, as outlined in the PACT Act. Additionally, funding supports capacity-building initiatives for staff. A targeted investment includes 'Increasing the Management Effectiveness of the Corozal Bay Wildlife Sanctuary' with Sarteneja Alliance for Conservation and Development, implemented in January 2022. Its time frame was 3 years with a total financial commitment of \$8,000. The 20/21 budget was \$339,457.00 and to date the total disbursed funds are \$638,674.
2. **Secondary investments:** These investments contribute to the overall management, operations, and program initiatives of protected areas beyond those prioritized in the Conservation Investment Strategy. A secondary investment has been the project 'Tapir Mountain Management and Sustainability Plan' in collaboration with Belize Karst Habitat Foundation. Its project time frame was 7 months with a total financial commitment of \$52,500.
3. **Extraordinary investments:** This type of investments provides financial support for the conservation of natural and cultural assets outside of protected areas. A project of this sort was 'Improving Community Access to Safe and Potable Water from the Chiquibul National Park through Enhanced Green Technology Infrastructure' in partnership with the Ministry of Labour, Local Government and Rural Development (MLLGRD) The project lasted 6 months and its total financial commitment was \$400,000.

5.5.3 Grenada

a) GEF SGP / UNDP

Since 2013, the SGP has operated in Grenada, carrying out at present 60 GEF projects which totals USD 2,961,273 and 5 Non-GEF projects equaling USD 140,989. The total amount of co-financing is USD 1,878,987.⁶³⁴ Regarding the main project priorities, the SGP focuses on Climate Change (50%); Capacity Development (15%); Land Degradation (15%); Biodiversity (12%); Climate Change Adaptation (5%); and International Waters (3%). Grenada's Small Grants Programme Results Report 2017-2023 highlighted that the maximum timeframe to connect guarantees with academia/ research centres as well as strengthening grantee networks was five years.⁶³⁵ Additionally, 4 years was also the maximum time period to use the NSC gender checklist concerning gender mainstreaming and only three years were given to 1) increasing food security and nutritional value; 2) increase access to infrastructure; and 3) diversify income. In comparison to Belize and the Bahamas, the timeframe of 2017-2023 was not fully utilised. The areas where strategy deployment needs to be furthered (strategies only deployed for one year) concerns increasing the access to finance, as well as numerous gender components such as partnering with women's organisations and producing guidance materials on gender in community-based projects.

UNDP has an in-country office in Grenada's capital of Saint George's.

Various SGP projects in Grenada include:⁶³⁶

- Assessment and Community Based Restoration of Mangroves along the Eastern Coast of Grenada (completed, grant amount USD 3,484).
- Implementing Renewable Energy and Preventing Land Degradation: A Proposal for an Intervention in the Nutmeg Industry in Grenada (completed, USD 50,000).
- The Introduction of Young Women to Organic Farming Methods in Urban and Rural Grenada (completed, USD 2,181).
- Grenada Apiculture & Biodiversity Capacity Building Project (completed, USD 50,000).
- Land Degradation and Beach Erosion along the North East Coast of Grenada (completed, USD 8,000).

b) Grenada Trust Funds

The NCTF of Grenada is the Grenada Sustainable Development Trust Fund (GSDTF), a fund established in 2016 by the Government of Grenada, the private sector, and community groups, has been dedicated to secure the long-term health of Grenada, Carriacou, and Petit Martinique's ecosystems.⁶³⁷ By providing reliable, long-term funding, the organization supports conservation and sustainable development efforts, fulfilling the goals of the Caribbean Challenge Initiative (CCI) and other international commitments. There are only 5 ongoing projects that surround MPAs, farmer livelihoods, fisheries, capacity building and nature reserves and one completed project on fish handling.

Another NCTF is the Grenada Fund for Conservation which was set up in 2007: Its most recent projects are At the Water's Edge (2013-2024) with a budget of US\$138,000.00; and Building Coastal Resilience in Grenada (La Mer) (2019) in collaboration with TNC. Its core partnerships include TNC, Ocean Spirits, and Grenada Red Cross Society.⁶³⁸ The Fund is governed by a nine-member Board of Advisors: four members are elected Directors, vested with the legal authority to execute banking transactions and other business on behalf of the Fund.

5.5.4 Jamaica

a) GEF SGP / UNDP

SGP has had a presence in Jamaica since 2005, assisting with 119 GCF projects, reaching a total USD 5,723,686. In relation to non-GEF projects, SGP has supported 43 issuing non-GEF grants of USD 972,096 (2024).⁶³⁹ The full amount of co-financing equals USD 9,459,718. Jamaica's country portfolio is as follows: Biodiversity (37%); Land Degradation (34%); Climate Change (21%); Capacity Development (3%); Chemicals and Waste (2%); International Waters (2%); Multifocal Area (1%); Climate Change Adaptation (1%). Regarding the Small Grants Programme Results Report 2017-2023 in Jamaica, in terms of capacity development strategies, the country spent the maximum of seven years connecting grantees with development agencies, academic and research centres, NGOs and government services.⁶⁴⁰ Additionally, in the same time frame, training was organised for SGP grantees on subjects to improve project implementation as well as understanding specific technical issues. Peer-to-peer learning was a top priority and grantee networks were strengthened. Better strategy deployment needs to be furthered (strategies only deployed for one year) regarding implementing a gender action plan in Jamaica as well as conducting a gender analysis.

The UNDP has an in-country office in Jamaica's capital of Kingston.

The SGP has carried out past projects in Jamaica, these include:⁶⁴¹

- Enhancing the Conservation Mechanisms of the Marine Ecosystems in Jamaica through Fisher-Controlled Sanctuaries (completed, grant amount USD 149,450).
- Building Resilience and Adaptation to Climate Change and Disaster Risk Reduction of Persons with Disability and other Vulnerable Groups in Jamaica (completed, USD 47,000).
- Conserving the Blue and John Crow Mountains National Park & World Heritage Site through Habitat Conservation, Awareness Building and Ecotourism Activities (ongoing, USD 150,000).
- Biodiesel Production Initiative: A Waste to Fuel Project for Energy diversification, transportation, education and climate change mitigation (completed, USD 50,000).
- Strengthening CSOs Capacity and Development of Knowledge Products amid the Pandemic (completed, USD 24,750).

b) Jamaica Trust Funds

The NCTF in Jamaica is the National Conservation Trust Fund of Jamaica (NCTFJ) created in 2014 which was born out of the Jamaica's government having received GEF funding to bolster its Protected Areas System.⁶⁴² Eleven members, representing the Government of Jamaica, the private sector, and civil society, comprise the Board of Directors. The reason for the creation of the NCTF is to address the US\$2 million annual funding shortfall in the National Protected Areas System, which requires US\$8.4 million annually for basic management. NCTFJ project portfolio surrounds working with White River Fish Sanctuary which highlights coral reef restoration, community training, marine protected area establishment, and public awareness; the Alligator Head Foundation which safeguards marine ecosystems and empowers local communities with sustainable livelihoods; Oracabessa Bay Fish Sanctuary seeks to enhance marine ecosystems and support local livelihoods, exemplifying a sustainable balance between nature and people; The University of the West Indies Discovery Bay Marine Lab advances sustainable marine management by providing essential knowledge for informed decisions and conservation actions; Caribbean Coastal Area Management Foundation aims to protect the environment while fostering economic development; Negril Area Protected Trust preserves local ecosystems and supports community livelihoods; Old Harbour Bay Fishing Bay, a crucial fishing hub in Jamaica; Jamaica Fishermen Cooperative Union contributes significantly to the long-term viability of the fishing industry and the socioeconomic well-being of its stakeholders; and Yardie Environmental Conservationists who promotes sustainable tourism and resource management.

The Environmental Foundation of Jamaica (EFJ) <https://www.gwgconservancy.org/partnerships/efj>, was established in 1993 to be the primary source of funding for environmental protection and child survival initiatives under the framework of sustainable development. To do so, EFJ makes grants, also partners with donors to make grants, manages endowment and endowment funds, and manages grants from other organizations. EFJ works in different locations in Jamaica, especially in major watersheds and public protected areas, covering freshwater, terrestrial and oceanic ecosystems.

5.5.5 Saint Lucia

a) GEF SGP / UNDP

Since 2012, the SGP has been supporting Saint Lucia in 121 GEF projects, reaching a grant amount of USD 3,403,613 as of 2024.⁶⁴³ Concerning the number of non-GEF projects, the SGP has provided assistance to 13 projects, with the total non-GEF amount equaling USD 316,811. The total amount of co-financing is currently USD 6,233,830. Concerning SGP's project areas this involves: Land Degradation (39%); Biodiversity (27%); Climate Change (15%); International Waters (7%); Chemicals and Waste (7%); and Capacity Development (5%). According to Saint Lucia's Small Grants Programme Results Report 2017-2023, seven years were spent connecting grantees with development agencies, government services and NGOs to further enhance their capacity development.⁶⁴⁴ Training within project grants on core technical issues were also carried out over the seven years. With regards to gender mainstreaming, the maximum number of years spent incorporating gender specific activities, outcomes and indicators was four. Saint Lucia did not utilise the NSC checklist like the other Caribbean nations. From this report, they had quite low engagement within the sphere of gender mainstreaming as a whole with the majority of strategies being under three years. Discussing the strategies to improve community development, six years was dedicated to the diversification of income. Apart from gender, the areas where greater deployment of strategies is needed (strategies only deployed for one year) is the increase access to infrastructure. UNDP has an in-country office in Saint Lucia's capital of Castries.

Concerning the projects implemented by the SGP, the list below details:⁶⁴⁵

- Rainwater Harvesting to Address the Impact of Drought in Bouton, Saint Lucia (completed, grant amount USD 4,684).

- Envi-Life: Enhancing the Environment and Livelihoods through Ecosystem- Based Adaptation Approaches in Small-Scale Commercial Production in the Community of Canaries, Saint Lucia (ongoing, USD 49,342).
- Diversifying the Apiculture Sector in Saint Lucia (completed, USD 39,971).
- The Development of Natural Apiculture as the Basis for Sustainable Livelihoods for Farmers with Disabilities in Saint Lucia (completed, USD 49,475).
- Building Capacity of SALCC to Integrate Community Based Action Research into Programmes that Strengthen the Capacity of CSOs while Adopting and Implementing Practices that Minimize their contribution to global warming (completed, USD 50,000).

b) St Lucia Trust Funds

The Saint Lucia National Conservation Trust Fund (SLUNCF), set up in 2016, has been committed to the conservation, restoration, and sustainable management of Saint Lucia's biodiversity and natural resources, and consists of an eleven-member board of directors, a majority of whom are representatives from NGOs.⁶⁴⁶ The SLUNCF features the Marine Health Alliance which utilises a top-down approach with grassroots delivering the project. The Tourism Enhancement Fund (TEF), the philanthropic arm of the SLHTA, empowers local communities, youth groups, and public and private sector initiatives by issuing Calls for Proposals (CFPs) to enhance national marine conservation efforts. The governance structure is highlighted below:

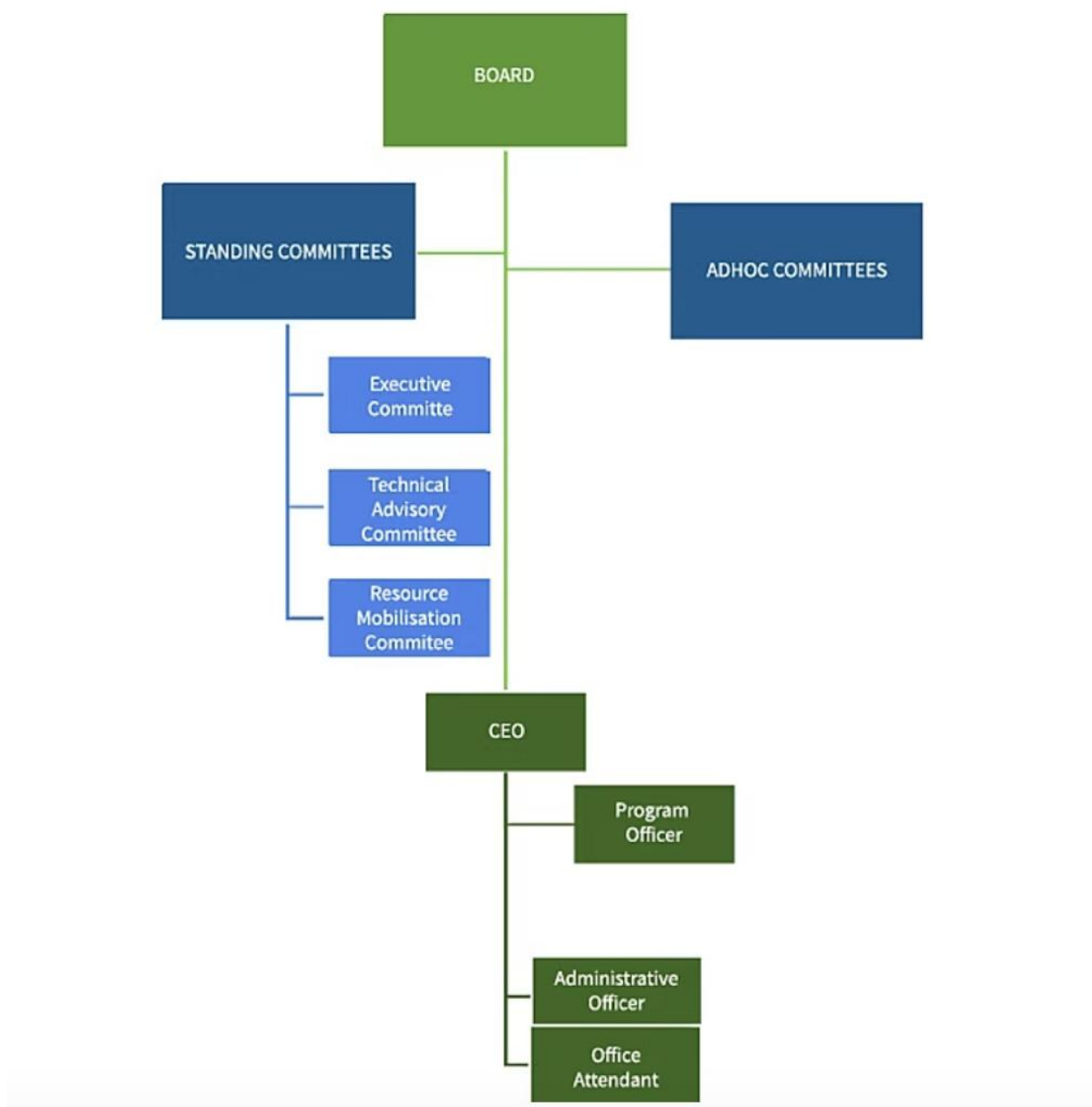


Figure 106 Governance structure of SLUNCT

5.5.6 GEF SGP Lessons Learned

With regards to the GEF Small Grant Programme in the target countries, lessons learned evaluations have been drafted in recent years, showcasing the SGP outcomes and achievements. In terms of how **livelihood and resilience** fit into the broader climate risks and vulnerability assessments conducted previously, it has been clear that a community's socio-economic health directly determines its capacity to withstand environmental shocks. In Saint Lucia for example, comprehensive tools like Country Poverty Assessments and Participatory Poverty Assessments were used to gather qualitative and quantitative data on living conditions, which helped identify the specific vulnerabilities and risks faced

by impoverished communities.¹⁰ Similarly, Belize's Growth and Sustainable Development Strategy explicitly identified the enhancement of social cohesion, resilience, and effective livelihood programs as critical factors necessary for the sustained health of the environment and disaster risk management.¹¹ Recognising that vulnerable demographics often face food and income insecurity—issues worsened by extreme weather and crises like the COVID-19 pandemic, past evaluations have detailed that in Grenada and Jamaica there have been programs introduced that prioritised alternative livelihoods, such as aquaponics, organic farming, and agro-ecology, that ensure food and income security year-round for vulnerable groups even during extreme weather.¹²

Additionally, community engagements have demonstrated that conservation efforts are most successful when they are country-driven, aligned with local priorities, and are built on sustainable business practices.¹³ To prevent projects from collapsing after grant funding ends, there was a strong push to adopt social economy models that transition community initiatives into financially viable microenterprises, such as ecotourism or green products.

Concerning the types of **local actors that have accessed SGP**, past evaluations have noted that CSOs, NGOs, CBOs, Indigenous peoples' organizations, women's agriculture cooperatives, youth-led groups, PWDs, fishermen's cooperatives, tour guide associations, riverfish protectors, farmers' associations as well as media organizations, local community development councils, and private business institutions partnered with community initiatives had been targeted. These actors have accessed funding through a multitude of avenues such as:

- To assist poor and marginalised groups, the SGP accepted alternative proposal formats such as participatory videos and photo stories¹⁴
- SGP planning grants (up to USD 2,000) to help formulate better-quality proposals¹⁵
- NGO mentorship - coaching on the grant-writing process¹⁶

By accessing funding from the SGP, the capacities of the local actors have evolved in a number of ways. Firstly, grant recipients developed better participatory planning mechanisms, systems for resource monitoring, and a deeper understanding of their own mandates.¹⁷ Secondly, organisations developed new partnerships with other CSOs, academia, the private sector, and governments.¹⁸ Lastly, successful SGP grantees leveraged their initial funding and proven track records to secure substantial co-financing, as well as being able to scale up their projects into larger GEF Medium- or Full-Sized Projects.¹⁹

Lastly, in terms of how the SGP experience has been used to **strengthen criteria for enhanced impact and reach of most vulnerable**, embedding social inclusion and gender equity into the grant evaluation and approval processes had been key. To ensure funding reaches marginalised populations, the SGP introduced action criteria that required the participation of women, youth, and the elderly in projects.²⁰ Mandatory tools such as National Steering Committee (NSC) gender checklists and UN Women checklists were used to screen and approve proposals. The SGP has also established targets on the proportion of projects focusing on gender issues, with goals such as at least 30% of projects being

¹⁰ UNDP and The Cadmus Group LLC. (2016). Climate Change Baseline Assessment Report.

¹¹ Evaluation of Belize Small Grants Program OAK Re-granting Portfolio. (2016).

¹² GEF SGP UNDP Grenada. (2023)

¹³ CANARI Small Grant Evaluation summary report

¹⁴ IEO & UNDP Evaluation of SGP. (2021).

¹⁵ IEO & UNDP Evaluation of SGP. (2021).

¹⁶ Evaluation of Belize Small Grants Program OAK Re-granting Portfolio. (2016).

¹⁷ CANARI Small Grant Evaluation summary report

¹⁸ Ibid.

¹⁹ IEO & UNDP Evaluation of SGP. (2021).

²⁰ Evaluation of Belize Small Grants Program OAK Re-granting Portfolio. (2016).

initiated or implemented by women and youth organisations.²¹ Furthermore, integrating gender-specific activities and gender-disaggregated indicators into project design was a strict requirement and dedicated gender and youth specialists were included on Technical Advisory Groups to help appraise proposals.²²

Programmatic criteria evolved to demand that social inclusion acts as a cross-cutting theme, ensuring projects consider the specific needs of indigenous peoples, persons with disabilities, and groups facing physical or geographical vulnerabilities. Strategically, the SGP deliberately targeted its support toward Least Developed Countries (LDCs), SIDS and countries facing fragile situations to reach marginalized groups.²³

²¹ GEF SGP UNDP Grenada. (2023) & IEO & UNDP Evaluation of SGP. (2021).

²² IEO & UNDP Evaluation of SGP. (2021).

²³ IEO & UNDP Evaluation of SGP. (2021).

6. Stakeholder needs

6.1 History of Stakeholder Development for CABRIC

In the previous stakeholder engagement conducted in 2019 for the CABRIC EDA programme, ENCO designed SEP to ensure that all consultations undertaken have (where possible) involved all key national stakeholders which included government ministries, departments and agencies; private sector organizations; civil society organizations; non-governmental organizations (NGOs); universities and/or research institutions; and regional organizations, as appropriate. The ENCO team has also reviewed strategic documents to support the production of other contracted deliverables, notably the EDA Risk Register (including Environmental and Social Impact Assessments reports for EDA projects in the region), the Grievance Redress Mechanism (GRM) Report, the Gender and Social Inclusion Action Plan (GSIAP) plus other similar donor project activities within the 5 countries, where information has been provided or sourced via the internet.

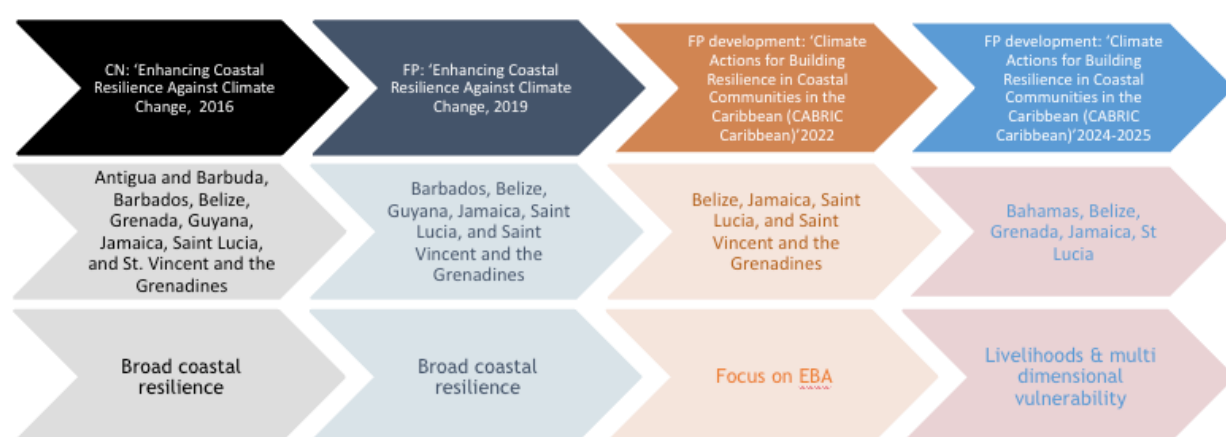


Figure 107 CABRIC timeline and history

For each of the four target countries visited, the role of national stakeholders was examined, influences, and concerns have been summarised into matrices.

6.2 NDA engagement

6.2.1 Miami meeting: 06 December 2024

The aim of the meeting was to bring together the NDAs of the countries involved in the development of the CABRIC EDA programme to consult on the revised design. Those in attendance included Charles Hamilton (Bahamas); Carlos Pol (Belize); Ms. Peron Johnson and Safiya Sawney (Grenada); Omar Alcock and Eleanor Terrelonge (Jamaica); Mr. Paul Hilaire and Eulampius Frederick (Saint Lucia); Ritesh Sardjoe, Narain Radjindreadath, Dr. Donneil Cain and Ezra Christopher (CCCCC); and Ellie La Trobe-Hogan (E Co.).

Following the presentation, the slides are attached [here](#) an open discussion was held. The first half of the session focused on the thematic areas and goals of the programme; and the second on operations and implementation.

Thematic areas:

- **Bahamas** - Confirmed that the areas aligned with country needs and highlighted how tourism was now one of the major livelihoods in the country, and this should be more explicit in the thematic areas and project designs. It was also noted that in terms of climate related health issues, mental health issues from the pressing climate challenges and labour issues from heatwaves should also be included in project types.
- **Belize** - Confirmed the areas aligned with their country needs but emphasised the importance of complementing existing programmes.
- **Grenada** - Confirmed that the areas aligned with country needs, but highlighted that along with health, social resilience in general was an issue, including education.
- **Jamaica** - Raised additional emphasis for thematic areas, including; Ecosystem restoration - seagrass and mangroves, fish sanctuaries, Ecosystem based Adaptation for coastal restoration and resilience, tourism sector, seaweed circular economy projects.
- **St Lucia** - Confirmed the thematic areas aligned with priorities, and emphasised the interest in health projects, particularly those that focus on mould infection of buildings. St. Lucia representatives also raised the issue of plastics, and their contribution to ecosystem vulnerability, and would favour the inclusion of these projects in the design.

During the conversation E Co. consultant, Ellie La Trobe-Hogan proposed that a simplification of the number of thematic areas would be beneficial to have a more focused approach in the design. Whilst there was a mutual agreement of this, it was not possible during the short meeting to conclude this, and so the following methodology was proposed to achieve this:

- **Bottom up:** Through consultations with NGOs and CSOs understand the financing gaps and needs.
- **Top down:** Evaluation on projects and pipeline projects against the thematic areas to understand the gaps in financing. This desk-based evaluation requires that countries provide a pipeline and present climate finance project list. Following the discussions CCCCC and E Co. team propose that this is complemented by a statement from country NDA teams on their priorities for increasing the flow of finance in coastal communities.
- **Combining the two evaluations:** The final thematic areas will be defined with a combination of the two evaluation methods.

Risks and mitigation strategies

- **Operational capacity of CSOs, NGOs and LAs-** Mitigate through building capacity through implementation support as built into project design.
- **High turnover of staff** - In addition to capacity of personnel, institutional capacity will be built into the design.
- **Climatic impact during project implementation** - A budget line will be added as a buffer fund for projects to request additional funding in the event of a storm or hurricane reversing any physically implemented activities.
- **Procurement issues** - Whilst both cost and timelines can be affected by procurement issues, there is potential to mitigate some of the cost issues through joint procurement between sub projects. Again, the budget line for unexpected events could include requests for additional funding to projects should costs rise unexpectedly due to external events.
- **Equity** - Ensuring that both beneficiary groups and local actors have equal access to the finance and benefits of the outcomes and impacts of sub projects is very important for the programme.

Processes will be built around the Gender Assessment and Action Plan, Environmental and Social Safeguarding Framework and Indigenous Peoples Plan Framework for the programme. This will be integrated into the processes for selection of projects and operationalisation of the overall programme.

- **Inclusion and rights of indigenous and traditional people** - A full assessment will be needed across all countries to inform project operations.
- **Expectations of local actors** - The Bahamas highlighted this as a very important risk to address for CSOs, NGOs and LAs and beneficiaries. To mitigate this, consultation during the programme design phase needs to be very explicit on the length of time development takes, and during inception of the programme realistic timelines need to be communicated for project design and approval.
- **Elections** - It was noted that elections will be held in Belize, Jamaica in 2025. This makes it essential that programme design is completed before June 2025.
- **Alignment of projects to national priorities** - The programme needs to seek a balance between bottom up and top down. To ensure national priorities are aligned to, countries are asked to prioritise project types as part of the thematic areas.

Long term sustainability

- **Set the EDA programme as a phase 1 for a broader phase 2** - CCCCC was noted to be developing a broader regional climate resilience financing facility. Such a facility would source multilateral and bilateral donor finance. It was proposed that such a facility may also be of interest to GCF at a phase 2 stage. Phase 2 could also utilise loans and other blended finance mechanisms to expand the local actor reach to SMEs.
- **Involvement of the private sector** - Jamaica representatives highlighted the potential of the private sector to be involved in a phase 2 of the EDA programme. Both at the local level and at an international impact investment / finance level.

The following list summarises the key conclusions of the discussions:

1. All countries confirmed the approach of the EDA programme and the thematic areas aligned with the needs and gaps of the countries.
2. Thematic areas shall be revised based on input from NDAs + gap assessment of climate finance projects + input from CSOs, NGOs and LAs on the ground coastal climate resilience financing gaps.
3. Overarching coastal climate resilience framework development and capacity building for implementation of policy and regulatory framework will be built into the revised design.
4. Coastal climate indicator collection and research will be expanded upon in the revised design.
5. Capacity building for development, implementation and evaluation will remain central to the programme design.
6. Lessons learnt will be further drawn on for programme design and implementation arrangements.
7. The country facilitator will be based in NDA offices, and clarification on role will be made on the relationship and communication with other partners such as CANARI + Grant Administrators + other Conservation Trust Funds.
8. The process for NGOs and CSO approval shall be defined and re-consulted at a country level.
9. Financial flows will need to be clearly defined and re-consulted at a country level.
10. Project redesign will need to integrate measures to mitigate the risks identified by the country's NDAs.
11. Long term sustainability will be proposed as a long term regional on-granting facility for climate resilience for CARICOM member states.

6.3 Country CSOs, NGOs and LAs engagement

6.3.1 Country workshops January - March 2025

Stakeholder consultation was conducted to understand key social and community-focused gaps from the desk research, provide support in filling data gaps and deepen understanding of the realities and lived experiences of local communities, identify risk and cultural practices that might impact the implementation of CABRIC informing the Prefeasibility Study (PfS), further inform and enhance Gender Baselines, Gender Assessments (GAs) and ensure Gender Action Plans (GAPs) are grounded in local contexts and realities, so they may serve to improve the lives of marginalised communities affected most by the climate crisis; through improving social and livelihood resilience. This chapter only shows the results of the consultations, the aspects of project design, and the gender, social and environmental aspects are shown in the Gender assessment Annex. Consultations took place in The Bahamas, Belize, Grenada, Jamaica and Saint Lucia.

The Bahamas

The Bahamas country workshop was conducted on March 6, 2025, as an online meeting with a total of 46 participants. Stakeholders provided overall support for the CABRIC EDA programme and its thematic areas. Discussions revealed several complex financial and implementation challenges, including the fact that existing legislation might inadvertently hinder the flow of funds to intended recipients, requiring an effective evaluation of the current system. Financial barriers were a significant point of discussion, noting that the Bahamas' classification as a high-income country limits its access to certain international funds (such as those from the European Union and Canada) despite its vulnerabilities. Furthermore, concerns were raised about the prevalence of short-term funding suitable for assessments rather than long-term monitoring, and the risk of predatory carbon credit schemes where a significant portion of finances might not reach local communities or support local ownership. The need for better coordination between siloed government agencies and local organizations was a key recommendation.

A major consensus was the critical need for capacity building across multiple levels, specifically in project proposal development, implementation, monitoring, and evaluation. Stakeholders highlighted the need to build the capacity of CSOs, NGOs and LAs to attract funds and develop financial specialists focusing on climate finance. The consultation repeatedly emphasized significant data deficiencies and barriers, including a dearth of data, issues with data ownership, limited access by communities, and temporal/spatial deficiencies in ocean observational platforms. Participants suggested establishing centralized data repositories with appropriate access protocols, proposing the University of Bahamas as a potential entity for long-term data management and stability. The importance of empowering local communities was consistently stressed, along with extending the program's focus beyond New Providence to the Family Islands, which were identified as the priority area for receiving additional funds and capacity support.

Belize

The Belize country consultations took place from February 4th to 6th, 2025, with 21 participants. There was overall support for the CABRIC EDA programme across all participants and topics included ensuring interventions lead to tangible benefits for communities within the key thematic areas: ecosystem resilience, food security, social well participants. A central challenge identified was the limited institutional capacity of local CSOs, NGOs and LAs to effectively manage finances and meet funder requirements, including basic tasks like handling wire transfers or opening bank accounts. Participants stressed the need for simpler processes for proposal writing, possibly utilizing local languages and flip charts, to ease the burden of administration. Financial constraints were also noted as a major barrier,

with concerns raised about how to effectively distribute funds to the communities most in need, as well as the low accessibility of formal financial structures (like banks and ATMs) in coastal areas. Stakeholders suggested exploring models for financial support, such as community credit enterprises (Syndicates/SUSU).

A significant theme was the need for accurate and relevant data and information. Participants emphasized moving beyond global models to use local and national data for climate risk and vulnerability assessments, advocating for downscaled climate analysis specific to Belize's coastal zone. Barriers were identified concerning data accessibility, literacy, and the effective, understandable communication of climate information to local communities for decision-making. Furthermore, stakeholders noted a need for capacity building not only in implementation but also in specialized areas such as Free, Prior, and Informed Consent (FPIC), ESS, and Grievance Redress Mechanisms (GRM). While the entire coastal zone was recognized as vulnerable, stakeholders suggested that priority areas for funding should consider pre-existing project locations to ensure a more even distribution of finance. The concept of on-granting and finding national CSOs/NGOs capable of managing larger grants was also discussed as a mechanism for financial flow.

Grenada

The Grenada country consultation involved a workshop held on January 27, 2025, and supplementary Key Informant Interviews conducted until February 6, 2025 - a total of 23 stakeholders participated, comprising 5 males and 18 females. There was overall support for the CABRIC EDA programme and general agreement on its thematic areas. Key resilience needs identified, particularly by organizations in Carriacou and Petite Martinique, included the need for local stewardship of coastal resources, continuing environmental awareness efforts, and protecting endangered species. Discussions emphasized the need for finance ready for a quick response post-climate disaster, and ensuring social resilience through social networks and the role of community groups, including providing psychological support both pre- and post-event. Priority vulnerable areas highlighted for receiving funds included St. Patricks, which was heavily impacted by Hurricane Emily, and St Andrews, which is affected by flooding due to poor development.

Stakeholders consistently raised institutional capacity as one of the largest barriers, due to the limited number of personnel and high turnover, stressing the need for succession planning to retain expertise. Smaller CSOs, NGOs and LAs were noted to have limited capacity, suggesting that applications would require support and funds could be delivered in tranches. Concerns were also raised regarding fiduciary capacity and the risk of corruption, suggesting the need for CSOs, NGOs and LAs to meet specific fiduciary criteria, perhaps being listed on KIPO. Regarding data, the issue was identified not as one of availability, but one of communication and data silos. Participants called for the establishment of dedicated learning platforms for training and sharing knowledge, and highlighted a lack of data literacy for decision-making, monitoring, and identifying capacity gaps. Furthermore, there was a need for specific, targeted training for livelihoods such as agriculture and fisheries.

Jamaica

The Jamaica country consultation took place over three days, from February 11th to 13th, 2025, engaging 19 participants. Stakeholders expressed overall support for the CABRIC EDA programme, recognizing the need for such a program, particularly when focused on CSOs, NGOs and LAs and strengthening coastal resilience. Discussions highlighted the importance of including student organizations and research, and integrating cultural centers, heritage, and archaeological sites located at the coastline. A key concern raised was the challenge of siloed work and communication, emphasizing the need to ensure CABRIC fills a financing gap without creating a new silo. Participants appreciated the proposed thematic areas but suggested additional emphasis on social resilience, including addressing the needs of PWDs (such as visual or hearing needs, and accessibility issues for shelters), as well as prioritizing the needs of the elderly and

youth. They also stressed the importance of mental health support pre, during, and post-climate events, and addressing GBV.

Significant barriers were identified, particularly concerning the capacity and financial flow to local actors. Many CSOs, NGOs and LAs are not registered or do not meet fiduciary standards, indicating a need for assistance in formalizing their operations. A major institutional capacity issue is the low capacity of CSOs, NGOs and LAs to monitor projects, coupled with the need for ongoing capacity building to ensure expertise is retained as staff age out. Financial sustainability to retain staff was also highlighted as a barrier. Regarding data and information, participants stressed the need for linking data platforms in one centralized place and ensuring the accessibility of information. Priority areas for funding require data to be established, but preliminary input pointed toward vulnerable groups who are not defined by geography, and specific areas like St. Catherine's (due to a high disability presence) and St. Elizabeth (high number of blind people). Stakeholders suggested leveraging existing mechanisms, such as the National Conservation Trust Fund of Jamaica (NCTFJ) and the Environmental Foundation of Jamaica (EFJ), rather than "reinventing the wheel".

St Lucia

The St. Lucia country consultation was conducted as a hybrid event on March 5, 2025, with 28 participants, with an overall endorsement for the CABRIC EDA programme. Discussions highlighted the importance of integrating ways to ensure that excluded groups, such as single mothers, are specifically included throughout the programme's design. Beyond the existing thematic areas, ways to ensure that excluded groups, such as single mothers, are specifically included throughout the programme's design. Beyond the existing thematic areas, stakeholders were keen to incorporate projects focused on mental health, spiritual health, and the inclusion of teenagers. Furthermore, participants stressed the need for information to be accessible for the wider population. A specific technical need identified within the ecosystem resilience area was the importance of coral restoration efforts moving beyond the focus on acropora to include gene banks or nurseries that cultivate a diversity of coral species resilient to disease and temperature. The entire coastal region was identified as a priority area for the program.

During the initial NDA consultation, St. Lucia representatives confirmed that the EDA thematic areas aligned with their country's priorities, particularly emphasizing interest in health projects, especially those focusing on mould infection of buildings. They also raised the issue of plastics and their contribution to ecosystem vulnerability. Stakeholders involved in the consultation included representatives from the St. Lucia National Conservation Fund (SLUNCF), Soufriere Marine Management Association Inc., St. Lucia Social Development Fund, various CSOs like the CYEN St. Lucia chapter and the St. Lucia Fisherfolk Cooperative Society, and government agencies. The Saint Lucia National Conservation Trust Fund (SLUNCF) is also listed as a Trust Fund/Small Grant initiative that could serve as an implementing partner for larger projects.

6.4 CANARI partnership

ORGANISATION	ROLE	DESCRIPTION OF ROLE
CANARI	Capacity Building and Implementing Partner	CANARI's main office is located in Trinidad and Tobago but is registered in Saint Lucia and United States Virgin Islands. CANARI is the primary stakeholder alongside national GCF NDAs and the CCCCC. Its role as an Implementing Partners is to support the EDA programme by ensuring that technical and capacity building needs are met. This includes building capacity through technical assistance (TA) and training to

		support project development with Civil Society Organizations (CSOs), Non-Governmental Organizations (NGOs) and LAs.
		CANARI will be the Implementing Partner for: 1.1.3, 1.1.4, 1.1.5, 1.1.6 1.3.2.1, 1.3.2.2

During the NDA consultation workshop, the complexity of implementation arrangements was discussed. It was noted that clarification is needed regarding the relationship of national coordinators with CANARI, as well as the communication structure with the board.

6.5 Grant Administration

TYPE	AGENCIES	DESCRIPTION	PROPOSED ROLE IN THE PROGRAM
Grant administration EEs	Belize Fund - Grant Administrating EE for Belize	Executing Entity	The Grant Administrators will make up the decision-making function. More specifically, they will oversee the management of the sub grants, launch call for proposals, coordinate decision making on sub grant proposals, and disbursement of tiered support to grantees.
	JSIF - Grant Administrating EE for Jamaica		
	The Bahamas Protected Areas Fund - EE for The Bahamas		
	Grenada Development Bank - EE for Grenada		
	Saint Lucia Development Bank -EE for Saint Lucia		
			Responsible for: 1.1.1, 1.1.2 1.3.3.2, 1.3.3.2 2.1.2, 2.1.3, 2.1.4

6.6 Country validation

The **CABRIC Caribbean Validation Meeting** took place on **December 4, 2025**, in Miami, Florida. The primary goal of the workshop was to present the design of the "Climate Actions for Building Resilience in Coastal Communities in the Caribbean" (CABRIC Caribbean) programme and receive feedback from **National Designated Authorities (NDAs)** to finalize the Funding Proposal for submission to the **Green Climate Fund (GCF)**. Participation was made by all NDAs and Executing Entities.

Table 57: Attendance for the CABRIC validation session

In person participants	Online participants
– Omar Alcock - Jamaica NDA focal point – Eleanor Terrelonge - Jamaica SIDAR Project Office – PS Anita Montoute - St Lucia NDA focal point – Donette Charlery - St Lucia Government – Rochelle Newbold - The Bahamas NDA focal point – Ryan Zuniga - CCCCC Head of Project Development – Ezra Christopher - CCCCC SIDAR technical coordinator – Ellie La Trobe-Hogan - E Co.	– PS Peron Johnson - Grenada NDA focal point – Dr Milton Clarke - JSIF – Anna Cadiz-Hadeed - Deputy Exec. Director CANARI – Rissa Edoo - Regional coordinator UNDP SGP – Dr Leandra Cho-Ricketts - Exec Director Belize Fund – Josue Oliva - Program Manager Belize Fund – Representative for Carlos Pol - Belize NDA focal point

Presentation on the CABRIC programme and the operation mechanism

The CABRIC programme is a **6-year initiative (2027-2032)** targeting the GCF's Enhanced Direct Access (EDA) window with a total budget of approximately **USD 46.82 million**. It focuses on five countries: **The Bahamas, Belize, Grenada, Jamaica, and St Lucia**.

The programme aims to accelerate locally led coastal resilience by addressing multidimensional vulnerabilities through three main outcomes:

- **Institutional Capacity:** Strengthening operational capacity for Gender, Equality, Disability, and Social Inclusion (GEDSI) integrated climate planning.
- **Grant Facility:** Improving social and livelihood resilience through a **USD 25 million** grant mechanism (providing **USD 5 million per country**) for grassroots initiatives.
- **Knowledge Sharing:** Enhancing regional communication regarding climate risk data and lessons learned.

The core of the programme is a grant facility targeting civil society organizations (CSOs), NGOs, and local authorities. Grants are categorized by size: **Small (< USD 150k)**, **Medium (USD 150k-300k)**, and **Large (USD 300k-500K)**. Projects will fall under two main themes:

- **Theme A: Gender-Transformative Climate-Resilient Livelihoods:** Includes climate-resilient agriculture (e.g., solar-powered hydroponics), ecosystem-based fisheries (e.g., mariculture), and Nature-Based Solutions (e.g., mangrove restoration).
- **Theme B: Inclusive Health, Wellbeing, and Social Resilience:** Includes early warning systems, climate-responsive mental health programs (e.g., youth art/music therapy), and climate-proofing maternal health centres or emergency shelters.

Key Feedback and Discussion Points

The validation meeting confirmed continued support from all five countries, though several critical points for improvement were raised:

- **Inclusion of Local Authorities:** Participants agreed that **Local Authorities (LAs)** should be explicitly included as eligible grantees alongside CSOs and NGOs to improve the flow of finance.
- **Eligibility Criteria:** The Bahamas and Jamaica NDAs emphasized the need for strict eligibility criteria to prevent large international organizations from "crowding out" smaller national entities with limited capacity.
- **Implementation Arrangements:** While most countries accepted the proposed administrators, **The Bahamas** requested moving their grant administrator from UNDP to the **Bahamas National Trust**.
- **Project Duplication:** Belize expressed concerns regarding potential duplication with existing projects in early warning systems and coastal resilience.

Conclusions and Next Steps

The workshop concluded with a roadmap for a **January 2026 GCF submission**. Key actions include:

1. **Updating the Operations Manual:** E Co. will integrate feedback regarding eligibility criteria and Local Authority inclusion by mid-December 2025.
2. **In-Country Consultations:** NDAs from the Bahamas, St Lucia, and Jamaica will conduct further consultations before final sign-off.
3. **Refining Implementation:** UNDP will clarify its rules for GCF status, and the Belize Fund will work with its NDA to ensure alignment and avoid project duplication.

7. Policy Context

This Chapter reviews the national/sectoral policy and legislative framework related to climate change for each country, specifically Climate Change Related Policy and Regulations. A regional overview is also provided to help place the EDA project into context from a broader Caribbean perspective.

7.1 Regional policy, institutional and capacity readiness frameworks

Responding to the economic, social and environmental vulnerabilities of Small Island Developing States (SIDS) demands an integrative, holistic approach to addressing these interdependent challenges. Each country has developed or are in the process of developing comprehensive frameworks towards achieving sustainable development. Furthermore, they are often all based on national, sub-regional and regional realities, but reflect also global instruments that are focused on the concerns and priorities of small States, and on promoting resilience and sustainable development, such as the 2030 Agenda for Sustainable Development and the SIDS Accelerated Modalities of Action (SAMOA) Pathway (Samoa Pathway). The national and regional development frameworks in the Caribbean are being aligned closely with both the 2030 Agenda and the Samoa Pathway, to which the Region is fully committed.

The Liliendaal Declaration, as an example, provides the vision of transformational change in all Caribbean Community (CARICOM) country responses to the challenges of a changing climate and highlights the fact that there is need for urgent and decisive action. Prior to this declaration, the CCCCC, based on a request from the CARICOM Heads of Government developed a “Regional Framework for Achieving Development Resilient to Climate Change. This was approved along with the Liliendaal Declaration by the CARICOM Heads of Government in July 2009. The proposed EDA project needs to be designed to support the Regional Framework for Achieving Development Resilient to Climate Change (2009 - 2015), namely the second strategic element *“Promote the implementation of specific adaptation measures to address key vulnerabilities in the region”*. This Regional Framework builds upon the work undertaken by the CCCCC and its precursor programs and projects including inter alia the Caribbean Planning for Adaptation to Climate Change (CPACC) 1998 - 2001, the Adaptation to Climate Change in the Caribbean (ACCC) Project 2001 - 2004, the Mainstreaming Adaptation to Climate Change (MACC) project 2003 - 2009 and the projects being undertaken under the Special Pilot Adaptation to Climate Change (SPACC). This Regional Framework ^[35] provides the CARICOM Member States and regional organizations with a roadmap for coping with climate change over the period 2009-2015.

The current EDA project proposal will therefore need to address 3 of the 5 strategic elements of the Regional Framework.

Strategic Element 1: Mainstream climate change adaptation strategies into the sustainable development agendas of the CARICOM Member States

- Goal 1: Assess the vulnerability and risks associated with a changing climate;
- Goal 2: Reduce vulnerability to a changing climate; and
- Goal 4: Build a society that is more informed about and resilient to a changing climate

Strategic Element 2: Promote the implementation of specific adaptation measures to address key vulnerabilities in the region

- Goal 2: Promote the implementation of measures to reduce climate impacts on coastal and marine infrastructure.
- Goal 4: Promote sound conservation practices in coastal and marine ecosystems to shelter these resources from climate-induced damage

Strategic Element 4: Promote actions to reduce the vulnerability of natural and human systems in CARICOM countries to the impacts of a changing climate.

Figure 108: Strategic elements of the Regional Framework

The project countries of the Bahamas, Belize, Grenada, Jamaica, and Saint Lucia have all ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol: They have submitted their first and second National Communications to the UNFCCC Conference of the Parties, are in the process of preparing their third communication, and many have prepared their Intended Nationally Determined Contribution (INDC) under the UNFCCC prior to the Conference of Parties (CoP 21) event in Paris France (2017). The countries all have constituted climate change committees and in November 2000, adopted the *St. George's Declaration of Principles for Environmental Sustainability in the OECS*. All countries are now parties to the Convention on Biological Diversity (CBD) and the Cartagena Protocol either by ratification or accession, and Saint Lucia (as an example) has declared Ramsar sites; two and one respectively. Further, Saint Lucia are Contracting Parties to The Regional Initiative for the Conservation and Wise Use of Caribbean Wetlands (CARIWET).

To support the UNFCCC ratification and Kyoto Protocol work, several countries have produced key Strategy Documents to help implement and monitor progress on these matters regarding climate change mitigation and adaptation as follows:

- Bahamas: National Development Plan Vision 2040
- Belize: Horizon 2030 National Development Framework;
- Grenada: National Adaptation Plan (NAP) (2017-2021)
- Jamaica: Vision 2030 National Development Plan;
- Saint Lucia: Medium-Term Development and Strategic Plan.

7.2 Climate Change-Related Policy and Regulatory Environment

7.2.1 Bahamas

As an island archipelago, Bahamas is very susceptible to climate change impacts. It has been ranked as one of the top 10 most vulnerable countries in the world with regards to climate change and its impacts. To address these threats, in 2005 the National Policy for the Adaptation to Climate Change

was adopted. This multi-sectoral approach recognised the country's high vulnerability to adverse effects of climate change. Through this policy, the country was able to assess its weaknesses by economic sectors; referring to coastal and marine resources, terrestrial biodiversity, agriculture and forestry, human settlements, health, water resources, energy and transport, tourism, finance and insurance. Moreover, by evaluating the current capacity for adaptation, the policy aimed to suggest strategies to protect Bahamas in the future through a plan of action. To strengthen its environmental framework, Bahamas has established complementary policies to protect the natural heritage of the country. Among them we find:

National Wetlands Policy (2007): Created in 2006, this policy was set for outlining guidelines and objectives for sustainable management and wetland protection in the country, underlining the contribution of these ecosystems to the livelihood and economic well-being of the communities around them. Its main goal is to conserve and restore these ecosystems in the national territory in conjunction with the sustainable development practices. To ensure them, concepts of the Ramsar Convention were adopted. Moreover, community involvement was promoted, providing incentives for preserving wetlands. (Climate Policy Radar, 2024) With this policy, protection measures for wetlands were implemented as well as environmental assessments for monitoring the impacts of human activities on their habitats. These processes were carried out with the participation of educational institutions, community groups and non-governmental organisations (Food Agriculture Organisation of the United Nations FAO, 2024). This policy also contemplated land-use management practices applicable to wetlands to prevent degradation and destruction due to landholders' activities. Rehabilitation practices were also included for degraded wetlands to restore their ecosystem structure, composition and natural processes as well as public awareness raising and institutional capacity building processes to promote conservation. Finally, cooperation and international partnerships were established for encouraging finance, investment and scientific research as a basis for policy and management (Ibid).

Forestry Act (2010) and Forestry Regulations (2014): In 2010, the Bahamian Parliament enhanced The Forestry Act, to provide the country with tools for controlling and promoting forests' conservation. With this law, a Forestry Unit under the authority of the Minister of Environment and Housing was established for regulating activities related to forestry management such as wood exploitation. These regulations looked after improving forest reserve management and developing new ways to monitor protected trees (Climate Policy Radar, 2024). Furthermore, the law allowed states to declare natural reserves according to the national environmental conservation objectives established to protect wildlife and prevent fires. The act also regulated private activities affecting these areas. According to this law, every five years, the Forest Management Plans should be developed, and the inclusion of carbon sequestration and reforestation was included in the update process of 2014. With these changes private landowners were encouraged to prepare their plans and include forest management practices. The adjustments of the law also contemplated the protection of forest roads, which cannot be used as public highways without a special governmental authorisation priorly issued (Ibid).

National Maritime Policy (2015): As part of changes made for the improvement of life quality and natural resources management in the Bahamas, the National Maritime Policy was established in 2015, to maximise and promote the sustainable utilisation of natural resources while strengthening the Bahamas' global position economically. Its purpose is promoting effective planning and development of maritime activities in a sustainable manner (Climate Policy Radar, 2024). The stated goals were: A) Support to ongoing economic activities of the country, B) Economic development in the maritime sector at national and international level C) Protection of marine environment and D) Safety of vessels in territorial sea and adjacent international waters. This policy seeks to strengthen the ocean economy in a sustainable way by diversifying maritime activities to create employment opportunities with the participation of local communities in planning and management strategies. It also proposed an integrated marine management with local institutions from relevant sectors such as fishery, tourism, transport and environment (Food Agriculture Organisation of the United Nations FAO, 2024). With this policy, measures to prevent damage

to marine ecosystems and depletion of marine resources were enhanced to ensure healthy and productive marine habitats, underlining the importance of sustainable coastal planning and development. In regard to climate change, adaptation and resilience-building strategies were incorporated to increase actions for climate change risk management. In this sense, National Disaster Prevention and Response Plans were implemented in maritime space and coastal areas for effective risk management (Ibid).

Environmental Planning and Protection Act No. 40 (2019): Regarding climate change adaptation measures, in 2019 Bahamas approved an Act for developing a robust climate change regime, promoting procedures and principles for Environmental Management Plans for sustainable use and management of natural resources (including wetlands and coral reefs) and Environmental Impact Assessments. The act also enhanced the creation of a National Environmental Policy to address environmental issues, raising-awareness and institutional mechanisms for national ecosystems' protection (Food Agriculture Organisation of the United Nations FAO, 2024). The main objectives of this act were:

- A) The establishment of an integrated environmental management system
- B) The protection of environment while maintaining ecological integrity and the social and economic welfare of local communities
- C) Strengthened legal framework for the protection, sustainable management and use, and development of the environment for the present and future generations
- D) Pollution control for the purposes of maintaining the quality of the environment
- E) The compliance and implementation of obligations under any regional and international agreements or conventions to which the Government of the Bahamas has ratified or acceded to
- F) Equitable allocation of the costs of environmental protection and restoration to encourage responsible use of, and reduced harm to, the environment
- G) Promoting best practices in environmental management and minimizing harm to the environment through strategic planning, public consultation and effective policies
- H) The development of a robust climate change regime that applies adaptation and mitigation technologies to address vulnerabilities
- I) The establishment of a mechanism for effective public participation in decision making and the formulation of environmental policy and
- J) Public awareness raising for a better understanding and appreciation of the environment. The Minister of Environment shall be responsible for the general supervision and management of this Act (Ibid).

National Energy Policy (2013-2033): The National Energy Policy aims to provide the Bahamas with a modern, diversified and efficient energy sector, by using affordable energy supplies and long-term energy security towards enhancing international competitiveness and sustainable prosperity for 2030. This policy presents a long-term vision and suggests precise legal and administrative arrangements that should be undertaken to enable a low-carbon, resilient energy scenario in the country (Climate Policy Radar, 2024).

Its main purpose is to lower the Bahamas' current dependency to imported oil thanks, for advancing towards an increased share of renewable electricity production and use, higher energy efficiency in buildings and decarbonised transport (Ibid).

National Determined Contributions (2022): The Bahamas communicated its NDC to the UNFCCC in 2016 and was built on the participatory multi-stakeholder and cross sectoral consultative processes undertaken during the development of The Bahamas First and Second National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) and its National Energy Policy (Government of Commonwealth of The Bahamas, 2022). Afterwards, Bahamas submitted an updated version in 2022. With this NDC, the country strives to reduce emissions to 30% by 2030, having at least 30% renewable energy in its energy mix and 35% and 15% of vehicle purchases be electric and hybrid, respectively. The updated NDC covers the energy, transportation, industrial processes, land-use change

and forestry, and waste sectors. The Bahamas has the target of achieving carbon neutrality by 2050 (UN Climate Change, 2022). Reaching these targets requires the promotion of energy efficiency at the national level, renewable generation and incentive mechanisms and electrification of road transportation systems (Government of Commonwealth of The Bahamas, 2022).

7.2.2 Belize

In 2008, a Draft Adaptation Policy was developed but was never finalized or adopted. However, since the publication of its First National Communication to the UNFCCC the GOB has sought, through several line ministries, to initiate policy-based activities, at the sector level, to address (adapt and mitigate) the impending impacts of CC.

Whilst there is no CC legislation and no official act, there is the Environment Protection Act. This speaks to emissions information for vehicles and factories, and a secondary legislation with the only legal reference to CC. Belize has a national climate change committee which is tasked with the inclusion of this type of consideration. Generally, the consultant team found that the local council in Belize City and educated stakeholders in Belmopan were aware of the issues related to metocean changes, but outside of the cities there was a general lack of understanding. Of relevance is that new regulatory updates to the Coastal Zone Management Act (AGRER 2018) have been proposed and more information on this aspect is included within the ESMP for this EDA proposal.

An important aspect of mainstreaming is the need for a governmental entity to be strategically placed so that it can effectively coordinate the implementation of Climate Change adaptation and mitigation action in development planning, decision-making and resource mobilization and allocation. The Climate Change Department (CCD), by virtue of its dedicated mandate, will play a crucial role in coordinating the implementation of the Climate Change programme approved by Cabinet. It will also seek to create partnerships among various stakeholders to ensure integrated and systematic implementation of the national Climate Change response agenda. The CCD has a national capacity development plan and produces consultancy documents. Some of the key policy initiatives undertaken to date are as follows:

- Integrated Coastal Zone Management Plan (2013);
- Ministry of Energy, Science, Public Utilities, Transport, Communications and National Emergency Management;
- Strategic Plan 2012-2017 and Sustainable Energy Action Plan for Belize;
- Integrated Water Resource Management Policy;
- Growth and Sustainable Development Strategy 2014-2017;
- The National Climate Resilience Investment Plan (2013).

The country has also embarked on several initiatives to review sector policies, legislation and other initiatives which will address issues of adaptation and mitigation in sectors which are most vulnerable to the impacts of Climate Change. These initiatives include the recently approved:

- Marine Conservation and Climate Adaptation (MCCA) project for Belize;
- Management and Protection of Key Biodiversity Areas.

In addition, other initiatives are being pursued towards the development of policies and project initiatives to address adaptation and mitigation in other sectors:

- National Agriculture Sector Adaptation Strategy and Action Plan to Address Climate Change in Belize;
- The National Adaptation Strategy to Address Climate Change in the Water Sector in Belize;
- Readiness Preparation Proposal (R-PP) to the Forest Carbon Partnership Facility (FCPF);
- Opportunities for Climate-compatible Tourism Development in Belize.

Horizon 2030: This is the national development framework; which was developed after extensive stakeholder consultation inclusive of all political parties. One of its four main pillars is responsible environmental stewardship. The strategies to achieve this pillar, namely integrating environmental sustainability into development planning and promoting sustainable energy for all, address the areas of concern relating to Belize's emission profile.

Growth and Sustainable Development Strategy 2016-2019: Produced in 2016, the Growth and Sustainable Development Strategy (GSDS) for Belize aims to rise to the challenge of guiding overall development for the nation for the period 2016-2019. It adopts an integrated, systemic approach based on the principles of sustainable development, and on three notable drivers that are common to successful developing countries: a proactive role for the state, tapping into global markets, and innovative social policy. The GSDS encompasses issues covered by previous medium-term economic development plans; but it incorporates, for the first time, both poverty reduction and long-term sustainable development issues.

It builds on previous documents including especially Horizon 2030: National Development Framework for Belize 2010-2030. This GSDS is the nation's primary planning document, providing detailed guidance on priorities and on specific actions to be taken during the planning period, including actions that contribute to longer term development objectives beyond 2019. At the core of the GSDS is a hierarchical framework of inter-related goals and objectives called the "Belize Framework for Sustainable Development" (BFSD).

Belize's National Climate Change Policy, Strategy and Master Plan (2021)

In 2015, the Government of Belize (GOB), acting through the Ministry of Forestry, Fisheries, and Sustainable Development (MFFSD), developed the first edition of the National Climate Change Policy, Strategy and Action Plan (NCCPSAP) for the period 2015-2020. This document provided policy guidance for the development of an appropriate administrative and legislative framework, in harmony with other sectoral policies, for the pursuance of a low-carbon and resilient development path for Belize in consideration of the country's vulnerable groups. Belize's NCCPSAP has been revised for the period 2021-2025 to (i) accommodate for new scientific findings on the risks posed by Climate Change on the socioeconomic and environmental well-being of Belize, (ii) incorporate updated mitigation and adaptation measures in sight of ongoing sectoral responses to Climate Change, and (iii) mainstream updated national/sectoral priorities regarding Climate Change under the NDC revision and newly-formulated LEDS in harmonization with a national long-term development goals.

National Climate Change Gender Action Plan 2022-2027 (2022): The NCCGAP was developed to guide all government and non-government organizations, the private sector, civil society, and all citizens of Belize in the pursuance of Climate Change adaptation and mitigation to enhance the resilience of the natural resource sectors and built infrastructure and reduce potential vulnerabilities to the effects of Climate Change and variability. It focuses on (1) Inclusive representation in climate negotiations and planning, (2) policy coherence across all of government, (3) capacity development for existing institutional structures, (4) continuous improvement of documenting evidence and best practices,

National Disaster Management Plan/Policy: Belize National Hazard Mitigation Plan (2006): This now-dated plan includes some important discussion of GSI issues. It acknowledges that "low-income populations and communities are disproportionately affected by hazards. Given the close link between environmental degradation and poverty, unsustainable natural resource use associated with poverty can exacerbate existing vulnerabilities. In addition, gender sensitivity requires the national government to pay particular attention in the assessment, planning, and programming stages of recovery to the needs of poor, especially female single-headed households. This sensitivity applies equally well when designing public outreach efforts and determining eligibility for safe housing programmes before disasters strike" (p. 27). It is unclear, however, how effectively this perspective has been applied.

The National Climate Resilience Investment Plan: Produced in 2013, this provides the framework for an efficient, productive and strategic approach to building economic and social resilience and development. Special importance is given to building climate resilience and improving disaster risk management capacities across all sectors.

National Communication on Climate Change: Fourth National Communication (2022): Belize's Fourth National Communication (FNC) provides a set of robust recommendations that are relevant to facilitate more effective coordination and planning for Climate Change mitigation and adaptation at the national and local level, in addition to the development of permanent institutional capacities and processes relating to Climate Change. The information from the FNC was critical in the formulation of the National Climate Change Policy, Strategy and Action Plan and for the mainstreaming of Climate Change in the national development planning agenda.

Nationally Determined Contribution: Belize's first NDC was submitted in 2016 followed by the updated NDC submitted in 2021 benefits from the availability of more robust data on land use trends and emission factors. It also carefully considers national capacity and circumstances as well as the availability of technological advancements. The updated NDC remains consistent with the overall goal of the Growth and Sustainable Development Strategy (GSDS) which encompasses medium-term economic development, poverty reduction, and longer-term sustainable development. The GSDS is the nation's primary planning document and outlines four critical success factors for the development of the country and to ensure a better quality of life for all Belizeans, living now and in the future.

Belize Policy on Adaptation to Global Climate Change: The Belize Climate Change Adaptation Policy encourages all agencies in Belize to explore and access the opportunities being developed by the climate change negotiation process such as capacity building, new sources of funding, and technology transfer. It also mandates the relevant government agencies to prepare adaptation policy options for their sectors. The objectives of the Belize Climate Change Adaptation Policy are to:

1. Explore and access the opportunities being developed through the climate change negotiation process to meet the development objectives of the nation.
2. Prepare all sectors of Belize to meet the challenges of global climate change.
3. Promote the development of economic incentives, which encourage investment in public and private sector adaptation measures.
4. Develop Belize's negotiating position on climate change at the regional and international levels to promote its economic and environmental interests.
5. Foster the development of appropriate institutional systems for planning and responding to global climate change.

The Belize Climate Change Adaptation Policy is directed at all government agencies, which execute policies or provide services in sectors, which may be impacted by global climate change. These include but are not limited to agriculture, coastal zone, energy, environment, fisheries, forestry, health, housing, local government, tourism, transportation, and water resources.

Climate Change Policy Assessment (IMF): The CCPA analyzes macroeconomic and fiscal effects of Belize's response to climate variability and change to understand and manage expected impacts, while ensuring sustainability. It also explores the cost of possible impacts, inclusive of natural disasters, based on current management plans. Policy gaps and resource needs are identified, and relevant economic reforms that may strengthen successful execution of the national strategy are suggested as well.

National Agriculture and Food Policy of Belize (2015-2030): This policy aim is to facilitate a conducive environment for the development of an Agriculture and Food Sector that is competitive, diversified, sustainable and enhances food security and nutrition, and contributes to the achievement of the socio-economic development goals of Belize. In order to do it, the document looks after ensuring greater

efficiency and effectiveness in the institutional systems of the agriculture and food sector in the country (Ministry of Agriculture, 2015). This will be done through well-defined roles of regulatory and promotional bodies, enhancing greater collaboration among key stakeholders, and the establishment of clear policy incentive or disincentive frameworks for the production, utilization, and marketing of agriculture and food products. These changes will promote agricultural sector growth in a sustainable way, ensure food security, improve farmers and producers' income, create employment and attract private sector investment (Ibid). This policy is based in five pillars:

1. Production, Productivity, and Competitiveness
2. Market Development, Access and Penetration
3. National Food and Nutrition Security and Rural Livelihoods
4. Sustainable Agriculture and Risk Management
5. Governance (Ibid)

Low Emissions Development Strategy and Action Plan (2020-2050): The Belize Low Emission Development Strategy (LEDS) defines pathways to achieve low emission development in Belize until 2050. It contains seven chapters:

1. Introduction: It states the context, governance mechanism and the approach for the LEDS in Belize.
2. Pathways towards low emissions development in Belize: It presents the overall emissions baseline and Business as Usual (BAU) projections and sector wise greenhouse gas emissions (GHG).
3. Potential impact of mitigation options on GHG emissions
4. Potential impact of mitigation options on costs and jobs: It provides an estimate of the accumulated net effect of implementing the mitigation policies on both costs and job creation.
5. Prioritization of mitigation options in each sector
6. High-Level Action Plan: It establishes the action framework and includes 36 mitigation options across forestry and land use, agriculture, energy, transport, and waste sectors.
7. Interaction of the LEDS with other policies and strategies: It includes an analysis of synergies with other national policies and strategies, including other climate policy frameworks, national development strategies, sector-specific policies and strategies (UNDP, 2021).

National Climate Finance Strategy of Belize (2021- 2026): The strategy is proposed for a five-year period from 2021 to 2026 overlapping with the NDC updating cycle. It is aiming at the overall goal of adequate climate finance being accessed effectively, contributing towards enhanced climate resilience and climate change mitigation actions of Belize. There are three specific objectives of the strategy as below (Commonwealth Secretariat, 2021):

1. To provide an integrated and strategic approach to access resources required towards enhancing climate resilience and climate change mitigation.
2. To enhance national capacities to mobilize and utilize resources required for priority climate actions.
3. To maximize synergies with other sectoral development plans and sustainable development co-benefits of climate investments (Ibid).

7.2.3 Grenada

The government has been implementing actions for both, mitigation and adaptation to mainstream climate into planning and key sectors.

National Development Strategy (2007): Developed by the government of Grenada in 2007, this policy aims to promote and provide guidance for disaster risk and climate change adaptation in the country by specifying the main existing threats for integrating environmental and physical development

consideration into national development. The document states several mechanisms to reach this goal such as land planning, buildings' renewal, disaster risk reduction actions, raising awareness and education. Moreover, the policy promotes a more sustainable ways for enhancing development through the exploration of alternative energy sources to increase energy independence and address vulnerability of energy infrastructure to natural disaster (Climate Policy Radar, 2024).

National Water Policy (2007 & 2019): A National Water Policy was also developed in 2007 for addressing the impacts of natural disasters and climate change on water resource management by providing a framework for the integrated, rational use, management and regulation of water resources and services in the country. For this, the policy aimed to achieve a sustainable development of the sector through planning and prevention actions oriented to reach disaster mitigation and emergency responses (Climate Investment Funds, 2011). This policy was never implemented so a new version was formulated in 2019 through a participatory process. It focused in promoting sustainable management of the country's water resources through stakeholder participation and contribution to economic, social and environmental development in an efficient and equitable manner. Furthermore, it identifies both structural and non-structural measures to strengthen climate resilience related to water management (Caribbean Protected Areas Gateway CPAG, 2020). The document is composed by four parts:

4. Situation analysis: Describes the global, regional and local contexts to identify Grenada's water resources and water management issues.
5. Strategic Focus: It characterizes the policy by detailing the Vision Statement, Guiding Principles, Goal, Outcomes and Objectives; as well as the basis and guidelines for action.
6. Institutional Framework: Describes the role of the main actors involved (e.g., government, private sector, civil society and the international community).
7. Policy Implementation: Identifies institutional arrangements and defines policy direction, coordination and regulations to reach an equitable and sustainable management of water resources, poverty reduction and rural development (Ibid).
8. Policy Implementation: Identifies institutional arrangements and defines policy direction, coordination and regulations to reach an equitable and sustainable management of water resources, poverty reduction and rural development (Ibid).

Grenada Strategic Program for Climate Resilience (2011): The Grenada Strategic Program for Climate Resilience (SPCR) is the key component of the Pilot Programme for Climate Resilience (PPCR), developed by the Ministry of Finance, Planning, Economy, Energy and Co-operatives in cooperation with and under financial assistance of the World Bank. The PPCR aims to help countries transform to a low-carbon climate resilient development path, consistent with poverty reduction and sustainable development goals (Climate Policy Radar, 2024). In this context, the SPCR proposes a package of infrastructure projects and technical assistance activities related to address climate change vulnerabilities who has been previously identified:

- Key infrastructure in the country is vulnerable to significant loss and damage from extreme weather events.
- Key natural resources like forests, beaches, soil and water damaged and threatened.
- Lack of systems, expertise and facilities to collect, store and analyse relevant information and data on topics related to climate change.
- Inadequate knowledge and awareness of potential impact of climate change and lack of technical skills to address them.
- Policies, laws and regulations related to climate change and disaster risk reduction need strengthening and the capacity to enforce these revised regulations need enhancement.
- Planning for a co-ordinated response to climate change and disaster risk reduction activities need improvement.

Considering these problems, the SPCR establishes six areas of intervention through investment projects and technical assistance: Disaster Vulnerability and Climate Risk Reduction, Forest Rehabilitation, Water Resources Assessment and Management Study, Roadmap for Coastal Zone Management, Improving the Use of Data & GIS for Climate Change Adaptation, Preparation of a Project for Rehabilitation of Bathway Sandstone Reef (Ibid).

National Energy Policy (2011): Grenada's National Energy Policy (GNEP) lays down the Government's objectives for shaping the energy sector in Grenada, to ensure access to affordable, equitable, and reliable energy sources and services to drive and secure national development, and to improve the quality of life for all of its citizens. For achieving this goal, the policy states strategies to facilitate the integration of renewable energy sources into the national energy mix and ensure social inclusiveness and equity access to energy (Climate Change Policy Radar, 2024). This policy is based on seven core principles:

9. Energy Security
10. Energy Independence
11. Energy Efficiency
12. Energy Conservation
13. Environmental Sustainability
14. Sustainable Resource Exploitation
15. Rational Energy Prices and
16. Energy Equity and Solidarity, including with future generations.

The GNEP called for a minimum of a 20% reduction of GHG emissions from fossil fuel combustion and set a specific target for renewable energy in the country: to provide 20% of all domestic energy used for electricity and transport by 2020. It also called for the implementation of various measures to encourage energy efficiency and conservation in energy generation, transport and buildings sectors (Ibid). To lay down climate change adaptation and mitigation, this policy seeks to achieve a low carbon development through a more diversified and sustainable energy production. Furthermore, risk and vulnerability assessments are also included into major energy infrastructure to increase resilience of assets, especially for the ones located in coastal areas. The use of renewable energy will also be promoted, including more sustainable sources such as geothermal, solar and wind; to ensure energy security and reduce reliance on imported energy sources. Finally, this policy promotes energy efficiency in the main economical sectors of the country such as agriculture to achieve development while ensuring energy conservation and protecting the environment (FAO, 2024).

National Climate Policy for Grenada, Carriacou and Petite Martinique (2017 - 2021): Grenada's climate change actions are guided by its main National Climate Change Policy built on the foundation laid by the National Climate Change Strategy and Action Plan (2007-2011). The priorities of these policies are based on the current gaps in addressing mitigation and adaptation, including Grenada's institutional setting and ability to respond to present and future risks posed by climate change; data and data access (digitalization) for climate; funds for investment in climate-related technology and infrastructure and capacity building; reliable estimates on revenues from climate-related investments such as energy efficiency or ecosystem-based adaptation; and increased awareness of climate change among civil society, the private sector and political decision makers (GCF Independent Evaluation Unit, 2023). The policy objectives are:

- A) **Strengthen institutional structure** to support coordination, mainstreaming and implementation of climate change adaptation and mitigation action, along with the systematic integration of climate change adaptation into development policies, plans, programmes, projects, budgets and processes.

- B) **Build climate resilience** in the following priority thematic areas: water supply and sewage management; agriculture, agri-business and food security; biodiversity and ecosystems; human health and coastal zone management.
- C) **Facilitate climate smart (low carbon, climate resilient) infrastructure location, planning, design and maintenance**, sustainable land management and reduce greenhouse gas (GHG) emissions in the electricity, transport, waste and forestry sectors.
- D) **Integrate disaster risk management and climate change adaptation**, and support funding applications for disaster risk management activities.
- E) **Strengthen institutional arrangements** for the collection, storage, analysis, sharing and use of climate, GHG emission and pollutant/chemical data and information to inform evidence-based decision making.
- F) **Improve citizens' awareness** of the causes, impacts and appropriate responses to climate change, so that they are in a better position to take independent action and support relevant public policies, and state and non-state activities.
- G) **Access climate technologies for mitigation and adaption** along with capacity building. Increase external climate finance support to Grenada's adaptation and mitigation process.
- H) **Advocate for international action on climate change** through foreign policy (Government of Grenada, 2017).

National Sustainable Development Plan (2020 - 2035): This policy sets out the vision for the country's sustainable development and long-term transformation, improving the way Grenadians live, work and interact with the environment and institutions. The three national goals outlined in the plan include high human and social development by putting people at the centre of sustainable development and transformation; a dynamic and competitive economy with supporting climate- and disaster-resilient infrastructure; and environmental sustainability and security (GCF Independent Evaluation Unit, 2023). The expected results are eight national outcomes which are based on improvements or positive changes in institutions, systems, communities, behaviours, living conditions or knowledge in the country. The national outcomes are:

17. A healthy population
18. Educated, productive, highly-skilled, trained and conscious citizens
19. A resilient, inclusive gender-sensitive and peaceful society
20. Broad-based, inclusive and sustainable economic growth and transformation
Competitive business environment
Modern climate and disaster resilient infrastructure
Climate resilience and hazard risk reduction
21. 5)Energy security and efficiency (ECLAC, 2020)

National Determined Contribution (2020): Although Grenada's total emissions are not significant in the global context, the island is committed to a low carbon emission development pathway which would have significant economic benefits for the country as well as reduce its carbon footprint. Through the recent submission of its second NDC, Grenada has committed to a broader climate action, reducing greenhouse gases by 40 percent by 2030. It will primarily focus on the emissions intensive sectors of energy (including transport), forestry, waste, and industrial processes and product use (including cooling). It also places a new emphasis on taking a comprehensive whole-of-society approach to climate action incorporating gender, youth, and other groups most vulnerable to the effects of climate change (UN Climate Change, 2024). The NDC implementation will depend on the amount of climate finance that can be mobilized. The government estimates this will require between USD 985 million and USD1 billion through 2030. Grenada anticipates that much of this support will come from multilateral institutions, such as the Green Climate Fund, as well as bilateral sources (Ibid).

7.2.4 Jamaica

Jamaica recognized that given the cross-cutting nature of climate change the development of an integrated approach to effectively build resilience at all levels was imminent. Therefore, the Climate Change Policy Framework was recently enacted (2015), with the intention of primarily supporting the efforts in reducing the risks posed by CC to all of Jamaica's sectors and development goals. This ratification is also crucial for Jamaica's commitments under the UNFCCC, as the Intended Nationally Determined Contributions made in 2015, are expected to be implemented through the Climate Change Policy Framework.

GoJ has developed national strategies and coherent policies to promote more resilient development planning. The 11th EDF National Indicative Programme (NIP) for Jamaica is a key document of relevance to this Budget Support as it clearly prioritizes environment and climate change as areas of intervention. The FP contributes to this national approach for sustainable and inclusive growth as it is in line with the EU's Agenda for Change and Government of Jamaica's Vision 2030, calling for supporting good governance. The FP and the NFMCP are also both aligned to the following National Obligations:

- Climate Change Policy Framework (2015);
- Medium Term Socio- Economic Framework;
- Protected Areas System Master Plan (PASMP);
- Jamaica Vision 2030 - National Development Plan (NDP);
- Third National Communication (TNC).

With specific reference to the Vision 2030 NDP, it is informed by four mutually reinforcing and inter-linked sectors and goals. It reports that deteriorating air and water quality; loss of biodiversity; watershed degradation; net loss of forest cover; and increasing incidence of forest fires being experienced within the country are threatening a sustainable future. Four (4) Vision 2030 Goals have clearly articulated national outcomes, many of which hinge on aspects that are presented within the FP. These are presented below:

- Goal 1: Jamaicans are empowered to achieve their fullest potential;
- Goal 2: The Jamaican society is secure, cohesive and just;
- Goal 3: Jamaica's economy is prosperous;
- Goal 4: Jamaica has a healthy natural environment.

Regarding policy coherence with supporting sectors to forestry, policy and legislative progress is apparent on a number of areas. The GoJ has made good progress on the institutional and legislative framework related to the conservation and protection of the natural resources within the context of sustainable development. Some of the major legislative initiatives related to environmental management include the Natural Resources Conservation Authority Act (1991), the Endangered Species (Conservation and Regulation of Trade) Act (2000), the Beach Control Act (1956), The Natural Resources (Marine Parks) Regulations (1992), and the National Solid Waste Management Act (2001).

Moreover, Jamaica recognized that given the cross-cutting nature of climate change the development of an integrated approach to effectively build resilience at all levels was imminent. Therefore, the Climate Change Policy Framework was recently enacted (2015), with the intention of primarily supporting the efforts in reducing the risks posed by climate change to all of Jamaica's sectors and development goals. This ratification is also crucial for Jamaica's commitments under the United Nations Framework Convention on Climate Change (UNFCCC), as the Intended Nationally Determined Contributions made in 2015, are expected to be implemented through the Climate Change Policy Framework.

National Economic & Social Development Plan: Vision 2030 Jamaica National Development Plan (2009): Jamaica has declared "hazard risk reduction and adaptation to climate change" as one of its 15

national aims. To this end, this document outlines why it is policy imperative, identifies specific weaknesses in the nation's disaster planning and response mechanisms, and commits to improvements. While GSI is not explicitly discussed, community-level issues and approaches are a clear and consistent theme. It also calls for confronting some thorny social issues, such as unplanned settlements.

National Communication on Climate Change: Climate Change Policy Framework for Jamaica (2015):

This policy framework squarely addresses GSI. It notes that 82% of the population lives within five kilometers of the coast, and points to high poverty (17.5%) as a compounding driver of vulnerability, as well as an impediment to achieving Jamaica's CC policy aims. It argues that the environment needs to be better mainstreamed and prioritized within Jamaica's public policy arena. At the same time, it calls for poverty reduction as a means of improving people's adaptive capacities. The document directly addresses youth and gender (p. 17-18). It points to the special vulnerabilities of youth, but also their potential to confront CC in the future. Gender is presented as a cross-cutting issue and the document calls for acknowledging and addressing "different economic, social and environmental realities" for women and men within CC planning. It represents a key document towards the framework for the Third National Communication (TNC- see below).

Third National Communication for Jamaica - TNC (2018): Jamaica has been a party to the United Nations Framework Convention on Climate Change (UNFCCC) since 1995. This requires the provision of timely updates on its actions to respond to climate change. This Third National Communication (TNC) provides an update on national circumstances contained in the Second National Communication and new information that has become available. It covers the time span of 2006 - 2012 and more recent information where possible. The TNC also includes the results of five assessments for determining the island's vulnerability to the impacts of climate change. They were done for the priority sectors of coastal resources, tourism, agriculture, human health, and water.

National Water Resources Development Master Plan (WRDMP) (2021): In Jamaica the access to safe water for all residents is a right. It must entitle all persons to have sufficient, affordable, accessible, safe and acceptable water for personal and domestic use. In this sense, the WRDMP summarizes the Government framework to ensure that the country's water resources are effectively managed to provide for Jamaica's social, economic and environmental well-being now and in the future. It includes sections on urban water and sewerage, rural water and sanitation, urban drainage and irrigation (WRA, 2024). It focuses on:

- Institutional responsibilities, and water allocation mechanisms.
- Ownership and private participation.
- Future water development and related capital expenditure to be driven by policy.
- Emphasis on water use efficiency and policies to encourage wise water use and conservation practices to reduce the water demand.
- Shifting of national priorities from water resources development to restoration of existing resources and enhancement of water quality as means to reduce capital required.
- Systematic planning as a matter of policy, based on reliable information and a range of alternatives to contain, demand and reduce the need for capital expenditure.
- Legislation to provide appropriate regulatory framework to protect consumers, investors and the environment in light of contemporary water problems (Ibid).

Jamaica Gender and Climate Change Strategy and Action Plan (GCCSAP) (2022-2025): Jamaica now has a Gender and Climate Change Strategy and Action Plan (GCCSAP). The Plan's development was guided by a national gender and climate change assessment, which provided an overview of the policy and institutional contexts for gender-responsive climate action.

Nationally Determined Contributions: Jamaica submitted its first NDC in 2020 and then submitted its revised NDC in 2020. The NDC outlines its contributions to the Paris Agreement including enhanced

commitments to reducing GHG emissions through actions in key sectors (energy, forestry, agriculture, with adaptation treated as a cross-cutting element.

7.2.5 Saint Lucia

There are several policies and plans in Saint Lucia that speak to climate adaptation and mitigation measures that safeguard the coastal and marine resources including mangroves ecosystems. These include inter alia National Climate Change Policy and Adaptation Policy; National Adaptation Plan 2018-2028 and Sectoral Adaptation Strategy and Action Plans (SASAPs) 2018 - 2028.

Saint Lucia has a medium-term development strategy (MTDSP) 2022-2023, entitled “Economic Growth on the A.R.I.S.E. - Nou Tout Ansanm”, is a clarion call for collective action to drive Saint Lucia’s development agenda. It seeks to accentuate the interconnected nature of development planning by ensuring economic, social and environmental considerations are incorporated and mainstreamed into Saint Lucia’s national planning framework.

The Saint Lucia Climate Change Adaptation Policy (2015) provides overall guidance for climate adaptation programming in an integrated manner. It focuses on using inter-connected processes of **Adaptation Facilitation** aimed at the appropriate policy, legislative and institutional environment; **Adaptation Financing**, involving instituting measures to ensure adequate and predictable financial flows; and **Adaptation Implementation**, which entails taking concrete actions on the ground to prepare for or respond to the impacts of climate change. Under the Pilot Programme for Climate Resilience (PPCR) project, adaptation projects were planned, and sectors prioritized for intervention. Additionally, sector policies and strategies have been developed and are at various stages of implementation. Therefore, to further consolidate the Government of Saint Lucia’s (GoSL) commitment towards building resilience it is proposed that this readiness proposal build on the work that has already commenced in its roll-out. GoSL envisages this readiness proposal as a catalyst to support the diffusion of transformational techniques, tools and approaches in defining a robust pipeline of fundable projects that contribute to building resilience and the long-term sustainable development of Saint Lucia.

The Saint Lucia Climate Change Adaptation Policy (2015) provides the framework for Saint Lucia’s ten-year **National Adaptation Plan 2018 -2028** process, which commenced in 2017 with a NAP Stocktaking, Climate Risk and Vulnerability Assessment. In 2018, Saint Lucia launched its NAP process, together with priority **Sectoral Adaptation Strategy and Action Plans (SASAPs) 2018 - 2028**, initially for fisheries, water and agriculture sectors and a thematic document for resilient ecosystems.

National Adaptation Plan: Saint Lucia’s National Adaptation Plan (NAP) 2018-2028 (2018): The government recently completed a ten-year National Adaptation Plan (NAP 2018), that outlines immediate, medium and long-term climate change adaptation needs and the process for the development of adaptation strategies and investment plans for priority sectors has already commenced. St. Lucia’s updated NAP presents a far-ranging vision with very clearly articulated priorities for current and future programming. The sector priorities do include health and education; ‘soft’ sectors which are critical to adaptation but often omitted from adaptation planning. The plan also includes a section on gender mainstreaming, which presents key data about women (e.g., that 40% of households are female-headed) and gendered divisions of labor “which is culturally acceptable” (p. 54). While this section argues that “poverty, age, and level of education achieved appear to be greater drivers of vulnerability than gender,” the authors give credit where credit is due and identify opportunities to better mainstream GSI into adaptation planning; including sensitivity to vulnerable groups, gender-disaggregated information, and better outreach and participation to women and other disadvantaged populations. The NDC includes a commitment to emissions reduction and an (indicative) quantified mitigation strategy to meet the reduction target. It identifies key sectors/areas for climate-change adaptation, but the government is

still in the process of developing sector specific strategies, so priority adaptation projects are not specified (see Chapter V below). Financing needs are identified only for mitigation. Moreover, the process for the development of sectoral strategies with costed investment plans for the Water, and Agriculture and Fisheries sectors, and a monitoring/evaluation plan has begun.

Saint Lucia's Sectoral Adaptation Strategy and Action Plan for Water Sector (Water SASAPs) 2018 - 2028: In the SASAP, the adaptation measures are grouped under 13 strategic objectives and contribute to four major expected outcomes, namely:

- Outcome 1. Enhanced enabling environment and improved behaviour for water-related climate adaptation action
- Outcome 2. Increased water access, availability and quality
- Outcome 3. Increased water efficiency and conservation
- Outcome 4. Strengthened preparedness to climate variability and extremes

The NAP process ranked the water sector highest in terms of urgently requiring climate adaptation interventions due to its national significance, the potential repercussions of non-action and its cross-sectoral nature. The NAP states that: “Due to the cross-cutting nature of water, water-mediated climate change impacts are expected to affect, directly and indirectly, all development sectors in Saint Lucia, with serious implications for the island’s population and economy.”

Saint Lucia's Sectoral Adaptation Strategy and Action Plan for Fisheries Sector (Fisheries SASAPs) 2018 - 2028: The overarching goal of the Sectoral Adaptation Strategy and Action Plan for the Fisheries Sector is to drive the implementation of effective adaptation actions to strengthen the sustainability of Saint Lucia’s fisheries and fishery-dependent businesses and the security of fisheries-dependent livelihoods under a changing climate.

- Outcome 1. Enhanced enabling environment for climate adaptation action in the fisheries sector
- Outcome 2: Enhanced nutrition, food availability, quality, and security through adaptation in the fisheries sector
- Outcome 3: Strengthened partnerships for building sustainable and resilient fisheries in a changing climate
- Outcome 4: Strengthened preparedness to climate variability and extremes in the fisheries sector

Saint Lucia's Sectoral Adaptation Strategy and Action Plan for Water Sector (Agriculture SASAPs) 2018 - 2028: The overarching goal of the Sectoral Adaptation Strategy and Action Plan for the Agriculture Sector is to overcome the barriers (policy, regulatory, institutional, technical, financial, business, and social) to facilitate the adoption and scaling up of climate resilient agriculture best practices and businesses for enhancing food and nutrition security in Saint Lucia under a changing climate. The Agriculture SASAP is based on three outcomes:

- Outcome 1. Enhanced enabling environment for climate adaptation action in the agriculture sector
- Outcome 2: Enhanced nutrition, food availability, quality, and security through adaptation in the agriculture sector
- Outcome 3: Strengthened partnerships for scaling up climate resilient agriculture
- Outcome 4: Built adaptive capacity to climate variability and extremes in the agriculture sector

Saint Lucia's Resilient Ecosystems Adaptation Strategy and Action Plan (REASAPs) 2020 - 2028: The overarching goal of the Resilient Ecosystems Adaptation Strategy and Action Plan is to drive the implementation of effective actions to safeguard Saint Lucia’s natural capital from the impacts of climate change, while harnessing biodiversity, ecosystems and ecosystem services to reduce vulnerability and

build resilience. The REASAP consists of 58 measures that respond to six strategic objectives and three major outcomes, all aligned with the CCAP's implementation elements (facilitation, implementation and financing).

- Outcome 1. Enhanced enabling environment for ecosystem-based adaptation and sustainable natural resource management under a changing climate
- Outcome 2. Enhanced ecosystem integrity for the sustainable supply of essential ecosystem goods and services to society under a changing climate
- Outcome 3: Strengthened Ecosystem-based Adaptation and Disaster Risk Reduction

Saint Lucia's Climate Finance Strategy (2020): The strategy document contains the elements of a strategy to access finance and ensure that the resources available to Saint Lucia for the achievement of its NAP objectives are appropriate and commensurate with its needs.

Saint Lucia's Private Sector Engagement Strategy (2020): The national commitment to strengthen general awareness and the demonstrated urgency for climate adaptation expressed in the NAP are thus the central pillars of this private sector engagement strategy. This commitment includes facilitating greater awareness of the business case for increasing efficiency and improving resilience within the entire private sector spectrum in Saint Lucia. This strategy intends to stimulate a more informed and devoted private sector to contribute actively to meeting national adaptation priorities.

National Communication on Climate Change: Third National Communication on Climate Change for Saint Lucia (2017): The TNC represents a key document to demonstrate that St. Lucia has made impressive gains on mainstreaming CC into public policy and calls for consolidating that with increasing uptake and implementation of adaptation actions; including those that engage on key issues. It clearly tackles how CCA will exacerbate poverty and vulnerability, and those in poor/marginalized circumstances will be least able to cope. It also recommends specific actions to reach them, ranging from early warning systems that effectively communicate with marginalized populations; psychosocial outreach; disaster relief; and other measures that disproportionately support those most in need.

Nationally Determined Contributions (NDC): Saint Lucia has also submitted its updated National Determined Contribution to the UNFCCC in 2021. The country is committed to global efforts to reduce greenhouse gas emissions. To this end, the country committed to providing up to 35% of electricity generation from renewable sources by 2020, a result that the country has fallen short of achieving. In its NDC, Saint Lucia aims at reducing its GHG emissions by 23% by 2030 conditional upon sufficient international support. The revised NDC is accompanied by NDC Implementation and Financing Strategies and is informed by national policies, including the National Energy Transition Strategy (NETS).

National Ocean Policy and Strategic Action Plan: Saint Lucia has recently established the National Ocean Policy - with a draft Strategic Action Plan (NOP SAP) as a comprehensive framework aimed at integrated marine planning and management within its marine territory, spanning from 2020 to 2035. This policy encompasses eight key outcomes, with a particular focus on incorporating climate change considerations.

Outcome 7 of the NOP specifically addresses the importance of enhancing resilience to mitigate climate-related hazards. Under this outcome, two primary goals have been identified: (i) Goal 7.1: To effectively manage the escalating risk of coastal hazards resulting from climate change. This will be achieved through the development of knowledge and information, which will play a crucial role in the successful implementation of the National Adaptation Plan (NAP) and other associated sectoral and thematic strategies, plans, and Integrated Coastal Zone Management (ICZM) policy. (ii) Goal 7.2: To promote the mainstreaming of Ecosystem-based Adaptation (EbA) and the ridge-to-reef approach into coastal planning processes. By integrating these nature-based solutions, Saint Lucia aims to enhance the resilience and sustainability of its coastal areas while addressing the challenges posed by climate change.

In essence, the National Ocean Policy and Strategic Action Plan sets forth a clear vision for Saint Lucia's marine space management, with a keen awareness of the need to adapt and respond to climate change impacts effectively.

8. Projects and programmes in CABRIC countries

8.1 Climate Finance Needs and Receipts for Adaptation and Resilience

Climate change poses significant challenges to Caribbean nations, particularly coastal communities vulnerable to rising sea levels, hurricanes, and other climate-related events. Addressing these challenges requires substantial financial resources dedicated to adaptation and resilience. Below is an assessment of climate finance needs and receipts in the Caribbean, with a focus on The Bahamas, Belize, Grenada, Jamaica, and Saint Lucia.

To begin with, the Caribbean region requires significant investment to enhance climate resilience. The organisation for Economic Co-operation and Development (OECD) emphasizes that climate resilience, access to finance, and regional integration are crucial for unlocking the potential of Caribbean economies. Its 2024 report highlights the needs of 15 Caribbean countries, including The Bahamas, Belize, Grenada, Jamaica, and Saint Lucia, particularly in improving access to climate finance to support adaptation efforts.⁶⁴⁷ The IMF adds that countries in Latin America and the Caribbean face severe challenges in adapting to climate change. Vulnerable nations in the region prioritize adaptation measures but require substantial financial resources to implement them effectively.⁶⁴⁸

8.1.1 The Bahamas

The Bahamas has experienced significant financial challenges due to climate-related disasters. Hurricane Dorian in 2019 caused \$3.4 billion in damage, exceeding the country's annual revenue⁶⁴⁹ and Prime Minister Philip Davis has consistently highlighted the need for increased international financial support to address these challenges.⁶⁵⁰ The Bahamas is actively involved in regional initiatives to enhance access to climate finance and build capacity for adaptation. For example, through partnerships with organizations like RMI, the country is working to unlock critical finance for adaptation strategies.⁶⁵¹ However, despite these efforts, securing sufficient climate finance remains a persistent challenge.⁶⁵²

8.1.2 Belize

Belize has actively participated in regional projects to improve access to climate finance, such as the “Enhancing Caribbean Civil Society’s Access and Readiness for Climate Finance” initiative, as mentioned in section 5, which promotes civil society leadership in climate finance. The country is also engaged with the CCCCC, focusing on regional capacity building and resilience strategies.⁶⁵³ Despite these efforts, Belize struggles to mobilize adequate funding to meet its adaptation and resilience needs. The country continues to seek additional international support to effectively address the impacts of climate change.⁶⁵⁴

8.1.3 Grenada

Grenada has demonstrated leadership in employing innovative financial tools to manage climate risks. In 2024, Grenada became the first nation to trigger a “hurricane clause,” which allowed the country to pause \$12 million in interest payments following the extensive damage caused by Hurricane Beryl. This

mechanism highlights the importance of embedding disaster-response tools into financial systems to ease debt burdens after natural disasters.^{655 & 656}

In addition to this mechanism, Grenada received a record \$44 million payout from the Caribbean Catastrophe Risk Insurance Facility (CCRIF), enabling the government to address immediate recovery needs without exacerbating its debt challenges.⁶⁵⁷ Prime Minister Dickon Mitchell has also advocated for advanced financial tools and strengthened international partnerships to enhance climate resiliency, emphasizing Grenada's proactive approach to climate adaptation.⁶⁵⁸

8.1.4 Jamaica

Jamaica has been active in regional initiatives to build climate resilience. The country is a participant in the Caribbean Organizations for a Resilient Environment (CORE) project, a CAD \$13.4 million initiative funded by Global Affairs Canada and the Caribbean Biodiversity Fund, which aims to increase resilience among vulnerable groups in eight Caribbean nations.⁶⁵⁹ Additionally, Jamaica benefits from the Pilot Program for Climate Resilience (PPCR), which supports the integration of climate risk and resilience measures into national development planning. Despite these efforts, Jamaica continues to face challenges in securing sufficient climate finance to fully implement its adaptation and resilience strategies. The country remains committed to seeking additional international funding to address escalating climate impacts.^{660 & 661}

8.1.5 Saint Lucia

Saint Lucia has made strides in developing strategic frameworks for climate finance. The country has engaged with the GCF, receiving readiness support to enhance its capacity for accessing and managing climate finance effectively.^{662 & 663}

In addition to these efforts, Saint Lucia participates in regional initiatives such as the CCCCC programs, which aim to develop and implement adaptation strategies across various sectors.⁶⁶⁴ Recognizing the critical role of tourism in its economy, the government has also emphasized sustainable tourism as a key climate resilience strategy. Through partnerships with organizations such as the Caribbean Tourism Organization, Saint Lucia integrates climate risks into tourism planning while promoting eco-tourism and climate-adaptive infrastructure.⁶⁶⁵

To further enhance its resilience, the Saint Lucia Climate Adaptation Finance Facility (CAFF), funded by the IDB, provides concessional loans to households and businesses for climate-resilient investments, including renewable energy systems and water storage solutions.⁶⁶⁶

8.1.6 Climate Finance Received as of 2023

As of 2023, Caribbean nations have received varying levels of climate finance to support adaptation and resilience efforts. The Climate Finance Access Network (CFAN), supported by Canada and the United States, has begun embedding climate finance advisors in Caribbean governments. This model, successfully applied in the Pacific, unlocked \$64.4 million in climate financing and developed a \$463.8 million investment pipeline. Similar efforts in the Caribbean aim to mobilize critical finance for resilience.⁶⁶⁷

The United States has also announced new funding for climate adaptation and resilience projects under its "PACC 2030" initiative. This partnership focuses on clean energy and climate-resilient infrastructure across the Caribbean, with countries like Saint Lucia and Grenada already benefiting.⁶⁶⁸

In addition, the GCF has disbursed \$215 million across the Caribbean for various resilience projects, including capacity building, renewable energy systems, and disaster risk reduction. Countries such as Jamaica, Saint Lucia, and Grenada have been prominent beneficiaries.⁶⁶⁹ Despite these investments, the region faces a significant funding gap, as the Caribbean's annual adaptation needs are estimated to reach \$10 billion. Advocating for increased access to concessional financing, insurance mechanisms, and innovative funding models remains a priority for the region.

8.2 Country level climate finance need for adaptation

Table 58 Country Climate Finance Needs and Challenges

Country	Estimated Climate Finance Needs	Notable Climate Challenges
The Bahamas	Annual adaptation costs estimated at 2-3% of GDP (~\$300-\$450 million/year).	Highly vulnerable to hurricanes and sea-level rise; Hurricane Dorian (2019) caused \$3.4 billion in damages. ⁶⁷⁰
Belize	Requires \$1.3 billion by 2030 for climate action (40% of GDP).	Susceptible to coastal erosion, hurricanes, and biodiversity loss. ⁶⁷¹
Grenada	Needs \$350 million by 2030 for adaptation measures (30% of GDP).	Faces hurricanes, landslides, and coastal degradation. Activated a "hurricane clause" in 2024, pausing \$12 million in interest payments after Hurricane Beryl. ⁶⁷²
Jamaica	Estimated \$7 billion needed by 2030 for climate resilience (50% of GDP).	Prone to hurricanes, flooding, and droughts; participates in CORE project (CAD \$13.4 million). ⁶⁷³
Saint Lucia	Requires \$400 million by 2030 for adaptation efforts (25% of GDP).	Vulnerable to hurricanes, landslides, and sea-level rise; engaged with the Green Climate Fund for readiness support. ⁶⁷⁴

The below table highlights the finance received in 2023 in each of the Caribbean nations as well as their projected needs for 2024-2030.

Table 59 Climate Finance Received and Projected Needs (2024-2030)

Country	Climate Finance Received (as of 2023)	Projected Climate Finance Needs (2024-2030)
The Bahamas	Approximately \$200 million in international climate finance received; part of the \$7.5 billion allocated by the Inter-American Development Bank (IDB) to Latin America and the Caribbean in 2023.	Requires an additional \$2.1 billion to meet adaptation and resilience targets by 2030 (IDB, 2023).

Belize	Received around \$150 million in climate-related funding; a beneficiary of regional initiatives. Specific national allocations are not detailed.	Needs an estimated \$1.15 billion more to achieve climate goals by 2030 (Belize Climate Change Office, 2022).
Grenada	Secured \$100 million in climate finance, including a record \$44 million payout from the Caribbean Catastrophe Risk Insurance Facility (CCRIF) following Hurricane Beryl.	Requires an additional \$250 million to fulfill adaptation plans by 2030 (Grenada Ministry of Finance, 2024).
Jamaica	Obtained \$500 million in climate finance through various international sources, including the Pilot Program for Climate Resilience (PPCR).	Needs a further \$6.5 billion to reach climate resilience objectives by 2030 (PPCR, 2023).
Saint Lucia	Received \$120 million in climate funding, including readiness support from the Green Climate Fund (GCF). Exact disbursement figures are evolving.	Requires an additional \$280 million to meet adaptation targets by 2030 (GCF, 2023).

The following section shows an analysis that was conducted of the present pipeline of climate finance projects funding adaptation actions in the participating CABRIC countries. It features the key projects, adaptation sectors and connections / synergies with the CABRIC EDA programme.

8.2.1 Bahamas

Table 60: Climate finance adaptation projects and programmes in the Bahamas

Program/ Project	Adaptation area	USD	Donor	Dates	IE	Objectives	Synergies
Adaptation to Climate Change in the Caribbean (ACCC) Project 2001-2004	Multi sector	\$2 million	CIDA	2001-2004	World Bank	To follow up climate change issues after CPACC and to lead into a later follow-on program being proposed to the Global Environment Facility	Paves the way for climate adaptation.
Mainstreaming Adaptation to Climate Change (MACC) project	Multi sector	\$10.9 million	GCF, CIDA	2003-2009	World Bank	To create the technical know-how and infrastructure for monitoring environmental variables strengthening the monitoring network and climate modelling techniques in the region	Paves the way for climate adaptation.
Catalytic Capital for First Private Investment Fund for Adaptation Technologies in Developing Countries (CRAFT) Multi country	Multi sector	\$400 million	GCF	2021 - In progress	Pegasus Capital Advisors, L.P.	To scale up climate adaptation finance and accelerate development, application and transfer of private sector technologies in climate adaptation and resilience.	Focuses on the private sector, which is complementary to this programme's focus on NGOs and CSOs and the provision of grants.
Global Fund for Coral Reefs Investment Window. Multi country	Ecosystem resilience	\$400 million	GCF	2022-2032	Pegasus Capital Advisors, L.P.	To create a private equity fund to encourage investments in the blue economy in the aim of protecting coral reefs from several stressors including climate change.	Focuses on the private sector, which is complementary to this programme's focus on NGOs and CSOs and the provision of grants.

Caribbean Net-Zero and Resilient Private Sector programme	Multi sector	\$527.2 million	GCF	2024 - In progress	Inter-American Development Bank (IDB Group)	It aims to overcome investment barriers by providing advisory services and finance solutions. It also enhances the gender approach and the diversity gaps in the region	Focuses on the private sector, which is complementary to this programme's focus on NGOs and CSOs and the provision of grants.
Implementing Land, Water and Ecosystem Management	Ecosystem resilience	\$ 867,250	GEF Trust Fund	2020-2023	UNEP	To develop a model of integrated land, water and ecosystem management for The Bahamas and other Small Island Developing States.	CABRIC will engage with the research and academic institutes of; Bonefish & Tarpon Trust, the University of Bahamas, the University of The Bahamas, Bahamas National Trust (BNT) involved in the project to synergize on knowledge sharing and outreach.
Pine Islands - Forest/Mangrove Innovation and Integration (Grand Bahama, New Providence, Abaco and Andros)	Ecosystem resilience	\$ 7.7 million	GEF Trust Fund	2016-2024	UNEP	It aims to build on recent advancements in the forestry sector by integrating biodiversity values, ecosystem services values and precepts of sustainable forest management and land-use into enhanced land-use planning in The Bahamas.	CABRIC will engage with the research and academic institutes of; Bahamas Agriculture and Industrial Corporation (BAIC), Bahamas National G.I.S. Centre (BNGIS), Bahamas National Trust (BNT),

Building a Sustainable National Marine Protected Area Network	Ecosystem resilience	\$ 7.7 million	GEF Trust Fund	2010-2014	UNEP	To expand protected area coverage of globally significant marine biodiversity and increase the management effectiveness of the national marine protected area network across the Bahamian archipelago.	<i>Bahamas Environment, Science and Technology (BEST), Bahamas National Trust, The Nature Conservancy</i>
---	----------------------	----------------	----------------	-----------	------	--	---

8.2.2 Belize

Table 61: Climate finance projects and programmes in the Belize

Program/ Project	Adaptation area	USD	Donor	Dates	IE	Objectives	Synergies
Integrated Flood Management in the Upper Regions of the Belize River Watershed	Water Security	\$671,221.15	GCF		CCCCC	This PPF will investigate the cost benefit of the proposed flood protection measures, possible social and environmental impacts, and the impacts of climate change on flood and flood risk, to inform the development of the full funding proposal. The study will compare scenarios with and without the project under a projection of climate change and against a baseline situation and compare those scenarios to each other to determine the impact of the project. As a result, support received will be used to conduct the following assessments. Feasibility study inclusive of an Economic/Financial Analysis, Climate Impact Assessment, Engineering Designs, and Detailed Budget Plan.	One of the CABRIC project themes focuses on the establishment of EWS to enhance resilience against climate hazards.

						• Environmental, Social and Gender Studies. • Risk Assessment, Register and Mitigation Plan • Identification of project level indicators • Advisory services on legal, financial, tax, regulatory and governance matters, to help structure the investment.	
National Adaptation Planning for Integrated Water Resource Management in Belize	Water Security	USD 902,937	GCF		CCCCC	Strengthen adaptation planning, governance, and institutional coordination to enable climate resilient water resources use and management practices.	Paves the way for climate adaptation.
The Marine Conservation Climate Adaptation project (MCCAP)	Ecosystem resilience	\$	AF	2015-2022	World Bank	The primary objective of the project was to implement priority ecosystem-based marine conservation and CCA measures to strengthen the climate resilience of the Belize Barrier Reef System.	Paves the way for climate adaptation.
Global Climate Change Alliance Grant	Water security	\$2.9 million	EU	2014	UNDP	The grant was implemented by UNDP to enhance adaptive capacity and resilience to climate change in national policies, including the water sector in Belize. According to the EU, 80% of the funds were used to finance investments in the water sector, where a climate change strategy is already in place with support from the World Bank. The remaining funds were dedicated to mainstreaming climate change policy, a pre-condition of which is that the government establishes a climate change desk.	Mirrors that of the CABRIC programme, especially through utilizing UNDP

FP101 Resilient Rural Belize (Be-Resilient)	Multi-theme	\$20 million	GCF	2020-ongoing	IFAD	The project will increase resilience of smallholder farmers in Belize to climate change impacts that have negative consequences on agricultural yields of important commodities for the country.	Paves the way for climate adaptation.
SAP035 Building the Adaptive Capacity of Sugarcane Farmers in Northern Belize (BaC-SuF)	Ecosystem Resilience	\$38.8 million	GCF	2024-ongoing	CCCCC	Building the Adaptive Capacity of Sugarcane Farmers in Northern Belize (BaC-SuF) aims to enhance their resilience by implementing a seed cane variety programme, strengthening farming, water control, sharing knowledge and expanding the range of sugarcane varieties.	Paves the way for climate adaptation.
Global Fund for Coral Reefs Investment Window Multi country	Ecosystem resilience	\$400 million	GCF	2022-2032	Pegasus Capital Advisors, L.P.	To create a private equity fund to encourage investments in the blue economy in the aim of protecting coral reefs from several stressors including climate change.	Focuses on the private sector, which is complementary to this programme's focus on NGOs and CSOs and the provision of grants.
Enhancing the Resilience of Belize's Coastal Communities to Climate Change Impacts	Ecosystem Resilience	\$4 million	AF	2024-ongoing	Protected Areas Conservation Trust	The objective of the proposed Project will be to increase climate resilience of coastal communities in Belize by improving coastal land use, habitation and monitoring by increasing adaptive capacity and knowledge transfer.	Paves the way for climate adaptation and enhancing the resilience of local communities
Belize Blue Cities and Beyond Program	Water and Food Security	\$27.5 million	GEF	2024-ongoing	The World Bank	To improve Belize's management capacity for sustainable coastal and blue economy development, increase safe water supply and reduce land-based pollution discharges	CABRIC has a strong focus on coastal communities and their resilience

						at targeted urban areas, and respond effectively in case of an eligible emergency	
Mainstreaming Biodiversity in Belize's Maya Golden Landscape	Ecosystem Resilience	\$2.8 million	GEF	2022-ongoing	FAO	To mainstream biodiversity in the Maya Golden Landscape's key biodiversity areas (KBAs).	Paves the way for climate adaptation.
Conservation And Sustainable Use of the Barrier Reef Complex	Ecosystem Resilience	\$2.1 million	GEF	1999-2008	UNDP	This project which builds on the achievements of the GEF-funded pilot phase project seeks to operationalize the recently passed Coastal Zone Management Act. This Act provides the institutional framework for the implementation of targeted interventions for biodiversity protection.	CABRIC has a strong focus on coastal communities and their resilience
Municipal Development Project	Infrastructure	\$15 million loan	World Bank	2010-n.d	Government of Belize	The objective of the project was to improve access to basic municipal infrastructure and to enhance municipal management in selected town and city councils of Belize. Belize Societal Investment Fund (BSIF) executed the project on behalf of the government.	Paves the way for climate mitigation.

8.2.3 Grenada

Table 62: Climate finance projects and programmes in Grenada

Program/ Project	Adaptation area	USD	Donor	Dates	IE	Objectives	Synergies
------------------	-----------------	-----	-------	-------	----	------------	-----------

Building Grenada's Strategic Framework to Enhance the Country's Capacity to Transition to Low Emission Development	Multi-sector	USD 999,968 .00	GCF	2023-2025	CCCCC	To create the enabling environment for Grenada's transition to low emission development.	Paves the way for climate mitigation.
Climate Resilient Water Sector in Grenada (G-CREWS)	Water	\$45.6 million	GCF	2019-2025	GIZ	G-CREWS supports the water sector by reducing water demand and increasing water availability.	G-CREWS
Integrated physical adaptation and community resilience through an enhanced direct access pilot in the public, private, and civil society sectors of three Eastern Caribbean small island developing states	Private sector	\$22.6 million	GCF	2019-2025	Department of Environment, Ministry of Health and Environment, Government of Antigua and Barbuda	A funding mechanism for public infrastructure (including drainage and irrigation) and ecosystems will also reduce disruptions in the water system and improve soil and water conservation, which are all threatened by the results of climate change.	Paves the way for climate adaptation and Focuses on the private sector, which is complementary to this programme's focus on NGOs and CSOs and the provision of grants.
Enhancing Land Management and Strengthening Ecosystem Resilience for Integrated Landscape Restoration and Climate-Resilient Food Systems in Carriacou, Grenada	Ecosystem resilience	\$2.2 million	GEF Trust Fund	2023-ongoing	UNEP	To effectively address land degradation in Carriacou, through demonstration and application of ecosystems-based landscape restoration, sustainable land management and good agricultural practices, using community participatory approaches that expands diversification and sustainability of livelihoods options.	Paves the way for climate adaptation.

Improving Waste Management and Public Awareness for a Clean and Healthy Ocean (Grenada)	Waste	\$4.5 million	GEF Trust Fund	2024-In progress	Conservation International	To improve waste management and public awareness for a clean and healthy ocean in the coastal area of Grenada.	Addressing a non-climate drive of ecosystem vulnerability, that many livelihoods depend upon.
Sustainable Energy Facility for the Eastern Caribbean	Energy	\$192.4 million	GCF	2019-2027	Inter-American Development Bank (IDB Group)	Financing commercial Geothermal Energy (GE) projects whilst strengthening legal and regulatory frameworks to underpin the development of GE potential in the East Caribbean region.	Paves the way for climate mitigation.

8.2.4 Jamaica

Table 63: Climate finance projects and programmes in Jamaica

Program/ Project	Adaptation area	USD	Donor	Dates	IE	Objectives	Synergies
Adaptation Program and Financing mechanism for the Pilot Program for Climate Resistance	Multi sector	\$12 million	IDB	2015-2019, 2020	MEGJC/ Project Executing Unit	The overall objective of the project is to increase Jamaica's resilience to climate change, through enhancing adaptive capacity across priority sectors.	Paves the way for climate adaptation.
'Building Resilience and Adaptation to Climate Change while Reducing Disaster Risk in Peckham, Clarendon, and Surrounding Communities'	DRM	\$783,000	Environmental Health Foundation (EHF)	n.d	RADA; PIOJ; Clarendon Municipal Corporation; Social Development Commission; Jamaica Agricultural Society; College of	Aims to build the community's capacity for climate change resilience and adaptation strategies. This will be implemented through several adaptive mechanisms such as training of farmers in sustainable land and water management techniques,	Paves the way for climate adaptation.

					Agriculture, Science and Education; ODPEM	implementation of an aquaponics system which will be fuelled by renewable energy, the preparation of disaster plan for the community, among others.	
Caribbean Regional Fund for Wastewater Management Project (CReW)	Water security		GEF	2011-2015	IDB	The main objective of the GEF CReW+ Project was to implement innovative, small-scale solutions in the wider caribbean region, using an Integrated Water and Wastewater Management (IWWM) approach and building on the sustainable financing mechanisms.	Addressing a non-climate drive of ecosystem vulnerability, that many livelihoods depend upon.
Coastal Protection for Climate Change Adaptation in the Small Island States in the Caribbean	DRM, ecosystem resilience	\$15 million	German Ministry for Economic Cooperation and Development	2015-2019	Caribbean Community Climate Change Centre	The Project is aimed to follow a bottom-up approach in which governmental and non-governmental institutions in participating countries can apply with proposals to pursue Local Adaptation Measures.	Paves the way for climate adaptation.
Enhancing Resilience of The Agricultural Sector and Coastal Areas to Protect Livelihoods and Improve Food Security	Food security / livelihoods	\$10 million	AF	2012-2016	Planning Institute of Jamaica	Protect Negril's beaches from coastal erosion; Enhancing the climate resilience of the agricultural sector by improving water and land management practices through water storage, soil conservation, microdams, small-scale irrigation, and other initiatives; Improving institutional and local level capacity for coastal and agricultural adaptation and awareness	Paves the way for climate adaptation.

Improving Climate Data and Information management	Climate data	\$7.5 million	WB	2015-2021	PIOJ	The objective of the ICDIMP is to improve the quality and use of climate related data for effective planning and action at the local and national levels. A wide range of benefits can therefore be attributed to upgrading hydro-met systems and improving dissemination of information about meteorological conditions and hazards.	Connects to Component 3 of climate information and knowledge sharing
Integrated management of the Yallahs-Hope Watershed Management Area	Water	\$12.8 million	GEF/IDB	2015-2019	NEPA	The objective of this project is to reduce pressure on natural resources in the Yallahs River and Hope River Watersheds of the Blue Mountains by increasing the practice of SLM resulting in improved management of Biological Diversity and enhanced flow of ecosystem services that sustain local livelihoods.	Addressing a non-climate drive of ecosystem vulnerability, that many livelihoods depend upon.
Jamaica Disaster Vulnerability Project	DRM	\$30 million	WB	2016-2022	Jamaica Social Investment Fund	Designed to enhance Jamaica's resilience to natural and climate-related disasters by improving disaster risk information, strengthening infrastructure, and implementing risk management policies.	One of the CABRIC project themes focuses on the establishment of EWS to enhance resilience against climate hazards.
Jamaica Mangroves Plus: Protection and Sustainable Management of Jamaica's	Ecosystem resilience	\$7.7 million	GEF	2023-ongoing	FAO	To support the implementation of the National Mangrove Management Plan for promoting a biodiversity-positive	Paves the way for climate adaptation.

Mangrove Ecosystems and Biodiversity						approach towards sustainable management of mangrove ecosystems	
Jamaica Rural Economy and Ecosystems Adapting to Climate Change II	Ecosystems	\$12 million	USAID	2015-2019	ACDI/VOCA	Promoted the protection of rural lives, livelihoods, and ecosystems through interventions that increased and strengthened climate change adaptation	Paves the way for climate adaptation.
FP223 Project GAIA ("GAIA") Multi country	Multi theme	1.5 billion across all countries	GCF	2023-ongoing	MUFG Bank, Ltd	Project GAIA will establish a blended finance platform that offers long-term loans for climate adaptation and mitigation investments in 19 of the most climate vulnerable countries in the world - making funding accessible through sources previously unattainable to participating countries.	Paves the way for climate adaptation and mitigation through a specific funding avenue.
Enhancing climate change resilience of vulnerable smallholders in Central Jamaica (ADAPT Jamaica)	Food security / climate data	50 million	GCF	2026-2031	FAO	ADAPT Jamaica aims to strengthen climate resilience among smallholder farmers by promoting Climate-Resilient Agriculture (CRA) practices and reducing food loss and waste across agricultural value chains. The project combines practical on-farm demonstrations, farmer training, and the scaling up of low-cost climate-resilient farming practices	Both projects aim to strengthen better agricultural practices and the improvement of financial access to encourage long-term investment in climate-resilient agriculture.

Caribbean Net-Zero and Resilient Private Sector programme Multi country	Multi sector	\$527.2 million	GCF	2024 - In progress	Inter-American Development Bank (IDB Group)	Aims to overcome investment barriers by providing advisory services and finance solutions. It also enhances the gender approach and the diversity gaps in the region.	Focuses on the private sector, which is complementary to this programme's focus on NGOs and CSOs and the provision of grants.
--	--------------	-----------------	-----	--------------------	---	---	---

8.2.5 Saint Lucia

Table 64: Climate finance projects and programmes in St Lucia

Program/ Project	Adaptation area	USD	Donor	Dates	IE	Objectives	Synergies
Building resilience for adaptation to climate change and climate vulnerabilities in agriculture in Saint Lucia	Water and Food Security	\$9.8 million	AF	2021-2025	CDB	The project goal is to build resilience in Saint Lucia's the agriculture sector for livelihoods security through enhanced adaptive capacities for climate change and climate variability. The project objective is to increase the resilience of rural farm communities, increasing farm productivity, water and livelihood security and reducing vulnerability to natural hazards, climate vulnerability and change.	Paves the way for climate adaptation.
Transforming climate resilience and sustainability in Saint Lucia's fisheries communities (Fish-ADAPT)	Ecosystems / livelihoods	\$16.7 million	GCF	2025-2030	FAO	The FISH-ADAPT project will address financial, market, technical, institutional and information barriers that hinder climate resilience in the fisheries and aquaculture sector of Saint Lucia.	Both projects aim to increasing the resilience of fisheries and vulnerable coastal communities; implement sustainable practices to improve ecosystem health and fish stock sustainability.
Valuing Nature and Nature-based Solutions for Sustainable Blue and Green Pathways for the Tourism, Food and Urban Sectors in Saint Lucia	Multi-theme	\$5.7 million	GEF	2025-ongoing	UNEP	To remove technical, financial and policy bottlenecks to nature-positive development in Saint Lucia's tourism and agri-food sectors.	CABRIC has a strong focus on coastal communities and their resilience.

Integrated Ecosystem Management and Restoration of Forests on the South East Coast of St. Lucia	Ecosystem Resilience	\$14.6 million	GEF	2018-ongoing	UNEP	To enable sustainable economic development of the South East Coast by maintaining healthy ecosystems, sustainable livelihoods, and securing global environmental benefits.	Paves the way for climate adaptation.
Increase Saint Lucia's Capacity to monitor MEA implementation and sustainable development	Sustainable development	\$1.08 million	GEF	2015-ongoing	UNEP	This cross-cutting capacity development (CCCD) project seeks to strengthen institutional capacity for the implementation and monitoring of international conventions as a follow-up to the National Capacity Self-Assessment (NCSA) of Saint Lucia. It also seeks to better integrate environmental concerns, and the value of ecosystems, into its broader development frameworks. The proposed project will feed into the CCCD project directly, by providing data on species, vulnerable ecosystems, GIS mapping, which will then be inputted into the Environmental Information System launched under the CCCD project.	CABRIC has a strong focus on enhancing community capacity.
Sustainable Financing and Management of Eastern Caribbean Marine Ecosystems	Ecosystems	\$10.1 million	GEF	2011-2017	The World Bank	This regional project which includes Saint Lucia is funded by the GEF and implemented by the World Bank through The Nature Conservancy (TNC). Its purpose is to improve the management of existing and expanded marine protected area networks through the establishment of	Paves the way for climate adaptation.

						sustainable financing mechanisms. Linkages will be sought on best practices and lessons learned of protecting biodiversity hotspots.	
Global Climate Change Alliance (GCCA) project on CCA and SLM in the Eastern Caribbean	Land management	\$1.37 million	Gov of the Virgin Islands	2017-n.d	Gov of the Virgin Islands	This is 3-phase project funded by the European Commission. During phase one, a comprehensive gap analysis assessed the institutional preparedness and the technical and human capacity level in the land management domain of the OECS Secretariat and each member state. During phase two, sought to run concurrent with this project, the gaps and the weaknesses identified in phase one will be addressed and dealt with. During phase three, the project will support the implementation of those segments of National Land Management Policies dealing with CCA measures. The third phase, the project intended to identify a set of SLM physical investment best practices in relevant sectors and replicate them through pilot or demonstration projects possibly in each Member State. There are important links to be sought here both on building resilience and SLM.	Mirrors the multi-country structure of CABRIC. It also paves the way for climate adaptation.
Environmental Protection under the Eastern Caribbean Marine Managed	Ecosystem resilience	\$14.7 million	International Climate Initiative	2013 - 2017	TNC	improve fisheries and conserve and restore marine resources, while providing for sustainable job opportunities in coastal communities in	CABRIC has a strong focus on coastal communities and their resilience.

Areas Network (ECMMAN) Project			(ICI) via The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)			6 OECS countries including Saint Lucia. The project focuses on: (i) Establishing new and strengthening existing marine management areas; (ii) Supporting fisher organizations and providing support for new livelihood opportunities; (iii) Improving access to data and information regarding management of marine resources; and (iv) Instituting sustainable funding mechanisms to support marine management as part of the Caribbean Challenge Initiative.	
Coastal stabilisation of Pidgeon Island, North Saint Lucia.	Tourism	No mention	KfW (German Funding)	n.d	CCCCC and St Lucia National Trust	Pidgeon Island has an artificial spit joining the main island of Saint Lucia to the smaller using material dredged during the creation of the Cruise Ship Terminal in the 1970's. An artificial beach was therefore created and has been the focus for tourism over the past 40 years. Construction on the spit includes road infrastructure, two luxury resorts, a harbour and pontoons. The spit and beaches are naturally eroding away as, without intervention, the natural coastal processes will return the coastline to the original state, prior to the dumping of the dredged material.	Paves the way for climate adaptation.

8.2.6 Other Caribbean regions in CCCCC pipeline

Table 65 Climate finance adaptation projects and programmes in CCCCC pipeline

Program/ Project	Adaptation area	USD	Donor	Dates	IE	Objectives	Synergies
Enhancing Climate ResiliencRre in CARIFORUM Countries	Ecosystems / livelihoods	USD 12,398,220	GCF	2019-2024	CCCCC	To reduce risks and vulnerabilities from climate change to human-made and natural assets in CARIFORUM countries.	Paves the way for climate adaptation.
Strengthening Climate Resilient Health Systems in the Caribbean	Health / livelihoods	USD \$565,627	European Union (EU), Pan American Health Organization (PAHO)	2020-2025	CCCCC	To strengthen national/subregional health systems to be able to manage the impacts of climate change on the health of the Caribbean people and on health services and delivery systems	Addressing a non-climate drive of ecosystem vulnerability, that many livelihoods depend upon.
Enhancing Eco-systems and Coastal Protection for Climate Change Resilience in the Caribbean - ECP-Caribbean	Ecosystems	USD 8,893,450	Global Affairs Canada	2023-2027	CCCCC	To increase climate resilience of communities and populations (especially vulnerable women and girls) in targeted Caribbean countries through improved marine and coastal ecosystem management/protection.	CABRIC has a strong focus on coastal communities and their resilience.
Capacity Building to facilitate Climate Resilience in Disaster Risk	Livelihoods	USD 999,853	GCF	/	CCCCC	Enhance the strategic frameworks and capacity of relevant stakeholders, including key national institutions and the	One of the CABRIC project themes focuses on the establishment of EWS to

Management and Private Sector Access to Climate Finance in St. Kitts and Nevis.						private sector in St. Kitts and Nevis, to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate variability and change.	enhance resilience against climate hazards.
Strengthening Strategic Framework and Institutional Capacity to Enhance Nationally Determined Contribution (NDC) Implementation in Saint Kitts and Nevis	Livelihoods	USD 989,098	GCF	2024-2025	CCCCC	Enhance Saint Kitts and Nevis' national capacity to enable a sustained and long-term implementation of NDC priorities for effective climate resilient building and low emission development.	Addresses institutional capacity.
Water Sector Resilience Nexus for Sustainability in Barbados WSRNS Barbados	Water Security / Livelihoods	USD 45.2 million	GCF	2018-2024	CCCCC	To boost the resilience of our water supply to climate change and severe weather hazards through the storage of water. In addition, it improves the sustainability of the water supply through the generation of cleaner energy from renewable sources. The project also includes a Revolving Adaptation Fund Facility (RAFF) to assist households, farmers and small businesses by supporting climate change adaptation and mitigation initiatives in the water sector.	CABRIC has a strong focus on coastal communities and their resilience.
The R's (Reduce, Reuse and Recycle) for Climate Resilience Wastewater Systems in Barbados	Multi-sector	USD 49,999,064	GCF	2022-2027	CCCCC	Facilitate the enhancement of the health, wellbeing, and productivity of Barbadians through the use of carbon neutral and climate resilient water and energy management technologies and strategies	Addressing a non-climate drive of ecosystem vulnerability, that many livelihoods depend upon.

						that ensures water is protected, managed, recycled, reused, and conserved.	
						"	
Readiness Support for the Implementation of the IRMF for the Caribbean Community Climate Change Centre (CCCCC)	Livelihoods	USD 199,966	GCF	2023-2025	CCCCC	The activities proposed under this readiness proposal seek to: (1) Complete two critical funding proposals within CCCCC's pipeline in line with the IRMF (2) Update the CCCCC project Formulation Manual and Manual for Project Monitoring, Review, Reporting, and Evaluation based on the IRMF's stipulations and all other relevant GCF policies and frameworks (3) Build the capacity of the PDMU team to develop, monitor, and evaluate projects aligned with the IRMPF to a high level of proficiency. The support provided by this readiness will have a direct and positive impact on the CCCCC and the Member states it serves; the outcome of this investment will allow the CCCCC to accelerate its pipeline and thus assist its Member States in mobilizing critical climate finance to build resilience to climate change.	Addresses institutional capacity.
Building Capacity for a Regional Approach to Climate Action in the Caribbean: Caribbean	Livelihoods				CCCCC	The objective of this proposal is aimed at accessing Readiness funding to enhance the capacity of the Centre, to facilitate	Addresses local capacity.

Community Climate Change Centre.						and increase the origination of high-quality funding proposals for GCF consideration.	
Strategic Actions for advancing climate action in CARICOM Member States	Livelihoods / Ecosystems	USD 1,400,000	GCF	2021-2025	CCCCC	This project is designed address the barriers facing CARICOM Member States to empower its citizens to develop bankable projects needed to catalyze the paradigm shift for mitigating, and adaptation to climate change. It will provide support to: (i) Enhance the national and regional strategic environment to guide climate actions (ii) Enable CARICOM Member States to remain engaged with UNFCCC process in a systematic and coordinated manner. (iii) Improve the capacity and evidence-based decision-making capabilities of CARICOM Member States to support the revision and development of policies, strategies and plans as well as (iv) Identify and prioritise climate actions that can be developed into bankable projects.	Paves the way for climate adaptation and mitigation.
Multi-Country Climate Resilient Urban Development Initiative	Urban	USD \$1,961,539.	GCF	2023-2026	CCCCC	Strengthen the Capacity of CARICOM member states to develop Strategic frameworks and capacities to guide climate change adaptation and integrate	Paves the way for climate mitigation.

						low-emissions pathways in development planning of urban communities.	
Programme for Accelerating Climate Change Adaptation	Livelihoods	USD 9,800,000			CCCCC	This program builds on ongoing the outputs and outcomes of USAID-CCAP and contributes to efforts by the CCCCC: (1) to provide research/evidence-based policy guidance to stakeholders of the region; (2) to support the climate change agenda and engagement with the UNFCCC processes; and (3) to assist in the development and implementation of transformative climate change adaptation and mitigation projects/program in the Eastern and Southern Caribbean.	Paves the way for climate adaptation.
Small Island Developing States Capacity and Resilience (SIDAR) Programme (Caribbean)	Ecosystems	£2,705,000.	UK-FCDO		CCCCC	To scale up access and speed to climate finance and support programmatic acceleration of climate-resilient actions in selected Caribbean countries	Paves the way for climate adaptation.
The Road to Resilient (R2R) fisheries - adopting ecosystem-based adaptation in four CARICOM Member States	Fisheries	USD 988,353	GCF	2024-2026	CCCCC	The Road to Resilient (R2R) fisheries-adopting ecosystem-based adaptation in four CARICOM Member States” seeks to increase the resilience of coastal and marine resource users to climate risks by adopting ecosystem-based solutions in marine managed areas (MMAs). The programme targets the Caribbean countries of Belize, Grenada, Jamaica, and St. Kitts and Nevis and pursues three key outcome areas: improved MMA management via the natural capital	CABRIC has a strong focus on coastal communities and their resilience.

						approach, implementation of ecosystem-based adaptation initiatives and a Technical Assistance Facility (TAF), and increased knowledge and strengthened knowledge management. In order to transform the endorsed concept note for this programme into a full funding proposal, a number of key gaps need to be filled. This PPF application therefore seeks support for the following studies: • Feasibility Study and Programme Design • Environmental and Social Due Diligence • Gender Assessment and Action Plan • Risk Assessment • Identification of Programme Level Indicators • Advisory Services on legal, financial, tax, regulatory and governance matters, to help structure the investment.	
--	--	--	--	--	--	---	--

8.3 Climate Finance adaptation project and programme gaps

Table 66 Project and Programme Gaps

Project and Programme Gaps		
Financial	Massive Unmet Needs	The five countries have a combined estimated climate finance need of over \$10.53 billion from 2024-2030 for adaptation and resilience, with Jamaica having the largest need at \$6.5 billion. In contrast, the five countries have collectively received only an estimated \$1.07 billion in climate-related funding as of 2023. The Caribbean SIDS face a finance gap of nearly \$55 billion by 2030 across the region
	Limited Access to Grant Finance	Caribbean SIDS receive a significant portion of international public adaptation finance as debt (44%), which exacerbates already unsustainable debt levels. There is a large deficit in grant-based funding from bilateral donors and climate funds.
	Low Flows to Grassroots Actors	There is a significant barrier of insufficient finance to meet the livelihood climate adaptation needs of coastal communities. Small-scale organizations, such as CSOs, NGOs and LAs, which are vital for bottom-up approaches, struggle to access this finance, leading to low financial absorption.
	"Middle-Income" Constraint	Many Caribbean SIDS are categorized as middle-income countries, which limits their access to concessional finance for development and climate objectives, despite their persistent vulnerabilities. This is a concern for The Bahamas, which is a high-income country and has limited access to funds from entities like the EU and Canada.
	Private Sector Mobilization	The Caribbean region has received minimal private climate financing despite being highly vulnerable. This is partly due to an insufficient pipeline of bankable climate projects and a lack of mechanisms like effective carbon pricing to incentivize private investment.
Institutional and Technical Capacity Gaps	Low Capacity of CSOs/NGOs	<u>Project Development:</u> Lack of personnel capacity for applying to small grant facilities and developing robust project proposals.

		<u>Project Implementation and Management:</u> Low institutional and personnel capacity for project implementation, ongoing monitoring, financial management (including simple tasks like wire transfers/opening bank accounts), and procurement. <u>Fiduciary Compliance:</u> Many CSOs/NGOs are not formally registered or do not meet fiduciary standards required by large international funders, including a low capacity for long-term organizational sustainability plans.
Data and Information Gaps	Lack of Downscaled Data	Climate and vulnerability data are generally not available at downscaled levels for marine and coastal sectors, complicating the development of appropriate and localized adaptation measures. There is a need to move beyond global models to use local and national data for risk and vulnerability assessments.
	Limited Accessibility and Literacy	There is limited access to and use of scientific data for decision-making, a lack of data literacy among CSOs/NGOs, and issues with data ownership and silos between organizations and governments.
	Knowledge Sharing	There is limited systematic sharing of success stories, learning experiences, and best practices of coastal climate resilience and adaptation within and between countries.
Gaps in Project and Policy Focus	Lack of Focus on Coastal Health and Social Resilience	<u>Mental Health:</u> The psychological impact of climate threats and disasters is often overlooked, with a recognized need for pre-, during, and post-event mental health initiatives. <u>Climate-Resilient Health Infrastructure:</u> There is a need for projects focused on retrofitting health centers and other social infrastructure (like clinics and shelters) to be climate-resilient and accessible, addressing issues like mould infection and structural vulnerability. <u>Inclusion of Vulnerable Groups:</u> While all countries face high vulnerability, there is a distinct gap in projects specifically targeting the unique needs of groups like Persons with Disabilities (PWDs), the elderly, and women-headed households, whose needs are not met by existing emergency infrastructure (e.g., inaccessible shelters in Belize).
	Coastal Policy Integration:	Coastal policy frameworks either do not exist, or do not effectively integrate climate risk to people, livelihoods, and the broader gender/social context of climate change. This results in adaptation activities proceeding without a cohesive high-level strategy.

Section B:

The climate solution and design of the CABRIC EDA programme

Climate vulnerable coastal communities struggling to keep pace with the impacts of climate hazards



CABRIC activities

Barriers

Access of finance

Technical capacity

Availability of data

CC coastal policy framework

Climate resilient coastal communities with secure livelihoods



9. Barriers to be address

The CABRIC EDA programme's goal is;

“Accelerated climate resilience actions in six CARICOM member states to support livelihood security, through addressing multidimensional vulnerabilities in coastal communities, driven by civil society”

This goal is a direct response to the core problem observed and validated by stakeholders through consultation of:

“Climate resilience actions in CARICOM member states are not keeping pace with the impacts of climate hazards to livelihoods in coastal communities”

To realise this goal, and address the core problem, there are several barriers that need to be addressed, a summary of these barriers is presented below with an in-depth analysis provided in the following sections. The programme aims to remove barriers permanently for the long term to achieve a paradigm shift from the core problem to the programme goal.

Table 67: Barriers CABRIC will address

Barrier type	Barrier ID and description	Needed project activities to address barriers for paradigm shift
B1- Institutional capacity	B1-1 - LAs, NGOs and CSOs personnel capacity for applying to small grant facilities inhibits the development of climate adaptation / resilience project proposals B1-2 - LAs, NGOs and CSO's institutional and personnel capacity for project implementation is low B1-3 - LAs, NGOs and CSO's institutional can personnel capacity for on-going monitoring and evaluation is low B1-4 - LAs, NGOs and CSOs are not fully integrating and using GRM process, and integrating GEDSI and ESS into activities.	- Development of training materials for NGOs and CSOs to design projects based on needs assessment - Deliver ongoing support to grant recipients to build capacity for implementation and operation of projects, as well as additional support regarding GRM, GEDSI and ESS - Provide support and build capacity with NGOs and CSOs to adaptively manage projects through collection of key indicators, and visual documentation
B2 - Technical capacity	B2-1 - Capacity to interpret climate data and other evidence to effectively propose solution is low in Local authorities, civil society and national NGOs. B2-1 - Limited spread of understanding of technically appropriate, and future horizon-aligned interventions results in	- Train participating countries' CSOs, NGOs and LAs in the understanding and use of climate, climate change data and information - Train participating countries' CSOs, NGOs and LAs in the use of tools to develop EDA-project related concept notes, proposals

	environmentally and socially misaligned solutions	
B3 - Data and information	B3-1 - Data is often available, but it is not accessible to those who need to use it. B3-2 - Limited knowledge sharing between organisations and countries of success stories, learning experiences, and best practice of coastal climate resilience and adaptation. B3-3 - Data gaps are not actually known due to the distribution and storage of data and information B3-4 - Data literacy inhibits use of information by LAs, CSOs and NGOs.	- Enhancing existing database and establishing a data-sharing platform - Upgrade existing climate change tools and databases in countries - Develop innovative knowledge and information products from project implementation - Ensure all project lessons learnt are shared via various media - Implement monitoring protocols for approved projects and share indicators publicly - Foster partnerships with relevant scientific research and learning institutions in the Caribbean and beyond - Formalise a regional climate resilience knowledge sharing annual event
B4 - Finance	B4-1 - Insufficient finance flowing to LAs, NGOs and CSOs to keep pace with livelihood climate adaptation needs of coastal communities B4-2 - Low financial absorption of CSOs, NGOs and LAs B4-3 - Women are discriminated against in application for finance	- Establish a coastal climate resilience and adaption EDA - Create a financial flow with larger NGOs to support smaller NGOs in developing and managing budgets - Select and disseminate finance with technical support to build capacity for financial management and project implementation - Foster an inclusive and gender-sensitive approach to climate finance
B5 - Awareness	B5-1 - Public and civil society awareness of coastal climate risks and solutions limit action B5-2 - Low awareness of gender, age and ability impacts of climate change	- Produce and manage public awareness and communication products - Raise awareness among stakeholders about: (1) impact climate change on all faction of society; (2) gender and social inclusion considerations that must be included in policies and climate change adaptation projects - Engage community-based organizations and schools through targeted outreach programme
B6 - Policy	B6-1 Climate resilience and GEDSI are not consistently integrated across policy frameworks that cover coastal communities	Provide technical assistance to develop GEDSI climate resilient-focused coastal policy frameworks and road map to integration with national policy landscape

B1. Institutional Capacity

The B1 barrier type, **Institutional Capacity**, identifies specific challenges related to the personnel and operational readiness of NGOs and CSOs participating in climate action initiatives. The identified barriers include **B1-1**, describing how the low personnel capacity of NGOs and CSOs for applying to small grant facilities hinders the development of climate adaptation and resilience project proposals. Barrier **B1-2** notes that NGOs' and CSOs' institutional and personnel capacity for project implementation is low, while **B1-3**

addresses the low institutional and personnel capacity related to ongoing monitoring and evaluation. Finally, B1-4 highlights the lack of capacity within these organizations to integrate critical considerations such as GRM, GEDSI, and ESS into their activities. To achieve a paradigm shift and overcome these challenges, needed project activities include developing training materials for NGOs and CSOs to design projects based on needs assessments, making these materials available for asynchronous learning, and embedding this knowledge within the organization. Furthermore, the programme must deliver ongoing support to grant recipients to build capacity for project implementation and operation, offering additional assistance regarding GRM, GEDSI, and ESS. Capacity support also extends to adaptive project management through the collection of key indicators and visual documentation (photos and videos) of the project and its impact.

During the stakeholder engagement, this validated the pervasive nature of the B1 Institutional Capacity barrier across the participating countries. Consultations revealed that low organizational capacity manifests in significant ways, such as the inability of many CSOs, NGOs and LAs to manage finances effectively or meet funder requirements, including executing basic tasks like handling wire transfers or opening bank accounts. This weak administrative foundation makes obtaining sufficient climate finance difficult, particularly since many CSOs/NGOs are not formally registered or lack the capacity required by large international funders. Stakeholders also noted that high staff turnover exacerbates the institutional capacity barrier, necessitating strategies, such as succession planning, to ensure expertise is retained within the organization even as personnel change. The CABRIC EDA programme directly responds to this by dedicating Outcome 1 of Component 1 to strengthening institutional and operational capacity for climate responsive planning. Specifically, Output 1.1 focuses on helping community-led initiatives develop climate adaptation project pipelines, directly addressing barriers B1-1 and B1-4. Moreover, Component 2, which focuses on grants with implementation support, aims to increase institutional capacity for project implementation and adaptive management, addressing barriers B1-2 and B1-3.

B2. Technical Capacity

The B2 barrier type, **Technical Capacity**, represents a significant barrier to effective climate action among CSOs and national NGOs. The core challenges identified under this barrier relate to the utilization and interpretation of technical information needed to design high-quality, impactful projects. Specifically, B2-1 identifies the low capacity within civil society and national NGOs to interpret climate data and other evidence required for effectively proposing climate solutions. Additionally, the lack of widespread understanding regarding technically appropriate, and future horizon-aligned interventions, leads to the proposal of environmentally and socially misaligned solutions.

To address the B2 Technical Capacity barriers and achieve a paradigm shift toward accelerated climate resilience actions, the programme outlines specific project activities focused on technical skills development. These activities include training participating countries' CSOs, NGOs and LAs in the understanding and use of climate, climate change data and information. Further capacity building involves equipping these organizations with tools to develop EDA project-related concept notes and proposals. This technical support is planned to be delivered under Component 1 and Component 2 of the CABRIC EDA programme.

Consultation feedback validates the necessity of these interventions, as a lack of technical skills represented a high priority concern for 58% of CSO survey respondents across 14 CARICOM nations. Furthermore, stakeholders in the Jamaica consultation noted the need for ongoing capacity building to ensure expertise is retained as staff age out. The technical assistance detailed in Output 1.1, Activity 1.1.2 of the project design directly targets this barrier by scheduling workshops and training to support the application and project development process, specifically including the use of climate data and Gender Equality and Social Inclusion (GEDSI) information. This strategy is foundational to improving the capacity of CSOs, NGOs and LAs to use and train other organizations in project development and data utilisation.

B3. Data and Information

The B3 barrier type, classified as **Data and Information**, poses a critical challenge to the development and implementation of effective coastal climate resilience projects. This category encompasses four primary barriers: **B3-1**, highlighting that Climate and vulnerability data is not available at downscaled levels for marine and coastal sectors. This complicates the tailoring of appropriate and localized adaptation measures. **B3-2** notes the limited information sharing between organizations and countries of success stories, learning experiences, and best practice of coastal climate resilience and adaptation. **B3-3** indicates that Research on coastal livelihood resilience to climate change is limited preventing use of information. Finally, **B3-4** identifies that a lack of data literacy inhibits knowledge growth and sharing for CSOs, NGOs and LAs. Addressing these barriers is vital for achieving a paradigm shift towards accelerated climate resilience actions.

To overcome the B3 data and information barriers, the CABRIC EDA programme outlines several key project activities. These include supporting the generation and presentation of climate data and information by enhancing existing database and establishing a data-sharing platform. The programme will also upgrade existing climate change tools and databases in countries. Furthermore, efforts will be made to develop innovative knowledge and information products from project implementation and ensure all project lessons learnt are shared via various media including the CCCCC's & CANARI's website, and to all participating NGOs and CSOs. To foster deeper collaboration and knowledge use, the programme will foster partnerships with relevant (coastal resilience) scientific research and learning institutions in the Caribbean and beyond and formalise a regional climate resilience knowledge sharing annual event adjunct to existing events. This set of interventions is primarily organized under Component 3: Climate Information, Knowledge Sharing & Public Awareness, with the goal of enhancing communication and knowledge sharing regionally.

Consultations across the participating countries consistently certified the urgency of addressing these data deficiencies. Stakeholders in the Bahamas emphasized significant data deficiencies including a lack of data, issues with data ownership, limited community access, and temporal/spatial deficiencies in ocean observational platforms. They recommended establishing centralized data repositories, potentially managed by an entity like the University of Bahamas, for long-term data management and stability. In Belize, participants stressed the need to move beyond global models and use local and national data for climate risk and vulnerability assessments, advocating for downscaled climate analysis specific to the coastal zone. In Grenada, the problem was noted primarily as one of communication and data silos, along with a lack of data literacy for decision-making and monitoring. Jamaica echoed this, stressing the need for linking data platforms in one centralized place and ensuring accessibility of information. The importance of data literacy (B3-4) is explicitly addressed by training programmes planned under Output 2.2 of Component 2, where Executing Entities will receive training on data literacy and M&E. Component 3 directly addresses the dissemination of knowledge through the establishment of an Integrated Knowledge Platform/Hub (Activity 3.1.1) hosted on the CCCCC website, which will specifically link to existing data repositories and provide accessible, interactive climate risk maps with GEDSI overlays. This effort is designed to shift the paradigm of climate knowledge management by translating complex scientific information into actionable and usable formats.

B4. Finance

While CARICOM member countries are battling the impact of extreme climatic events on their environmental and social systems, livelihoods and economies, they lack the financial resources to combat these growing vulnerabilities and threats posed by climate change. Under the B4 barrier type, **Finance**, the principal barriers are **B4-1**, which describes the lack of finance flowing to CSOs, NGOs and LAs for climate adaptation needs of coastal communities due to the public good nature of interventions. This challenge is combined with **B4-2**, representing the low financial absorption of CSOs, NGOs and LAs, meaning they struggle to effectively manage and deploy funds. Finally, **B4-3** specifically addresses the lack of gender-sensitive access to climate finance. To achieve a paradigm shift and ensure accelerated climate resilience actions, the CABRIC EDA programme proposes several core project activities. These include establishing a coastal climate resilience and adaptation EDA facility, fostering an inclusive and gender-sensitive approach to climate

finance, and designing a financial flow mechanism where larger NGOs support smaller NGOs in developing and managing budgets. Furthermore, the programme aims to select and disseminate finance with technical support to build capacity for financial management and project implementation.

Consultation with stakeholders across the participating Caribbean nations reinforces the urgency of addressing these financial barriers. There is an unmet need for climate finance in the region; as noted, the five countries have a combined estimated climate finance need of over \$10.53 billion from 2024-2030 for adaptation and resilience, with Jamaica alone needing an estimated \$6.5 billion. In stark contrast, these five countries collectively received only an estimated \$1.07 billion in climate-related funding as of 2023, contributing to a regional finance gap of nearly \$55 billion by 2030. A significant structural financial gap is the limited access to grant finance, as Caribbean SIDS receive a substantial portion of international public adaptation finance as debt (44%), exacerbating already unsustainable debt levels. Furthermore, the categorization of many Caribbean SIDS, such as The Bahamas, as "Middle-Income" or "high-income" countries restricts their access to concessional finance from major entities like the EU and Canada, despite their persistent vulnerability. The core problem of low financial flow to grassroots actors (B4-1) is addressed by the EDA facility's overall design, with Output 2.1 specifically aiming to deliver grants to priority projects, directly tackling all three B4 barriers (B4-1, B4-2, and B4-3). The activity 2.1.3 explicitly addresses B4-2 by offering capacity building support to CSOs/NGOs that lack sufficient technical or fiduciary capacity, including financial management training, to prepare them for applying to subsequent calls for proposals. This focus on financial capacity transfer and local empowerment is critical, as low financial absorption (B4-2) and the struggle to access finance represent key gaps that CABRIC is designed to fill.

B5. Awareness

The B5 barrier type, **Awareness**, represents deficits in understanding among the public and civil society regarding climate change impacts and resilience strategies. This barrier is specifically detailed by two key descriptions: **B5-1**, which highlights that Public and civil society awareness of coastal climate resilient livelihoods limits uptake, and **B5-2**, which points to the Low awareness of the differentiated impacts of climate change according to gender, age and ability. These deficits hinder the implementation and effectiveness of climate action. To achieve a paradigm shift by overcoming the B5 Awareness barriers, the CABRIC EDA programme outlines a set of project activities. These include producing and managing public awareness and communication products and engaging community-based organizations and schools through targeted outreach programme. Crucially, the programme plans to raise awareness among stakeholders about: (1) impact climate change on all faction of society including women, youth and the differently able; (2) gender and social inclusion considerations that must be included in policies and climate change adaptation projects.

This awareness barrier is directly addressed by Component 3 of the CABRIC project design. Output 3.2 is dedicated to ensuring an enhanced awareness of climate change vulnerabilities, risks and impacts and gender-transformative responses to climate change for decision making among both communities and CSOs, NGOs and LAs. The communication strategy developed under Activity 3.2.1 targets coastal communities, local governments, and the general public, with an explicit focus on accessibility considerations for diverse disabilities. This includes ensuring the use of appropriate language and dialect for the target audience in communication materials, developing resources in accessible formats (like braille for signage), and considering the height of signage for wheelchair users. Furthermore, the implementation of community-level awareness and engagement campaigns (Activity 3.2.2) is intended to ensure broad participation, particularly of marginalized groups such as women, indigenous groups, people with disabilities, and youth. These campaigns will be supported by a user-friendly website hosting project information, case studies, and an accessible grievance mechanism (Activity 3.2.1), and a CABRIC helpline providing pre-recorded information and a direct connection to country facilitators. These measures are essential for tackling the low awareness barrier (B5-2) and ensuring that climate resilience uptake (B5-1) is supported by informed local populations.

B6. Policy

The final barrier type, Policy, addresses the systemic challenges in integrating climate considerations into high-level governmental frameworks, identifying **B6-1** as the core challenge: Climate resilience and GEDSI are not consistently integrated across policy frameworks that cover coastal communities. This policy gap results in adaptation activities proceeding without a cohesive high-level strategy, thereby hindering effective climate action. To achieve a paradigm shift and ensure that future development is climate-resilient and socially inclusive, the corresponding project activities outlined in the CABRIC EDA programme include providing technical assistance to develop GEDSI climate resilient-focused coastal policy frameworks and a road map to integration with the national policy landscape.

The CABRIC EDA programme's design actively incorporates mechanisms to permanently overcome this barrier. Component 1, which focuses on Policy and Institutional capacity, dedicates Output 1.2 to producing Climate resilience and GEDSI mainstreamed national climate resilient coastal policy frameworks for each participating country. This output involves specific activities, such as Activity 1.2.1: Produce a GEDSI integrated climate-resilient coastal policy framework. This entails conducting a comprehensive assessment of existing national coastal zone management policies, climate adaptation plans, and sectoral policies to identify gaps in gender-inclusive provisions and multi-hazard approaches. Following this review, the programme will develop draft national integrated coastal resilience policy frameworks that mainstream gender considerations and address identified gaps, complete with implementation roadmaps, institutional coordination mechanisms, and monitoring frameworks.

Furthermore, to ensure sustainability and regional transferability, the programme will develop a regional guidance document and best practice toolkit for GEDSI-integrated coastal resilience policy development, drawing lessons from the cross-country experiences within CABRIC. This strategic focus on policy transformation fundamentally contributes to creating an enabling environment for future climate action.

10. CABRIC Caribbean programme

10.1 Theory of Change

The CABRIC EDA programme is structured for long-term success by addressing systemic barriers that prevent climate resilience actions from keeping pace with accelerating climate hazards in coastal communities. The project directly tackles the financial barrier (B4), establishing a grants facility to ensure that finance flows effectively to grassroots actors (LAs, CSOs and NGOs) who struggle with accessing capital and meeting fiduciary requirements, a critical need across the CARICOM SIDS. To ensure these funds are absorbed and managed effectively, the programme counters institutional (B1) and technical capacity (B2) barriers by embedding sustained support, training, and write-shops into the design (Outcome 1), preparing CSOs/NGOs and LAs not only to develop strong proposals but also to implement and monitor projects effectively. For true systemic change, Component 1 is dedicated to challenging the policy barrier (B6) by providing technical assistance to develop Gender-Equality and Social Inclusion (GEDSI)-integrated climate resilient coastal policy frameworks. By strengthening both the local implementing capacity (the "bottom-up" action) and the regional policy and knowledge environment (the "top-down" framework), CABRIC is designed as the foundation for a scalable, self-sustaining regional climate finance mechanism (Phase 2), ensuring that local adaptation is culturally appropriate, evidence-based, and institutionally supported.

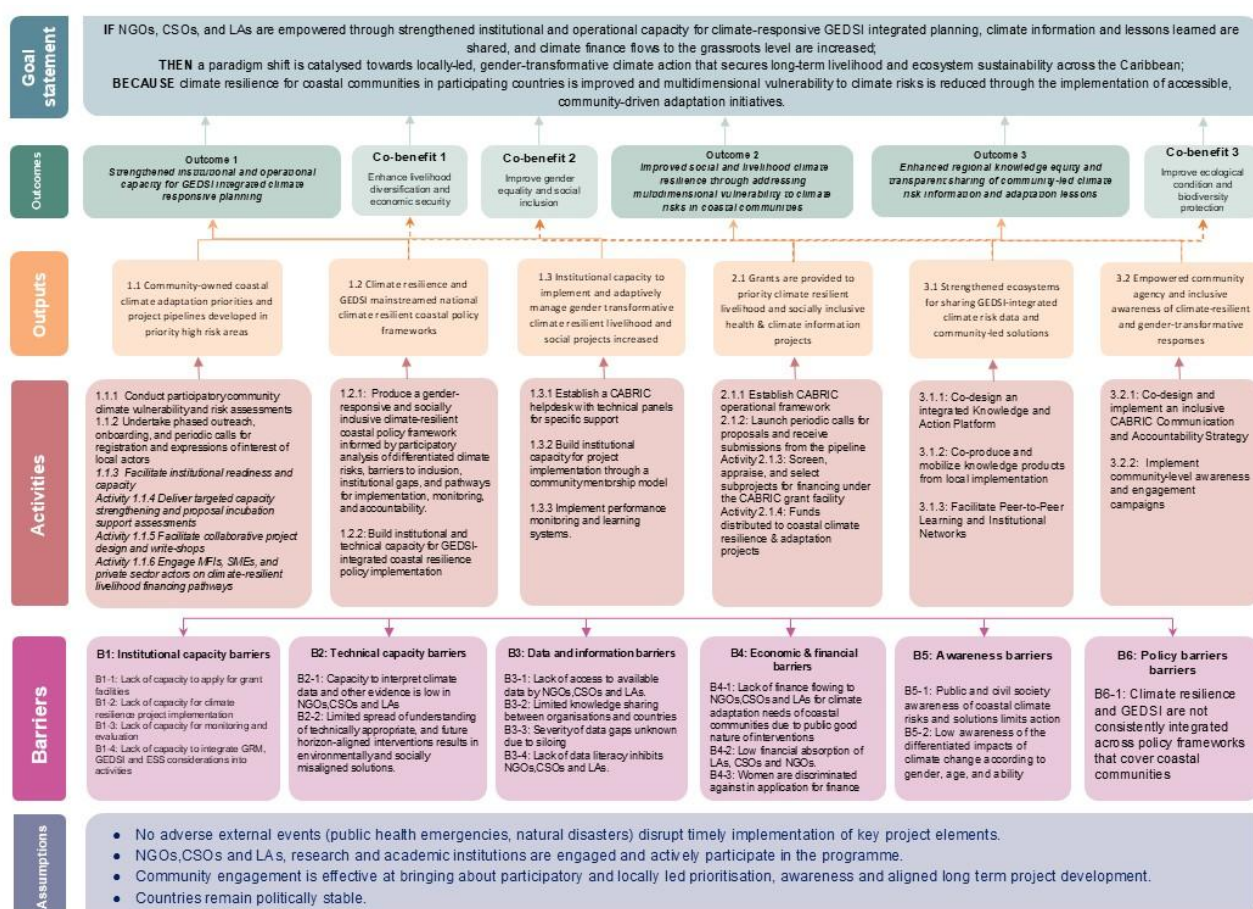


Figure 109. Theory of Change

10.2 Thematic areas and indicative interventions

The CABRIC EDA facility offers a tiered funding structure with three distinct grant windows designed to accommodate a range of organisational capacities and project scales.

Small Grants: Up to \$150,000

This window is designed to be highly accessible, catering to a wide range of organisations including smaller community-based organisations (CBOs), grassroots groups, and established NGOs and Local Authorities (LAs) undertaking well-defined projects. Projects in this category will feature a streamlined application and reporting process.

Medium Grants: \$150,000 - \$300,000

Aimed at more established NGOs, CSOs and LAs with proven project management capabilities. This window is suitable for projects of a larger scale and complexity that are expected to deliver significant, and potentially multi-year, community-level impact.

Large Grants: \$300,000 - \$500,000

This window is intended for experienced national organisations and consortiums undertaking substantial, strategic projects. Proposals in this category will be expected to demonstrate a high level of technical detail, a robust monitoring and evaluation framework, and the potential for broad, lasting, and replicable impact.

The following tables identify the scope, coast categories, national alignment and GCF Adaptation Results Areas the interventions eligible for grants align to. These thematic areas were consulted on, refined, revised and improved through workshops with all five NDAs during a two-day meeting in December 2024, and via 6 consultations at the country level with the NGOs, CSOs and LAs between January and March 2025. For further information, please see Annex 7, the Stakeholder Engagement Plan for details on how the following themes were prioritised for this current package.

With that being said, it is also important to note that the thematic areas were also interconnected to the Funding Proposal Package from 2019. It addressed the theme relating to gender transformative climate-resilient livelihoods by mandating that all community-based adaptation projects under Component 2 screen for and integrate gender and social inclusion. Stakeholder consultations from 2018-2019 highlighted the necessity of accommodating women's specific constraints—such as childcare, domestic burdens, and travel limitations—to ensure their active participation. Consultations also called for women to be equally involved in key project decisions, including technology choices and operation and maintenance arrangements and stakeholders emphasised the need for alternative, sustainable livelihoods that protect vulnerable groups, such as ensuring fishers can maintain their livelihoods while reducing pressure on marine environments.

Similarly, inclusive health, wellbeing, and social resilience were embedded directly into the proposal's core framework, specifically listed as key results areas for the GCF. To build inclusive health and wellbeing, the proposal targeted thematic areas such as the creation of early warning systems for public health impacts and the retrofitting of SMART Health Buildings, which aimed to protect vulnerable healthcare infrastructure. Social resilience was further prioritised by safeguarding food and freshwater security to prevent the transmission of diseases during droughts and floods. Based on what was discussed during the 2018-2019 stakeholder consultations, public health and environmental officials strongly advocated for the integration of water quality testing, access to clean potable water, and improved hygiene into project designs, with a special focus on schools and emergency preparedness. Stakeholders also championed the active inclusion of marginalised groups, including youth, the disabled, and ethnic minorities. To ensure such inclusivity was realised, the consultations recommended utilising informal,

village-level discussions and tailored communication methods—such as non-text-based presentations for communities with low literacy rates—to guarantee all voices can be heard.

THEME 1: Gender transformative climate resilient livelihoods

Gender transformative climate resilient livelihood intervention 1: Climate Smart agriculture

Description: This sub category of project includes those practices that supports adapted agricultural practices to the climate risks. For example: Resilient crop varieties; Soil & water conservation farming and land management techniques; Rainwater harvesting; Watershed management; and Agroforestry as livelihood approaches that address the climate risk of droughts and water security issues for agriculture. All projects will have a gender transformative / socially inclusive approach. Sub projects can include data gathering, storage and use, and awareness raising.

Scope:	Intervention Areas: Coastal agricultural areas, conservation agriculture, water security. Impact spheres: Adaptation and economic Duration: 3 years
Cost categories:	1. Small- to medium-scale climate-resilient community infrastructure and equipment 2. Services for planning, implementation and management 3. Training, research and monitoring 4. Operational costs 5. Consumables (seeds, crops etc)
National alignment:	• Bahamas: Stated in its 3rd NC²⁴ • Belize: Stated in its 4th NC²⁵ • Grenada: Stated in its 2nd NC²⁶ • Jamaica: Stated in its 3rd NC²⁷ • St Lucia: Stated in its 3rd NC²⁸
GCF ARA:	ARA1- Most vulnerable people and communities ARA2- Well-being, food and water security

Gender transformative climate resilient livelihood intervention 2: Climate resilient Ecosystem-based fisheries

Description: Sustainable fisheries management balances environmental, economic, social, and cultural goals. Interconnected marine and coastal habitats. This subcategory of project includes sustainable climate resilient fisheries and aquaculture approaches that could include: Livelihood diversification to sustainable climate-resilient gender-transformative aquaculture practices; Post harvest loss reduction; Value chain building; EbA fisheries practices; Fish nursery protection; and Participatory LMMAs. All projects will have a gender transformative / socially inclusive approach. Sub projects can include data gathering, storage and use, and awareness raising.

Scope:	Intervention Areas: Marine biodiversity management, fish stock restoration, livelihood diversification Impact spheres: environmental, adaptation and economic
--------	--

²⁴ <https://unfccc.int/sites/default/files/resource/2024%20The%20Bahamas%20TNC%20to%20the%20UNFCCC.pdf>

²⁵ <https://unfccc.int/sites/default/files/resource/Belize%20National%20Communication.pdf>

²⁶ https://unfccc.int/sites/default/files/resource/Grenada%20Second%20National%20Communication_Final%20%281%29%20%281%29.pdf

²⁷ https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/578491_Jamaica-NC3-1-TNC_Final_December132018.pdf

²⁸ https://unfccc.int/sites/default/files/resource/THIRD%20NATIONAL%20COMMUNICATION%20_%20SAINT%20LUCIA%202017.pdf

	Duration: 2-5 years
Cost categories:	• Small scale infrastructure and equipment • Marine ecosystem service for planning and adaptation, implementation and management • Training, research and monitoring • Operational costs • Consumables (seedlings etc)
National alignment:	• Bahamas: Stated in its 3rd NC • Belize: Stated in its 4th NC • Grenada: Stated in its 2nd NC • Jamaica: Stated in its 3rd NC • St Lucia: Stated in its 3rd NC
GCF ARA:	ARA1- Most vulnerable people and communities ARA3- Infrastructure and built environment ARA4- Ecosystems and ecosystem services

Gender transformative climate resilient livelihood intervention 3: Restorative and protective coastal NbS

Description: Restoration of coastal areas aims to restore the integrity of ecological systems, sustaining biodiversity and improving resilience and protection for coastal communities. This restoration will enhance local livelihoods and re-establish a transformative relationship between communities and the coast. A range of conservation and restoration approaches, with a focus on NbS interventions, aim to improve the current state of coastal ecosystems such as seagrass meadows, mangrove forests, sand dunes, beaches, and coral reefs. This will also support sustainable tourism and ecotourism by promoting community-led, environmentally responsible tourism activities that depend on and incentivize the protection of healthy coastal ecosystems. Interventions that connect economic, social and environmental sustainability are favoured. There is an opportunity in this area to include the nexus of producers and tourism. Sub projects can include data gathering, storage and use, and awareness raising.

Scope:	Intervention Areas: Biodiversity management, restoration, water management and soil conservation measures, Sustainable and resilient Tourism (Ecotourism and Sustainable Tourism) including the producer-tourism nexus. Impact spheres: environmental, adaptation and economic Duration: 2-5 years
Cost categories:	• Small scale infrastructure and equipment • Training, research and monitoring • Operation costs • Consumables (seeds, crops etc) • Mangrove ecosystem service for planning and adaptation, implementation and management • Reef/mangrove/seagrass ecosystem service for planning and adaptation, implementation and management
National alignment:	• Bahamas: Stated in its 3rd NC • Belize: Stated in its 4th NC • Grenada: Stated in its 2nd NC • Jamaica: Stated in its 3rd NC

	St Lucia: Stated in its 3rd NC
GCF ARA:	ARA1- Most vulnerable people and communities ARA4- Ecosystems and ecosystem services

THEME 2: Inclusive health, wellbeing and social resilience

Health, wellbeing and social resilience 1: Equitable Early Warning Systems & emergency health risk management

Description: This sub-category aims to establish community-led, socially inclusive early warning systems to enhance resilience against climate risks and health hazards. These systems will provide crucial information dissemination structures and processes, including data storage, labour heat stress action planning, and communication strategies. They will also promote community awareness and participatory planning based on climate hazard risk, ensuring that communities are actively involved in developing and implementing strategies to protect themselves. Sub projects can include data gathering, storage and use, and awareness raising.

Scope:	Intervention Areas: Social inclusion, early warning systems, community resilience Impact spheres: Adaptation and economic Duration: 2 - 5 years
Cost categories:	- Small scale infrastructure and equipment - Training, research and monitoring - Operational costs
National alignment:	- Bahamas: Stated in its 3rd NC - Belize: Stated in its 4th NC - Grenada: Stated in its 2nd NC - Jamaica: Stated in its 3rd NC - St Lucia: Stated in its 3rd NC
GCF ARA:	ARA2- Well-being, food and water security ARA3- Infrastructure and built environment

Health, wellbeing and social resilience 2: Gender and socially responsive mental health initiatives

Description: The psychological impact of the threat of, the experience of, and the post traumatic response to climate disasters is often overlooked. This sub-category looks to finance initiatives that support pre, during and post event anxiety and psychological distress in a socially inclusive way. This could include; social sharing groups, programmes, helplines, or further research that offer tangible solutions. Sub projects can include data gathering, storage and use, and awareness raising.

Scope:	Intervention Areas: Community resilience, social inclusion, well-being Impact spheres: Adaptation and economic Duration: 2 - 5 years
Cost categories:	- Small scale infrastructure and equipment - Training, research and monitoring - Operational costs

National alignment:	• Bahamas: Mental Health Bill (2022)²⁹ • Belize: National Mental health policy (2023-2028)³⁰ • Grenada: The Health Sector Strategic plan 2015-2024³¹ • Jamaica National Mental Health Strategic Plan 2020-2025³² • St Lucia: Saint Lucia National Mental Health Policy³³
GCF ARA:	ARA2- Well-being, food and water security

Health, wellbeing and social resilience 3: Socially inclusive community health clinics and shelters

Description: Community health clinics will be community-driven and aim to provide affordable, comprehensive primary care for all. They will focus on integrating climate information with disease monitoring and communication to adapt to each community's unique needs. To ensure continuity of services during climate shocks and periods of water or energy stress, clinics will be supported by climate-resilient water and energy systems. This includes reliable access to safe water for drinking, sanitation, and infection prevention and control, as well as renewable and backup energy solutions—such as solar power and energy storage—to maintain essential health services during extreme weather events, outages, and emergencies. Additionally, accessible shelters will be established to provide protection and access to health services to all community members, including those with disabilities.

Scope:	Intervention Areas: Community resilience, social inclusion, well-being, Water Security, Energy Security Impact spheres: Adaptation and economic Duration: 2 - 5 years
Cost categories:	• Large scale infrastructure and equipment • Training, research and monitoring • Operational costs
National alignment:	• Bahamas: Stated in its 3rd NC (only mentions shelters) • Belize: National Hazard Mitigation Policy³⁴ • Grenada: Stated in its 2nd NC (only mentions shelters) • Jamaica: Jamaica's Comprehensive Disaster Risk Management Policy and Strategy (2020-2040)³⁵ • St Lucia: Stated in its 3rd NC
GCF ARA:	ARA2- Well-being, food and water security ARA3- Infrastructure and built environment

²⁹ <https://www.bahamas.gov.bs/wps/wcm/connect/ef693ed6-7643-49ef-b500-5f5b54496ac5/Annex+1+Mental+Health+Bill+Final.pdf?MOD=AJPERES>

³⁰ <https://www.health.gov.bz/wp-content/uploads/2023/11/NMH-Policy-Final-Signed.pdf>

³¹ <https://iris.who.int/bitstream/handle/10665/272543/ccsbrief-grd-eng.pdf?sequence=1>

³² <https://www.moh.gov.jm/jamaica-endorses-paho-policy-for-improving-mental-health/>

³³ <https://archive.stlucia.gov.lc/docs/DraftMentalHealthPolicy.pdf>

³⁴ https://site.nemo.org.bz/wp-content/publications/National_Hazard_Mitigation_Policy-Final_Draft.pdf

³⁵ <https://www.odpem.org.jm/wp-content/uploads/2024/08/Jamaicas-Comprehensive-Disaster-Risk-Management-Policy-and-Strategy-2020-2040.pdf>

10.3 Project Design

The CABRIC programme is a pilot for scale and financing, designed as a capacity building, knowledge sharing, and policy strengthening mechanism. It aims for replication across other CARICOM countries in a potential Phase 2, focusing on gender-transformative livelihood and social resilience through the 8 LLCA principles. The program bridges the gap between regional scientific expertise and local coastal agency, ensuring that those most affected by climate change are the primary architects of their own resilience.

The programme is organized into three components that address institutional barriers, financial accessibility, and knowledge equity:

- **Component 1 (Institutional Capacity):** Strengthened institutional and operational capacity for GEDSI integrated climate responsive planning.
- **Component 2 (Grants Facility):** Improved social and livelihood climate resilience through addressing multidimensional vulnerability to climate risks in coastal communities.
- **Component 3 (Knowledge & Agency):** Enhanced regional knowledge equity and transparent sharing of community-led climate risk information and lessons learned.

10.3.1 Component 1 Policy and institutional capacity

Outcome 1. Strengthened institutional and operational capacity for GEDSI integrated climate responsive planning

Component 1 addresses the systemic barriers that currently prevent locally led climate resilience actions from keeping pace with accelerating climate hazards. To ensure the funds provided under Component 2 are absorbed and managed effectively, this component counters institutional (B1) and technical capacity (B2) barriers by embedding sustained support, training, and write-shops into the programme design. It is structured to deliver a progressive pipeline development process that prepares Civil Society Organisations (CSOs), Non-Governmental Organisations (NGOs), and Local Authorities (LAs) not only to develop strong, bankable adaptation proposals but also to implement and monitor them effectively.

For true systemic change, Component 1 pairs this "bottom-up" local implementing capacity with a "top-down" strengthening of the regional policy and knowledge environment. It tackles policy barriers (B6) by providing targeted technical assistance to develop Gender Equality, Disability, and Social Inclusion (GEDSI)-integrated climate-resilient coastal policy frameworks, establishing the foundation for a scalable, self-sustaining regional climate finance mechanism.

Output 1.1 Community-owned coastal climate adaptation priorities and project pipelines developed in priority high risk areas: This output drives the development of adaptation project pipelines within each country through a progressive, bottom-up co-creation process. Addressing previous gaps in locally led adaptation, local communities will be directly enabled to identify, prioritize, and validate their own adaptation ideas. CSOs, NGOs, and LAs will play a facilitative and technical role, supported by institutional capacity building, to help communities translate grassroots priorities into viable projects.

To ensure true community ownership, all developed pipelines will be explicitly grounded in participatory Community-Led Climate Risk and Vulnerability Assessments (CVRAs), proving that interventions are driven by local lived experiences rather than top-down models. This output addresses institutional capacity barriers (B1-1 and B1-4) by devolving decision-making power to the lowest appropriate level. Sustainability is achieved by investing in long-term local institutional capabilities rather than short-term project cycles, and by building an investment-ready local pipeline, this output creates a vital bridge to patient and predictable finance for grassroots organizations).

Activity 1.1.1 Conduct participatory community climate vulnerability and risk assessments

This will identify climate hazards, exposed groups, livelihood impacts, ecosystem vulnerabilities, and locally validated priority adaptation needs in high-risk coastal areas. This would help demonstrate that the grant facility is not only locally accessible, but also locally driven by evidence of vulnerability and priority needs.

Sub activities include:

- **Sub-activity 1.1.1.1:** Facilitate Community-Led Participatory CRVA "Deep-Dive" workshops: Conduct localized workshops where community members use participatory mapping, historical timelines, and seasonal calendars to identify climate hazards and social vulnerabilities. These sessions will ensure that GEDSI considerations (e.g., specific risks to women-headed households, Indigenous groups, or Persons with Disabilities) are documented and used to ground-truth scientific data. **(Grant administrators)**
- **Sub-activity 1.1.1.2:** Synthesize community inputs into formal CVRA baseline reports: Compile the findings from the participatory mapping and dialogues into comprehensive CVRA reports. These reports will explicitly map local climate hazards to targeted adaptation responses, serving as the foundational evidence base for the subsequent project co-design write-shops, **(Grant administrators)**
- **Sub-activity 1.1.1.3** Anchoring project eligibility criteria based on national pCRVA: Integrate findings of pCRVA into national level eligibility criteria to account for priority climate risk areas and priority climate adaptation interventions. **(Grant administrators)**.

Activity 1.1.2: Undertake phased outreach, onboarding, and periodic calls for registration and expressions of interest of local actors

Conduct decentralized outreach and entry-point support for CSOs, NGOs, CBOs, women-led groups, youth groups, and Local Authorities to explain eligibility, thematic windows, fiduciary expectations, and registration/EOI requirements. This step broadens access and reduces entry barriers for lower-capacity actors. This activity will use an initial broad-based outreach and onboarding phase, followed by rolling or periodic registration and expression of interest windows throughout programme implementation, to ensure continued access for new and strengthening local actors.

Sub activities include:

- **Sub-activity 1.1.2.1:** Produce outreach materials and establish the EOI registry. Develop and distribute the comprehensive outreach materials package (including eligibility notes, simplified applicant guides, and FAQs) and set up the centralized Registry of Expressions of Interest (EOIs) to track prospective applicants. **(CCCCC)**
- **Sub-activity 1.1.2.2:** Hold decentralized entry-point workshops and outreach events. Conduct decentralized outreach sessions for local actors (CSOs, NGOs, CBOs, and Local Authorities). These semi-annual workshops will simplify the registration and EOI processes and provide continuous, decentralized support to help lower-capacity organizations overcome initial fiduciary and administrative hurdles. **(Grant administrators)**
- **Sub-activity 1.1.2.3:** Launch periodic calls for registration and EOIs. Communicate rolling or periodic windows for registration and Expressions of Interest throughout programme implementation, ensuring clear processes are defined so that new and strengthening local actors have continued access to the facility. **(Grant administrators)**

Activity 1.1.3: Facilitate institutional readiness and capacity assessments

Evaluate technical, financial, and GEDSI responsiveness of prospective grantees to match them to the appropriate level of funding and support based on the EOIs received. Conduct rolling institutional readiness and capacity assessments of prospective grantees, linked to phased capacity strengthening and proposal incubation. Interested local actors will first complete a simple institutional self-assessment and submit basic organizational information at registration or expression of interest stage. This will be followed by a grant facility-led validation and readiness assessment, to assess fiduciary, technical, implementation, GEDSI, ESS, GRM, and monitoring capacities. Based on the results, applicants will be categorized by readiness level and provided with tailored capacity strengthening, technical assistance, and proposal incubation support. Assessments will be undertaken on a rolling or periodic basis throughout programme implementation, with

applicants able to be reassessed after support and advanced into subsequent funding cycles as their capacities improve.

Sub activities include:

- **Sub-activity 1.1.3.1:** Co-design and deploy a participatory institutional readiness tool: This sub activity will evaluate technical, financial and GESDI responsiveness, along with local and indigenous knowledge through community dialogues and reflection sessions to identify skills, knowledge and systems gaps. (CCCCC / CANARI)
- **Sub-activity 1.1.3.2:** Develop community-led action roadmaps and support packages: Based on the participatory readiness assessments conducted in sub-activity 1.1.3.1, synthesize the findings into individual assessment reports and a broader progression matrix. These will categorize organizations by their readiness level and outline the specific foundational support, write-shop themes, and long-term technical assistance required to prepare prospective grantees for funding. (CCCCC / CANARI)

Activity 1.1.4: Deliver targeted capacity strengthening and proposal incubation support

Deliver modular training and technical assistance on proposal development, climate rationale, financial management, GESDI, ESS, monitoring, and implementation planning. Training will not be generic or front-loaded for all applicants. It will follow the assessment results and be differentiated by readiness level. For example: low-capacity applicants will receive foundational support on fiduciary basics, proposal writing, and safeguards; moderate-capacity applicants will receive targeted technical assistance to strengthen concept notes and implementation systems; and more advanced applicants will move quickly into proposal incubation and technical refinement. Based on the EDA grant planner, 6 calls for proposals are expected under the facility over 3.5 years. The delivery of targeted training will be scheduled in batches based on the capacity levels of prospective grantees (e.g., 3 workshops per country per year to provide targeted capacity development prior to the submission of proposals under Component 2).

Sub activities include:

- **Sub-activity 1.1.4.1:** Develop a modular Locally Led Adaptation Toolkit and curriculum: Co-produced by CANARI, academic partners, and local practitioners, this stand-alone, accessible training package prioritizes learning-by-doing. It will serve as the foundation for the differentiated training levels and include specific, tailored modules covering financial management and fiduciary basics, Environmental and Social Safeguards (ESS) screening, participatory monitoring and evaluation (M&E), and GESDI integration. This toolkit will provide the standardized templates and tools for project management specifically designed for the Caribbean context. (CCCCC / CANARI)
- **Sub-activity 1.1.4.2:** Deliver targeted foundational and moderate-capacity training: Conduct in-person, batched training (3 workshops per country per year) tailored to the readiness level of applicants. This dictates when and how the training is received: progressively, prior to proposal submission, and matched to absorptive capacity. (CCCCC / CANARI)
 - For low-capacity applicants: Workshops will focus on foundational support, teaching fiduciary basics, financial management, M&E systems, and ESS compliance so they can meet international funding standards.
 - For moderate-capacity applicants: Workshops will bridge the gap between scientific climate models and local lived experience, teaching participants to build a strong climate rationale by interpreting climate and GESDI data. This ensures projects address future climate risks while remaining grounded in local social dynamics, directly linking back to the community CVRAs conducted in 1.1.1.1.

Activity 1.1.5: Facilitate collaborative project design and write-shops.

Convene co-design sessions and write-shops only after community priorities are known and grantees have received initial support (1.1.4). These sessions should translate validated local priorities into technically sound subprojects aligned with the CABRIC thematic areas.

Sub activities include:

- **Sub-activity 1.1.5.1:** Hold collaborative project design write-shops for subproject proponents: Conduct intensive co-design sessions every 6 months for groups that meet core criteria. These workshops focus on aligning community-led priorities with the CABRIC thematic areas, ensuring technical feasibility while maintaining community ownership. These sessions must come after the community CVRA activities (conducted under 1.1.1) so they are fundamentally informed by local adaptation priorities. Community representatives will also be invited to the write-shops to ensure a co-creative design. (CCCCC / CANARI)

Activity 1.1.6: Engage MFIs, SMEs, and private sector actors on climate-resilient livelihood financing pathways.

Facilitate targeted engagement with the local private and financial sectors to ensure the broader economic ecosystem supports community-led resilience.

Sub activities include:

- **Sub-activity 1.1.6.1:** Deliver targeted capacity-building for MFIs and SMEs: Deliver specialized capacity-building workshops tailored to the private sector, including sessions for Microfinance Institutions (MFIs) on climate-risk mainstreaming in lending, and for local Small and Medium Enterprises (SMEs) on business continuity and climate resilience planning. (CCCCC / CANARI)

Output 1.2 Climate resilience and GEDSI mainstreamed national climate resilient coastal policy frameworks: This output supports each target country in addressing its unique policy landscape by moving beyond general desk reviews to operational, participatory gap assessments. Through targeted technical assistance, the programme will develop actionable roadmaps and national coastal policy frameworks that fundamentally integrate GEDSI and climate resilience. By utilizing structured engagement, this output ensures that national policies are validated and shaped by the localized vulnerabilities and gender-specific needs of the coastal communities they affect.

To ensure these frameworks drive lasting impact, the output evaluates the regional mechanisms needed to support policy development and produces a regional guidance knowledge product to help other CARICOM member states adopt locally led coastal resilience models. This output directly addresses policy barriers (B6-1) and strives to align with core LLCA principles: Structural Equality, by ensuring policies specifically target the removal of barriers for marginalized groups (LLCA Principle 2); and Transparency and Accountability, by establishing clear roadmaps and institutional coordination mechanisms that make national governments accountable to coastal communities (LLCA Principle 7).

Activity 1.2.1: Produce a gender-responsive and socially inclusive climate-resilient coastal policy framework informed by participatory analysis of differentiated climate risks, barriers to inclusion, institutional gaps, and pathways for implementation, monitoring, and accountability.

Managed by CCCCC, this activity moves beyond a general reference to GEDSI integration by ensuring that national coastal policy frameworks are evidence-based, operational, and shaped by structured engagement with the communities they affect. This will be conducted in each of the five target countries. It explicitly incorporates a participatory analysis of differentiated vulnerabilities and barriers, ensuring that the resulting policy frameworks and roadmaps are genuinely gender-responsive and socially inclusive, in full alignment with GCF's expectations for institutional strengthening.

Sub activities include:

- **Sub-activity 1.2.1.1:** Conduct a participatory gender-responsive and socially inclusive gap assessment of national coastal policies Conduct a comprehensive assessment of existing coastal zone management and climate plans. This will include structured engagement and Policy-to-Community validation sessions where CSOs, local actors, women, and marginalized groups identify institutional gaps, differentiated climate risks, and specific barriers to inclusion. This ensures the gap assessment is rooted in the lived realities of vulnerable populations. (CCCCC)
- **Sub-activity 1.2.1.2:** Co-design gender-responsive and socially inclusive coastal resilience frameworks and implementation roadmaps Develop frameworks and actionable roadmaps that

mainstream gender and multi-hazard approaches based on the gap assessment. These documents will include explicit provisions for monitoring, accountability, grievance redress mechanisms, and the tracking of sex- and vulnerability-disaggregated indicators. They will also embed institutional coordination mechanisms that clearly define the role of local actors in national governance, ensuring a bottom-up influence on policy implementation. (CCCCC)

Activity 1.2.2: Build institutional and technical capacity for GEDSI-integrated coastal resilience policy implementation.

Managed by CCCCC, this activity aims to strengthen regional capacity for coastal resilience by training policymakers and technical staff on interpreting climate data and assessing vulnerability. To ensure this is not just a temporary intervention, the initiative creates a lasting impact by embedding standardized curricula directly into national institutions, developing a regional best-practice toolkit, and fostering a peer-to-peer learning network for sustained knowledge exchange. This ensures that future cohorts of policymakers are equipped with Locally Led Climate Action (LLCA) methodologies from the start.

Sub activities include:

- **Sub-activity 1.2.2.1:** Design and deliver training on climate data interpretation, GEDSI analysis, and coastal vulnerability assessment for policymakers and technical staff Design and deliver targeted training for policymakers and technical staff that focuses on translating complex climate and gender data into localized policy actions. This ensures policies address the distinct vulnerabilities of marginalized groups. (CCCCC)
- **Sub-activity 1.2.2.2:** Develop and institutionalise standardised training curricula within national institutions Develop and embed standardized training curricula and knowledge management systems within national institutions. These curricula will incorporate both climate resilience and GEDSI considerations to ensure that new cohorts of technical staff are equipped with LLCA methodologies from the start, guaranteeing sustainability beyond project completion. (CCCCC)
- **Sub-activity 1.2.2.3:** Produce regional LLCA coastal policy guidance and Best Practice Toolkit Synthesize cross-country experiences and lessons learned from CABRIC into a regional guidance document and Best Practice Toolkit for GEDSI-integrated coastal resilience policy development. This will provide a blueprint for other CARICOM member states to adopt locally led coastal resilience models. (CCCCC)
- **Sub-activity 1.2.2.4:** Establish a Community of Practice network among participating countries Establish a network of CSOs, policymakers, and technical staff to facilitate peer-to-peer "Local-to-Local" learning and the exchange of practical solutions to implementation challenges. To ensure post-project sustainability, the CABRIC Community of Practice will not operate as a temporary, standalone mechanism. It will be strategically integrated into existing, highly active regional civil society networks convened by CANARI to ensure the network remains active and self-sustaining beyond the lifespan of GCF financing. (CCCCC)

Output 1.3 Institutional capacity to implement and adaptively manage gender transformative climate resilient livelihood and social projects increased: Activities under this output support the implementation of projects. It addresses risks of ineffective implementation and barriers of technical and intuitional capacity to bring the inventions to the ground and monitor success. This output addresses B1-2 and B1-3 as well as the financial absorption barrier B4-2.

Activity 1.3.1: Establish a CABRIC helpdesk with national technical panels for specific support: This activity will be managed by CCCCC with support of the technical body expert members providing consultancy support. It ensures that local proponents have continuous access to expertise.

Sub activities include:

- **Sub-activity 1.3.1.1:** Establish regular project implementation reviews through quarterly site visits by Country Facilitators to assess progress, identify challenges, and provide targeted technical assistance. (CCCCC / CANARI)

- **Sub-activity 1.3.1.2:** Establish technical panels, structures and processes for the helpdesk and communication of the support to LAs, CSOs and NGOs. (CCCCC / CANARI)

Activity 1.3.2: Build institutional capacity for project implementation through a community mentorship model

This activity utilizes a sponsorship model to facilitate Knowledge sharing between experienced organizations and emerging local actors. Managed by CCCCC, through CANARI with national CABRIC teams.

Sub activities include:

- **Sub-activity 1.3.2.1:** Develop community-owned Data Systems and M&E Training Programmes that utilize a Mentorship Framework. (CCCCC / CANARI)
- **Sub-activity 1.3.2.2:** Provide specialised training on GEDSI integration on GEDSI situations including baseline information as well as Environmental and Social Safeguards implementation for active project teams. (CCCCC / CANARI)

Activity 1.3.3: Implement performance monitoring and learning systems:

This activity supports local actors implement monitoring protocols that foster cross learning and knowledge sharing. Managed by CCCCC, with CANARI supporting, the following activities will be delivered by the country and regional teams.

Sub activities include:

- **Sub-activity 1.3.3.1:** Co-design flexible data collection templates and monitoring tools with grantees to ensure consistent knowledge capture while reducing administrative burden. (CCCCC)
- **Sub-activity 1.3.3.2:** Conduct collaborative performance assessments and implement learning-based corrective action processes for underperforming projects. (Grant administrators)
- **Sub-activity 1.3.3.3:** Organise cross-project peer learning exchanges and site visits to facilitate knowledge sharing and identify best practices. (Grant administrators)

10.3.2 Component 2: GRANTS FACILITY FOR LOCALLY LED ADAPTATION MEASURES -

Outcome 2: Improved social and livelihood climate resilience through addressing multidimensional vulnerability to climate risks in coastal communities

There one output which will support the outcome of this component: 2.1 grants are provided to priority climate resilient livelihood and social projects (Beneficiaries = community members + ecosystems). CABRIC operationalizes Locally Led Adaptation by stripping away the barriers that exclude grassroots organizations. As detailed in the Operations Manual, the facility utilizes a tiered approach. Small grants benefit from simplified application pathways, are exempt from commissioning costly independent external audits, and face a lowered co-financing threshold of just 5% (which can be fully satisfied via in-kind community contributions like volunteer labour). This ensures the facility is accessible to true community-based organizations, not just highly capacitated international NGOs.

To ensure that grassroots interventions are driven by a robust climate rationale and localised climate drivers, all medium and large grants are required to submit a Participatory CRVA. This ensures that every sub-project explicitly maps the local climate hazard to a targeted adaptation response before funding is approved. The facility recognizes Traditional, Indigenous, and Local Knowledge (TILK) as valid Climate Rationale. Applicants can submit documented anecdotal histories, participatory community hazard maps, and local seasonal calendars.

Output 2.1 Grants are provided to priority climate resilient livelihood and socially inclusive health & climate information projects (Beneficiaries = community members + ecosystems): This output is where the majority of the funds for the programme will be required. As the intention of CABRIC is to accelerate climate resilience actions on the ground, the programme aims to develop effective and simple processes for application that build capacity with as little bureaucracy as possible, whilst managing risk as identified in the risk assessment. Sub projects will be required to have sustainability, replicability or / and scalability integrated into their design, along with ESS and GEDSI considerations. This output will address all the financial barriers, B4-1, B4-2 and B4-3, and institutional capacity barriers of B1-3.

Activity 2.1.1 Establish CABRIC operational framework.

This activity will be managed by CCCCC and will set up the basis for the EDA facility, including the governance and operational structures to ensure the success of the management of the fund delivery. The sub activities include:

Sub activities include:

- **Sub-activity 2.1.1.1** Conduct orientation workshops with national grant administrators and their existing governance bodies (boards, project approval committees, technical review panels) to ensure alignment with CABRIC objectives, criteria, and approval processes, and alignment with CCCCC and GCF requirements. Hold regional dialogue for the inception of the programme. (CCCCC)
- **Sub-activity 2.1.1.2** CABRIC facility is maintained for the duration of the programme - This activity ensures that the CABRIC model is kept maintained throughout the programme lifecycle. (CCCCC)

Activity 2.1.2: Launch periodic calls for proposals and receive submissions from the pipeline.

Following the progressive pipeline development in Component 1, this activity initiates the formal funding cycles of the grant facility. It focuses strictly on launching the periodic calls for full proposals, providing clear communication on submission processes, and formally receiving the proposal packages from the incubated local actors.

Sub activities include:

- **Sub-activity 2.1.2.1** Communicate calls for proposals and distribute application packages: Formally announce the funding windows to the pipeline of prospective grantees and distribute the required proposal documentation and guidelines. (Grant administrators)
- **Sub-activity 2.1.2.2:** Manage proposal submission and receipt -Operate the formal intake process for full proposals, ensuring all submissions are properly logged and prepared for the pre-screening and appraisal stage (Activity 2.1.3). (Grant administrators)

Activity 2.1.3: Screen, appraise, and select subprojects for financing under the CABRIC grant facility.

This activity will assess subproject proposals emerging from the Component 1 pipeline and periodic calls for proposals. The activity will apply a staged review process to ensure that only proposals that are eligible, community-prioritized, technically sound, climate-responsive, gender- and socially inclusive, environmentally and socially compliant, and institutionally feasible are recommended for grant approval. The appraisal process will build on the readiness assessments, vulnerability analyses, and proposal incubation support provided under Component 1, thereby ensuring coherence between pipeline development and grant financing.

Sub activities include:

- **Sub-activity 2.1.3.1:** Conduct pre-screening and completeness checks: *Upon receipt of proposals from the Component 1 pipeline, the National Grant Administrators will act as a first filter to verify administrative completeness and basic eligibility. Particular attention will be paid to verifying that*

the required evidence of community co-design (e.g., minutes from community validation meetings) is included in the application. (Grant administrators)

- *Sub-activity 2.1.3.2: Appraise proposals through National Grant Committees: The technical bodies embedded within the Grant Administrators will conduct the formal technical, financial, and Environmental and Social Safeguards (ESS) appraisal. Proposals will be scored against CABRIC investment criteria, generating a ranked list of funding recommendations. (Grant administrators)*
- *Sub-activity 2.1.3.3: Secure binding final approval from National Boards: The National Boards (serving as the final oversight authority at the country level) will review the recommendations from the Grant Committees to ensure the selection process was fair and aligned with national climate priorities. The Boards will issue the final, binding approval for sub-projects to proceed to the contracting and financing stage. (Grant administrators)*

Activity 2.1.4: Funds distributed to coastal climate resilience & adaptation projects:

This activity disperses funds to Executing Entities for sub grant and larger projects.

Sub activities include:

- **Sub-activity 2.1.4.1 Disperse funds to CSOs, NGOs and LAs in Bahamas** - Once proposals are approved, a detailed work plan and budget are finalized with each selected CSOs, NGOs and LAs. These documents form the basis for the grant agreement. The disbursement will make it possible for smaller CSOs, NGOs and LAs to implement impactful projects in the Bahamas. **(Bahamas Protected Areas Fund)**.
- **Sub-activity 2.1.4.2 Disperse funds to CSOs, NGOs and LAs in Belize** - Once proposals are approved, a detailed work plan and budget are finalized with each selected CSOs, NGOs and LAs. These documents form the basis for the grant agreement. The disbursement will make it possible for smaller CSOs, NGOs and LAs to implement impactful projects in Belize. **(Belize Fund)**
- **Sub-activity 2.1.4.3 Disperse funds to CSOs, NGOs and LAs in Grenada** - Once proposals are approved, a detailed work plan and budget are finalized with each selected CSOs, NGOs and LAs. These documents form the basis for the grant agreement. The disbursement will make it possible for smaller CSOs, NGOs and LAs to implement impactful projects in Grenada. **(Grenada Development Bank)**
- **Sub-activity 2.1.4.4 Disperse funds to CSOs, NGOs and LAs in Jamaica** - Once proposals are approved, a detailed work plan and budget are finalized with each selected CSOs, NGOs and LAs. These documents form the basis for the grant agreement. The disbursement will make it possible for smaller CSOs, NGOs and LAs to implement impactful projects in Jamaica. **(JSIF)**
- **Sub-activity 2.1.4.5 Disperse funds to CSOs, NGOs and LAs in St Lucia** - Once proposals are approved, a detailed work plan and budget are finalized with each selected CSOs, NGOs and LAs. These documents form the basis for the grant agreement. The disbursement will make it possible for smaller CSOs, NGOs and LAs to implement impactful projects in St Lucia. **(St Lucia Development Bank)**

Thematic areas and interventions: Through Activity 2.1.4 funds will be distributed to the projects at a country level to two thematic areas and broad project interventions addressing: Theme 1: gender transformative livelihood security and Theme 2: Health, wellbeing and social resilience (see section 11.3).

These thematic areas respond to differentiated climate impacts on livelihoods, access to resources and social systems, particularly among vulnerable groups. Combined, they represent integrated pathways to strengthen adaptive capacity, reduce structural inequalities, and enhance community-level resilience in line with GCF's Locally Led Climate Action Framework. By having the communities identify thematic priorities, CABRIC directly integrates the three main LLCA parameters having advanced the devolution of decision-making through beneficiary-led priorities. The specific activities planned outlines downstream ownership through LAs, CSO, NGOs and will therefore contribute sustainably to greater economic capacity of beneficiaries, strengthening livelihood options and building institutional and social resilience.

While the GEF SGP interventions focused primarily on biodiversity, CABRIC will be adaptation-focused building lessons learned from the GEF SGP. Within the broad themes, community-led prioritization will

shape the specific sub-interventions and support the pipeline building activities of 1.1. These thematic areas were based on national priorities, and project gap analysis that responds directly to locally identified climate vulnerability drivers, rather than predefined sectors. The following tables identify the scope, coast categories, national alignment and GCF Adaptation Results Area they align to. The results were consulted on, refined, revised and improved through workshops with all five NDAs during a two-day meeting in December 2024, and via 6 consultations with national NGOs and CSOs. . Leaning on the GEF SDP successes, CABRIC proposes an eligibility criterion clearly identifying the types of organizations (LA, CBO, NGO, CSO) that will qualify. Given best practices, organizations must be registered in country of operations, The sub-project's focal area, within the LLCA context, will include climate change, across various sectors and must centralize community participation that engenders inclusivity of marginalized groups such as women, youth and disabled.

A National Coordinator will be engaged to serve as the primary contact for the sub-projects and lead a structured, seamless application process. To ensure accessibility for varying capacities, the EDA programme establishes a three-tier grant architecture: Small (up to USD 150,000), Medium (USD 150,000 - 300,000), and Large (USD 300,000 - 500,000). Based on the EDA grant planner, this means the programme targets exactly 118 sub-projects across the five countries.

Component 3: CLIMATE INFORMATION, KNOWLEDGE SHARING & Agency

Outcome 3. Enhanced regional knowledge equity and transparent sharing of community-led climate risk information and adaptation lessons

There are two outputs which will support the outcome of this component: 3.1 - Strengthened ecosystems for sharing GEDSI-integrated climate risk data and community-led solutions. This focuses on usable and accessible formats that prioritize local agency over static data repositories. 3.2 - Enhanced public agency and awareness of climate vulnerabilities and gender-transformative responses. This output ensures that information flows bidirectionally between decision-makers and coastal communities.

CABRIC adopts a participatory M&E approach. As outlined in the Operations Manual (Appendix IV), all Medium and Large grant applicants are required to dedicate a specific portion of their budget to Participatory MEL (PMEL). This ensures that target communities are not just passive beneficiaries of the interventions, but are actively employed and trained to collect data, monitor indicators, and facilitate local learning dialogues throughout the project's lifecycle.

Activities within this component follow a chronological and iterative sequence to ensure knowledge directly supports adaptive management. At the beginning of the programme, foundational knowledge dissemination platforms (e.g., the CABRIC Knowledge Hub) are built to remain active throughout the lifecycle. Running in parallel to sub-project implementation, continuous peer-to-peer learning networks, social media advocacy, and awareness campaigns are triggered. At mid-cycle, as sub-project results emerge, targeted case studies and policy-influence research are developed. Crucially, the learning generated through these platforms will not remain static; it is directly linked to adaptive management. Through regular 'pause and reflect' sessions and participatory feedback mechanisms, the PMU and National Executing Entities will use this community-generated knowledge to continually adjust capacity-building strategies and refine subsequent calls for proposals.

Output 3.1 Strengthened ecosystems for sharing GEDSI-integrated climate risk data and community-led solutions: This output moves beyond traditional data storage to create a living Knowledge-Ecosystem. It bridges the gap between scientific institutions and coastal practitioners, ensuring that data is co-created and accessible to those who need it most for project development and local advocacy. This output can be achieved by knowledge integration; of local and indigenous knowledge with scientific data, and transparency; ensuring open access to risk information, allowing communities to hold decision-makers accountable for climate action.

Activity 3.1.1: Co-design an integrated Knowledge and Action Platform

Managed by CCCCC, this activity focuses on the usability and accessibility of existing data, ensuring it serves as a tool for local empowerment rather than just a technical repository.

Sub activities include:

- **Sub-activity 3.1.1.1: Facilitate a participatory audit of climate information barriers:** Beyond a desk review, this involves user-journey mapping" with CSOs and local actors to identify why existing data isn't reaching the ground. It specifically identifies gaps in GEDSI-disaggregated data and barriers for low-connectivity communities. (CCCCC)
- **Sub-activity 3.1.1.2: Launch of the CABRIC knowledge hub:** A user-centric interface that prioritizes low-bandwidth accessibility and offline-capable tools. It links structured data repositories with community-generated reports, case studies, and GEDSI toolkits. (CCCCC)
- **Sub-activity 3.1.1.3: Interactive community-validated climate risk maps:** Visualizing hazard and exposure data with "citizen science" overlays. These maps allow communities to contribute their own observations of coastal change (e.g., local flood markers or mangrove health), ensuring scientific models are ground-truthed by lived experience. (CCCCC)

Activity 3.1.2: Co-produce and mobilize knowledge products from local implementation

This activity ensures that lessons from CABRIC sub-projects are captured as blueprints for learning, scaling, and replication, translated into formats that are culturally and linguistically appropriate.

Sub activities include:

- **Sub-activity 3.1.2.1: Develop Locally led adaptation practice case studies:** Focus on both successes and productive failures. These briefs will highlight how local actors navigated fiduciary requirements or managed community conflicts, providing a realistic roadmap for other CSOs. (CCCCC)
- **Sub-activity 3.1.2.2: Conduct collaborative research for policy influence:** Partner with regional research institutes to translate community-level data into policy-ready evidence, supporting the bottom-up influence on national frameworks established in Output 1.2. (CCCCC)
- **Sub-activity 3.1.2.3: Multimedia mobilization for diverse audiences:** Produce documentaries, podcasts, and infographics that use storytelling to explain complex climate risks. Content will be available in local dialects and designed for community radio and mobile-first social platforms.

Activity 3.1.3: Facilitate Peer-to-Peer Learning and Institutional Networks

This activity moves away from static training toward Learning Networks where local actors are the primary experts.

Sub activities include:

- **Sub-activity 3.1.3.1 Establish virtual regional CABRIC problem solving circles:** These problem solving and success sharing quarterly sessions will be established for grantees to share real-time challenges. These are facilitated as safe spaces for collaborative problem-solving rather than formal reporting sessions. Members of the technical panel will also be present. Responsibility of CCCCC RPCU. (CCCCC)
- **Sub-activity 3.1.3.2 Establish an annual regional knowledge to action conference:** A hybrid event where local community leaders and CSOs present their work to regional donors and policymakers, reversing the traditional power dynamic where experts speak to communities. Sessions will be interactive, group work dominate and support the sharing of lessons learnt and experiences of all partners and the grantees. Responsibility of CCCCC RPCU. (CCCCC)
- **Sub-activity 3.1.3.3 Establish local Communities of Practice:** Sustainable networks among CSOs and LAs that meet in person and online are set up by national coordinators in each of the participating countries. These CoPs focus on the practical methods of locally led adaptation, sustained by a shared

commitment to regional coastal resilience. The structure, cadence and process should establish a community of practice beyond the life span of the project. (CCCCC)

- **Sub-activity 3.1.3.4 Institutionalise research-community partnerships:** Create formal mechanisms for universities to provide ongoing technical TA to CSOs, ensuring that technical knowledge transfer becomes a permanent feature of the regional landscape. Sub activity is the responsibility of the RPCU, initiated through engagement with research and learning institutes at country and regional level to facilitate partnerships and institutional collaborations that support ongoing technical knowledge transfer - The engagement process will involve identifying key research institutes and universities in CABRIC countries and the wider region that are active in climate science, coastal management, and social equity issues. (CCCCC)

Output 3.2: Empowered community agency and inclusive awareness of climate-resilient and gender-transformative responses: This output will be achieved through awareness raising on climate risk and GEDSI specific vulnerabilities. It is important for the success of the project that awareness of climate change, impacts and solutions are raised with both community members and local governmental representatives and other stakeholders including the private sector and other community groups. This output focuses on dismantling barriers to information (B5-1 and B5-2) through a Universal Design approach. It ensures that climate risk information and gender-transformative solutions are not only disseminated but are actionable for all community members, including those with disabilities and marginalized groups. Materials should be created in accessible formats, including but not limited to: colour contrast selection for written materials online and in print; inclusion of braille formats for signage; height consideration of signage for wheelchair users; language (both complexity of language and appropriate dialect for the location). This output addresses structural inequality and accountability.

Activity 3.2.1: Co-design and implement an inclusive CABRIC Communication and Accountability Strategy

Managed by CCCCC, this activity ensures that the project's voice is culturally relevant, linguistically appropriate, and technically accessible. This activity aims to enhance public awareness of climate change vulnerabilities, risks, and impacts, with a strong focus on gender-transformative and socially inclusive responses. The primary goal is to address the specific barriers of awareness (B5-1 and B5-2) by developing and implementing a comprehensive communication strategy that effectively reaches a diverse range of stakeholders.

Sub activities include:

- **Sub-activity 3.2.1.1 Design a universally accessible communication strategy:** targeting coastal communities, local governments, and general public with accessibility considerations for diverse disabilities and knowledge levels - The strategy emphasizes several key elements to ensure accessibility: written materials with braille formats as well as dialect of the language used will be tailored to the specific location / group to ensure it is easily understood by the target audience. (CCCCC)
- **Sub-activity 3.2.1.2 Launch a transparent CABRIC website and accountability portal:** A central hub for project data, case studies, and a Simplified Grievance Mechanism. This portal will be mobile-friendly and gender-sensitive, providing a direct channel for communities to hold the programme accountable. (CCCCC)
- **Sub-activity 3.2.1.3 Develop multi-format, community-validated communication materials:** Create brochures, videos, and infographics that are culturally rooted. Content will be validated by community groups to ensure that complex climate science is translated into the language of coastal residents and indigenous groups. (CCCCC)

Activity 3.2.2: Implement community-level participatory CRVAs, awareness, and engagement campaigns

Grant administrators will be empowered with dedicated budgets to facilitate Participatory Climate Risk and Vulnerability Assessments (pCRVAs). These are not just awareness events, but active research and engagement processes where communities define their own risks. This will feed into the activities of output 1.1, to ensure subprojects are addressing local level priorities.

Sub activities include:

- Sub-activity 3.2.2.1 Mobilize social media for community-driven advocacy - Execute digital campaigns where the pCRVA findings are shared by the community members themselves. This showcases the results of their participatory mapping, positioning the community as the primary authority on local climate impacts and resilience needs. (CCCCC)

10.4 CABRIC facility structure

Figure 110 outlines an indicative approach that may be adopted to help convey a strategic approach to reporting lines between each NDC and the CCCCC. As the AE, the CCCCC is the primary signatory to the funding agreement with the GCF. It holds the ultimate fiduciary responsibility for the entire programme, ensuring that all activities and financial disbursements comply with GCF policies and standards. The CCCCC is responsible for overall programme oversight and reporting to the GCF. In a dual capacity, the CCCCC also serves as the programme's lead Executing Entity. In this role, it is responsible for the day-to-day execution and management of the programme. This includes hosting the CABRIC Regional Programme Coordination Unit (PMCU), entering into legal agreements with the Executing Entities, managing the overall programme budget, and ensuring the coordination of all programme components. Lastly, the Executing Entities will be responsible of the implementation of the specific components of the programme in their respective countries of implementations, similarly they will report back to the AE. Furthermore, the proposed structure and roles of the EDA facility is explained in

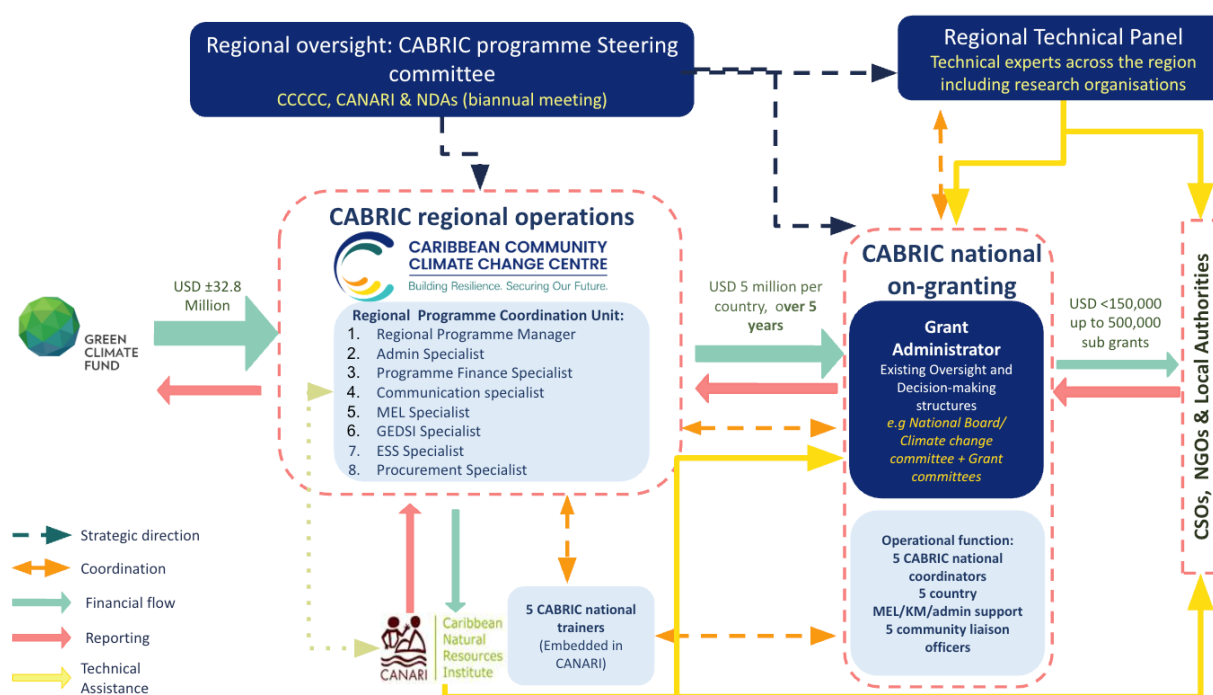


Figure 110 Indicative Reporting lines for the EDA Programme

Table 68 Roles of CABRICgrants facility

Governance Body / Committee	Composition (Who sits on it)	Core Authority & Decision-Making Power
Regional Steering	Representatives from the 5 NDAs, CCCCC, CANARI, and rotating civil	Strategic Oversight (Non-Grant): The highest programmatic oversight body.

Governance Body / Committee	Composition (Who sits on it)	Core Authority & Decision-Making Power
Committee (RSC)	society members from the National Boards.	Resolves high-level issues and ensures GCF alignment. <i>Does not approve day-to-day sub-grants.</i>
Regional Programme Coordination Unit (RPCU)	Project staff hosted and employed by CCCCC (Regional Programme Manager, Programme Financial Specialist, Admin Specialist, MEL Specialist, GEDSI Specialist, ESS Specialist, Procurement Specialist, and a Communications Specialist).	Day-to-Day Regional Management: The engine of the programme. Consolidates the 5 national grant portfolios, manages the regional M&E reporting, and runs the overarching project administration.
Regional Technical Advisory Panel	Independent regional experts (agriculture, fisheries, engineering) and academic representatives.	Advisory & Quality Assurance: Functions strictly in a non-binding, advisory capacity. Provides strategic guidance to the RPCU and reviews highly complex grant proposals upon request. Provides technical support via helpdesk requests.
National Boards (or National Climate Change Committees)	Senior leadership of the National EE, NDA reps, and mandatory rotating seats for local CSO/CBO leaders.	Binding Final Approval: The ultimate fiduciary and approval authority at the country level. Reviews technical recommendations and holds the formal power to approve sub-projects for contracting.
National Grant Committees	Technical and fiduciary staff embedded within the National EEs.	Technical Screening (Non-Binding): Conducts the hard technical, financial, and safeguards screening of applications. Provides a ranked list of funding recommendations to the National Board.
Regional Helpdesk	Coordinated by CCCCC and the RPCU	Proposal Facilitation: Operates on-demand to assist low-capacity grassroots groups with navigating the application process, conducting participatory CRVAs, and understanding GCF standards.

Reporting Tasks

CCCCC acting as the AE will be responsible for the overall programme oversight and reporting to the GCF. While in-country reporting will be carried out by the Executing Entities acting as the *Grant Administering IPs*. Each IP will report to CCCCC on a biannual basis detailing accomplishment, status of project activities, foreseeable delays and other risks at the time of reporting. These biannual reports are essential to ensure

compliance with CCCCC policies and accreditation credentials. These quarterly reports will also feed into annual and mid-term reports that will be submitted to the GCF. These reports will be coupled with field visit and site monitoring missions, which will include primary data collection and observations. There will be a final report at the end of the period of implementation. This report will also be accompanied by the final project financial audit to be completed by an independent and accredited auditor. All records on this project will be kept for at least five years for review by the GCF or its authorized bodies after project completion.

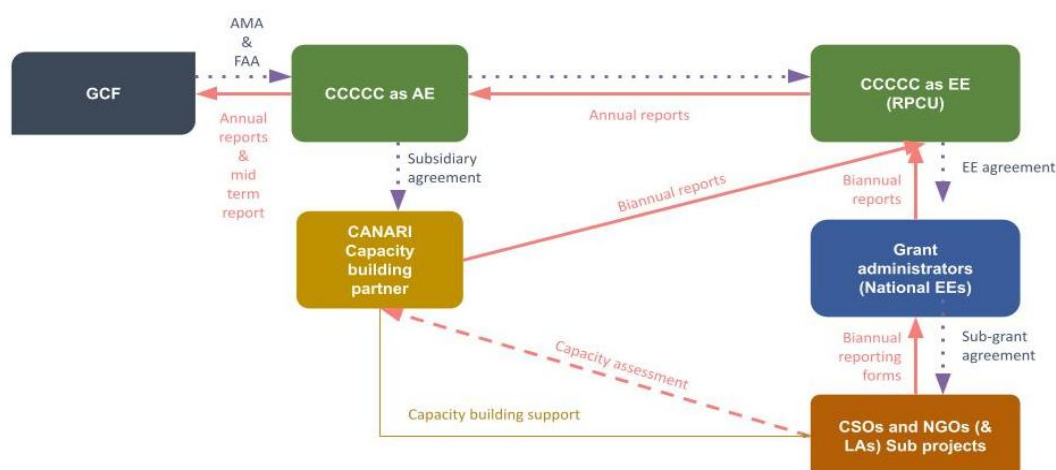


Figure 111: reporting arrangements

11. Implementation Arrangements

Accredited Entity: As a DAE, CCCCC fulfils various fiduciary functions. These include managing small-scale initiatives, adhering to Category B environmental and social (ESS) standards, and maintaining core fiduciary standards, such as project management, monitoring and reporting. The CCCCC will act as the Accredited Entity (AE) to the programme, in its role as AE will retain the overall responsibility and oversight for the programme, including its preparation and implementation, financial management and procurement.

Operation mechanism: As shown in **Error! Reference source not found.**; The program's governance is structured into three levels: 1 - Overall programme governance (the regional CABRIC Regional steering committee), 2 - Programme coordination (CABRIC RCMU) and most importantly 3 - National coordination.

Programme governance will offer oversight through biannual meetings of the CABRIC steering committee including CCCCC, CANARI, representatives from each of the NDAs and two rotating seats for CSO, NGO and community representatives, nominated by national boards. The body has the highest programmatic oversight body. Resolves high-level issues and ensures GCF alignment.

Programme operation will be coordinated by the CCCCC RPCU based in Belmopan, Belize, with the following national-level staff embedded in each Grant Administrator's country office: (i) a National Coordinator, contracted by the Grant Administrator and funded through GCF proceeds via the Subsidiary Agreement, serving as the primary liaison between the Grant Administrator and the RPCU, with a reporting line to the Grant Administrator and a coordination line to the CABRIC Regional Programme Manager; (ii) a National MEL and Administration Specialists, contracted by CCCCC, reporting to the CABRIC Regional Programme Manager with a secondary reporting line to the Grant Administrator; and (iii) a Community Liaison Officer, contracted by CCCCC, reporting to the National Coordinator. CANARI will deploy Capacity Building Officers as part of its service contract with CCCCC, providing technical direction for capacity-building activities and reporting to CANARI's project lead, with day-to-day coordination with the National Coordinator.

At the national level, each Grant Administrator is required to maintain **two functionally separated governance bodies for CABRIC**: (i) a National Grant Committee (or equivalent technical body), responsible for the technical review and scoring of sub-project applications in a non-binding advisory capacity; and (ii) a National Board (or equivalent oversight body), which holds the final binding decision-making authority over sub-grant approvals. Where a Grant Administrator does not already have both bodies in place, CABRIC mandates their creation during the programme inception phase. The National Board must include the NDA (or national climate change committee where the NDA is not directly represented), at least one CSO/NGO representative, and at least one community representative, with these civil society seats rotating on a regular schedule.

Community validation and accountability are embedded throughout the programme cycle. Community priorities are established through pCRVAs and validated during collaborative write-shops. The LLCA weighting in the grant appraisal scoring framework (25-40%) ensures that proposals lacking genuine community ownership are not competitive. Community and CSO representatives hold rotating seats on National Boards and the RSC, providing direct voice in governance. During implementation, compensated community monitors participate in PMEL, and the GRM provides an independent accountability channel. Grant Administrators are encouraged to include community-engagement indicators in their Stakeholder Engagement Plans, enabling systematic tracking of engagement quality across the portfolio and informing adaptive management at the national and programme level.

CCCCC performs a dual function in the CABRIC programme. As the **Accredited Entity (AE)**, CCCCC holds the ultimate fiduciary responsibility to the GCF, including formal reporting to the GCF, compliance monitoring, and ensuring adherence to the AMA and FAA obligations. These functions are managed independently by CCCCC's internal audit, finance, and compliance departments, which sit outside the RPCU structure. As the **Lead Executing Entity (EE)**, CCCCC is responsible for the day-to-day execution and management of the programme through the dedicated RPCU, including entering into Subsidiary Agreements with the Grant

Administrators, managing the programme budget, and coordinating programme delivery across all three components. The two functions are kept separate through discrete personnel and hierarchical oversight

The PrograRegionalmme Steering Committee (RSC): Serves as the principal oversight body for the programme, responsible for providing strategic guidance and overseeing all aspects of programme management. The RSC will be chaired by representatives from the NDAs of the 5 participating countries, as well as members from CCCCC, CANARI, and rotating NGO and CSO representative positions. The specific responsibilities of the RSC include:

- Provide overall guidance and direction to the programme, ensuring it remains within any specified constraints.
- Address and unblock programme issues as raised by the AE.
- Provide guidance on project risks and agree on possible mitigation and management actions to address these.
- Support coordination between various donor and government-funded in-country projects and programmes.
- Ensure coordination with various government agencies and their participation in programme activities.
- Track, monitor and secure co-financing for this programme.
- Review the programme's progress, assess performance, and appraise the Annual Work Plan for the following year.
- Provide direction and recommendations to ensure that the agreed deliverables are produced according to plans.
- Approve the programme Inception Report, Mid-term Review and Terminal Evaluation reports and corresponding management responses.
- Review the final programme report package during an end-of-project review meeting to discuss lessons learned and opportunities for scaling up.

The RSC will take decisions by consensus. If consensus cannot be reached, the CCCCC representative will facilitate mediation. If mediation does not resolve the matter, CCCCC, as the AE, will propose a final decision to avoid implementation delays. The RSC will meet biannually, convened by CCCCC, either virtually or in person. The following members hold full participation rights: representatives from the five NDAs, CCCCC, and CANARI. Two rotating seats are reserved for CSO/NGO and community representatives nominated by the National Boards. These rotating members participate with full voice but in an advisory capacity. The specific decision-making procedures, including quorum requirements, will be finalised in the programme Inception Report.

The Regional Technical Advisory Panel (RTAP): To ensure technical consistency and promote regional learning, a Regional Technical Advisory Panel will be established under the CABRIC Regional Steering Committee (RSC). This panel will serve a critical advisory and quality assurance function for the program, supporting both the EDA Regional Project Coordination Unit (RPCU) and the national Grant Administrators. The Regional Technical Advisory Panel will be composed of independent regional experts recruited through a selective process at programme inception, including representatives from the regional professional, academic, and research community. Members will serve in an advisory capacity and will operate independently of the day-to-day management of the RPCU. To avoid any conflict of interest, neither CANARI staff who have supported in the proposal development under Component 1) nor CCCCC RPCU staff will serve as formal members of the Panel. The Panel functions strictly in a non-binding, advisory, and quality assurance capacity. It does not possess authority to make final funding decisions, approve sub-projects, or allocate grant capital.

CABRIC Regional Programme Coordination Unit (RPCU): The RPCU's core function is operational management of the programme: designing and implementing the annual work plan and budget, coordinating with Grant Administrators to launch calls for proposals, consolidating approved grant portfolios for regional monitoring and reporting, supporting the CABRIC Helpdesk, and establishing national technical panels. The RPCU does not exercise AE oversight functions, which are retained by CCCCC's institutional compliance structure. A set allocation for helpdesk technical assistance will be managed across the grantees as a percentage of their grant size.

National grant administrators acting as Executing Entities: These partners are legally established entities in each country, their primary functions include serving as a liaison between the RPCU and project proponent (CSOs, CBOs, NGOs, LAs, producer groups, research & academic institutes, and Local Authorities) acting as a financial vehicle to distribute sub-grant funding at the local level. For this programme, the executing entities are: the **Belize Fund (for Belize)**, the **Jamaica Social Investment Fund for Jamaica**, the **Bahamas Protected Areas Fund** in The Bahamas, the **Saint Lucia Development Bank** in Saint Lucia and **Grenada Development Bank** in Grenada. Each country will receive an allocation of USD 5 million to support projects within the designated thematic area. The sub-grant sizes will range from small grants of up to USD 150,000, medium grants from USD 150,000 to USD 300,000, and large grants up to USD 500,000

Flow of funds AE: The CCCCC will act as both the RPCU and EE, serving as the main financial vehicle for the grant facility operation, will contract CANARI as a service provider under a service contract for capacity-building activities, and will separately procure contractors and consultants in accordance with CCCCC's procurement framework. These entities act as service providers and do not exercise implementation discretion over GCF proceeds who will support the overall functionality of the facility. The grant funding will be distributed in tranches at the national level to the Grant Administrator Executing Entities. Furthermore, in its role as AE, the CCCCC will also be responsible for overseeing programme implementation and conducting capacity assessments for all Grant Administrators. The Figure below shows the finance flow of the programme.

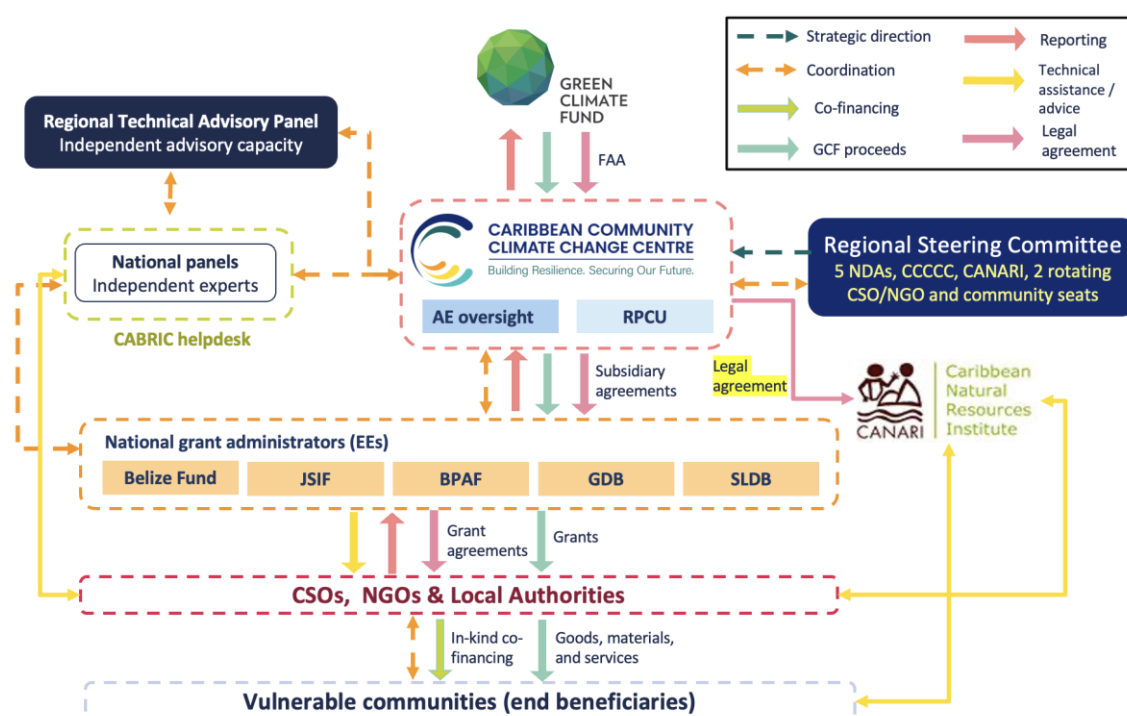


Figure 112 Implementation arrangements and flow of funds

CABRIC Caribbean grants mechanism: Component 2 of the programme establishes a mechanism for small, medium and large grants to be dispersed to CSOs including NGOs, producer groups, Community Based Organisations, research and academic institutes and Local Authorities to access grants up to USD 500,000 for projects in CABRIC thematic areas. Grantees are required to provide 5% for small grants, 10% for medium grants, 15% for large grants, of the project funding, which can be as an in kind contribution in alignment with requirements explicated in the Operations Manual.

Flow of funds to Grant Administrators: The flow of funds and fiduciary controls are documented in the Subsidiary Agreements between CCCCC (as Lead Executing Entity, in addition to its AE role) and each National EE. GCF Proceeds are disbursed by CCCCC to each EE in tranches based on financial reporting and against pre-agreed disbursement conditions. Each EE is required to maintain a segregated account for GCF Proceeds, apply fiduciary controls consistent with CCCCC's accreditation standards, and submit financial reports to CCCCC at agreed intervals. Independent external audits apply at the EE level and at the sub-

project level on a tiered basis. If a participating country or national EE withdraws, the country's allocation will be: (i) held in reserve for re-engagement during the programme cycle if the issue is expected to be resolved; or (ii) reallocated proportionally to the remaining four countries through the Regional Steering Committee, subject to GCF approval, if re-engagement is not feasible within the programme timeframe. Capacity activities under Components 1 and 3 that are regional in nature would continue with adjusted scope. The contingency arrangements are documented in the Subsidiary Agreement

Disbursement to grantees: The grant facility utilizes a multi-stage process (Figure 10) for the distribution of grants to local NGOs, CSOs and Local Governments. Under its service contract with CCCCC, CANARI will deliver capacity-building activities including community awareness sessions, co-facilitated write-shops, and institutional readiness support to help prospective grantees develop eligible proposals under Component 1. CANARI does not participate in the grant appraisal or approval process. Eligible NGOs, CSOs and local governments may then apply for grants. As the first stage, LAs, NGOs and CSOs will submit an Expression of Interest (EOI) to the Grant Administrators for their approval. This EOI will be screened for alignment with GCF investment criteria and community engagement principles, as specified in the annexes of the CABRIC Operations Manual.

Process: To ensure a sequential approach, all capacity building, institutional readiness, and proposal incubation (including dedicated write-shops) are strictly frontloaded under Component 1. Prospective grantees will first benefit from this tailored capacity development to build implementation-ready proposals. Once pipelines are developed, Component 2 is initiated. The grant facility uses a simplified one-step process for small projects (under USD 150k) and a two-step process (EOI followed by full proposal) for medium and large projects. Proposals are then reviewed by the National Grant Administrators' technical committees, with final, binding approval from the National Boards based on pre-defined GCF criteria. Approved projects then move to the contracting phase, which specifies the project duration, reporting requirements, and payment schedules. After the contract is signed, grant recipients will implement their projects, adhering to milestones and reporting obligations. Fund disbursement is structured to prevent lump-sum payments; instead, funds are disbursed in tranches (e.g., quarterly or semi-annually) based on the project's duration and the grantee's assessed capacity. Monitoring and evaluation are integral to this process, with baselines established early in the project. The duration of each project's implementation varies based on its funding and nature, and the timeline is assessed for feasibility during the selection process (see **Error! Reference source not found.**). Full details on the application process and project cycle are found in Annex 21: Operations Manual

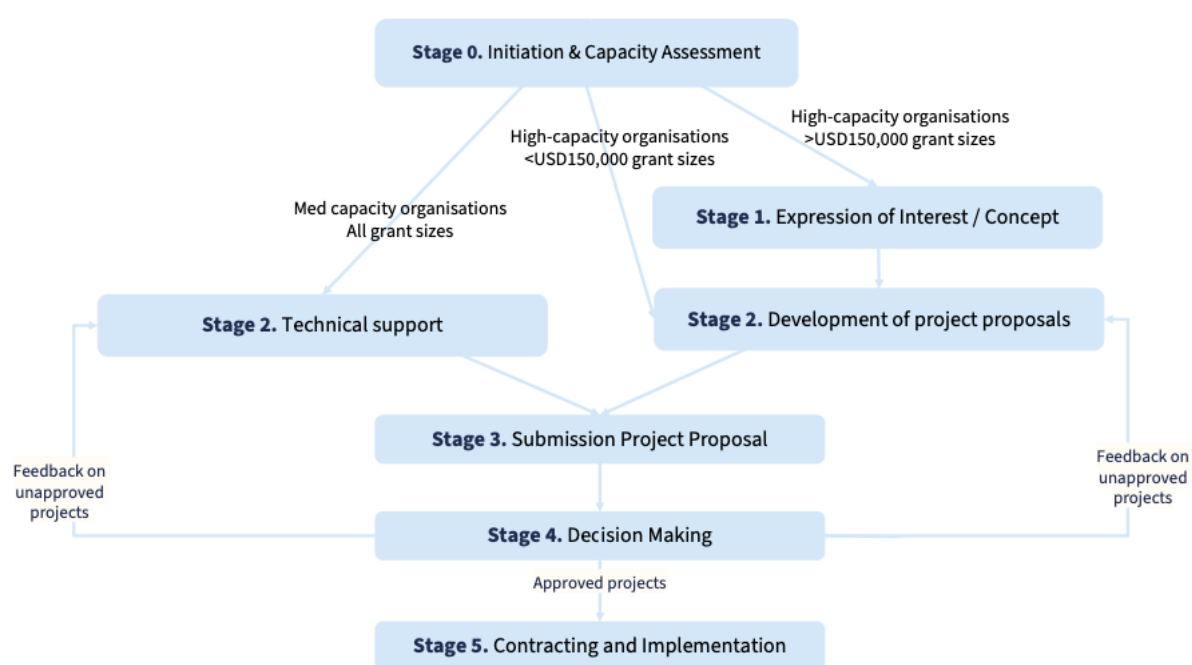


Figure 113 EDA facility application process and project cycle

The project pipeline generated under Component 1 is the primary feeder for grant applications under Component 2. However, the periodic calls for proposals under Activity 2.1.2 are open to all eligible entities that meet the criteria set out in the Operations Manual, regardless of whether they participated in Component 1 capacity-building activities. All applicants, whether from the C1 pipeline or from open calls, are assessed against the same eligibility, technical, and safeguards criteria. Entities that did not benefit from Component 1 support must independently demonstrate the same readiness standards (fiduciary capacity, CRVA grounding, community engagement evidence) that C1-supported applicants achieve through the programme's capacity-building activities. Where the number of viable proposals exceeds the available grant envelope in any given call, proposals that meet all eligibility and quality criteria but cannot be funded will be maintained in a reserve pipeline by the RPCU. These proposals will be given priority consideration in subsequent calls. CCCCC will also actively support the linkage of unfunded but viable proposals to alternative climate finance sources, including other GCF instruments, the Adaptation Fund, bilateral programmes, and national climate finance mechanisms.

Technical assistance across the three components is delineated as follows: Component 1 covers all pre-application capacity building, including institutional readiness assessments, write-shops, proposal incubation, and CRVA facilitation; Component 2 covers the grant facility operations (calls for proposals, screening, appraisal, disbursement) and post-award implementation support through the Helpdesk, national technical panels, and performance monitoring; Component 3 covers knowledge management, communication, and regional learning. CANARI's role is confined to Component 1 (pre-application capacity building). Post-award implementation support under Component 2 is delivered by the CCCCC RPCU, National Coordinators, and the Helpdesk, drawing on the Regional Technical Advisory Panel as needed.

In country operations: at the national level, Grant Administrators will utilise their existing board structure and will be responsible for guiding and overseeing in-country projects. The boards will ensure sub-project outcomes, resolve issues, and review project evaluation lists. They are required to include the NDA, and if they do not, National Climate Change Committees should be utilised. It is required that two additional seats on these boards should be allocated to: 1 - A CBO representative and 2 - A community representative.

Local structures: To respect existing social structures and avoid imposing top-down administrative burdens, CABRIC mandates that sub-project oversight be integrated into legitimate, pre-existing local governance bodies. As outlined in the Operations Manual (Section 4.7), grantees will report directly to established community forums, such as Village Councils or local fisherfolk associations, ensuring that long-term project governance remains permanently rooted in the community.

LLCA principles: The structure of the CABRIC programme integrates LLCA principles by shifting oversight from traditional top-down auditing to a partnership-based technical accompaniment model. Along with prioritisation and project development being participatory in their approach. Furthermore, by institutionalising participatory monitoring and evaluation, the programme ensures that the community's own indicators and lived experiences drive the learning and adaptive management processes, fulfilling the mandate of transparency and local accountability.

Role of CABRIC team: CABRIC National Coordinators, national MEL and Administration Specialist, and Community Liaison Officers will collaborate with CANARI and the Technical Panel to provide technical assistance, information sessions, and participatory workshops, supporting communities to prioritise and cocreate projects with local actors.

11.1 National ownership

National ownership: Although the focus of CABRIC is a locally led approach, NDAs of each country will have oversight as part of the regional steering committee, and the position on national grant administrator boards. This will ensure that not only country priorities are aligned with the thematic sub project targets, but also with information and knowledge sharing in both directions.

Table 69 National governance integration with CABRIC

Country	NDA	National Climate Body	Grant Administrator	NDA Role in CABRIC
Bahamas	Office of the Prime Minister (Climate Change & Environmental Advisory Unit)	National Climate Change Committee (NCCC), coordinating body for multi-sector climate engagement	Bahamas Protected Areas Fund (BPAF)	Member of RSC; seat on BPAF Board for CABRIC oversight; ensures alignment with NDC 3.0 priorities
Belize	Ministry of Economic Transformation	National Climate Change Office (NCCO)	Belize Fund for a Sustainable Future	Member of RSC; seat on Belize Fund Board; alignment with NCRIP and NDC priorities
Grenada	Ministry of Climate Resilience, the Environment and Renewable Energy	National Climate Change Committee	Grenada Development Bank (GDB)	Member of RSC; seat on GDB National Board; alignment with SPCR and NDC priorities
Jamaica	Ministry of Economic Growth and Job Creation	Climate Change Division	Jamaica Social Investment Fund (JSIF)	Member of RSC; represented on JSIF committees; alignment with Climate Change Policy Framework
Saint Lucia	Ministry of Finance / Dept. of Sustainable Development	National Climate Change Committee	Saint Lucia Development Bank (SLDB)	Member of RSC; seat on SLDB Board; alignment with NAP and NDC priorities

National Designated Authority (NDA) are government institutions that serve as the interface between each country and the Fund. They provide broad strategic oversight of the GCF's activities in the country and communicate the country's priorities for financing low-emission and climate-resilient development. The NDA or focal point for the GCF seeks to ensure that activities supported by the GCF align with strategic national objectives and priorities and help advance ambitious action on adaptation and mitigation in line with national needs. The NDA mandate and responsibilities cover a range of functions:

- (i) Mandate and responsibilities:
 - a. Provide broad strategic oversight of the Fund's activities in their country.
 - b. Convene relevant public, private and civil society stakeholders to identify priority sectors to be financed by the Fund.
 - c. Communicate nominations / no objection of entities (sub-national, national, or regional, public and private) seeking accreditation to the Fund under the 'direct access' track.
 - d. Implement the no-objection procedure on funding proposals submitted to the Fund, to ensure consistency of funding proposals with national climate change plans and priorities.
 - e. Provide leadership on the deployment of readiness and preparatory support funding in the country.
- (ii) Recommended capacities of the NDA or focal point. The NDA can lead and coordinate a country coordination mechanism that allows for an overview of key sectors as they relate to the country's climate change strategies and plans. The ability to convene representative stakeholders across these priority areas is a critical function of an NDA or focal point.

- (iii) Linking country strategic priorities to the Fund. The countries are already engaged in low-emission, climate resilient development, improving resilient in the face of more frequent and intense severe weather warning events.

12.3.1. Role of the NDAs

The CABRIC programme embeds the NDAs into the active governance and decision-making architecture at both the regional and national levels to ensure continuous country ownership.

1. **Regional Oversight (Regional Steering Committee):** The NDAs of the five participating countries will serve as members of the **Regional Steering Committee (RSC)**. The RSC is the principal oversight body responsible for providing strategic guidance, reviewing programme progress, and addressing high-level issues raised by the Accredited Entity.
2. **National Oversight and Decision Making (National Boards):** At the country level, the NDAs are required to participate in the **National Board of Grant Administrators**
 - a. **Alignment:** Their primary function on this board is to ensure that approved projects and overall grant priorities align with national climate policies (e.g., NDCs, NAPs) and meet the specific needs of beneficiaries in target areas
 - b. **Approval:** While the Grant Administrator manages the day-to-day operations, the NDA's approval is essential for the grants awarded in each funding window. In cases where a National Board does not explicitly exist, the NDA may utilize existing National Climate Change Committees to fulfil this oversight function.
3. **Operational Liaison:** To ensure daily operations remain aligned with government priorities, the **National Coordinator**—who is contracted by the CCCCC and embedded within the Grant Administrator—will maintain a **secondary reporting line** directly to the NDA. This ensures the NDA is kept informed of the pipeline status and can facilitate coordination with other government ministries to resolve policy bottlenecks.

Table 70 National Designated Authority (NDA) or Focal Point for the GCF

Country	NDA	Contact details	Key departments and ministries to support the EDA facility
Bahamas	Office of the Prime Minister	Mrs. Rochelle Newbold <i>Special Advisor for Climate Change & Environmental Matters</i> Rochellenewbold@bahamas.gov.bs Dr. Rhianna Neely <i>Director, Department of Environmental Planning and Protection Ministry of Environment and Natural Resources</i> Rhiannaneely@bahamas.gov.bs Ms. Christine Thompson <i>Deputy Director Economics, Ministry of Finance</i> ChristineMThompson@bahamas.gov.bs Sir Cecil Wallace Whitfield Center, Nassau, Bahamas	- Ministry of the Environment and Natural Resources - Bahamas Agricultural Health and Food Safety Authority - Bureau of Womens Affairs - Ministry of Economic Affairs - Ministry of Education and Technical and Vocational Training - Department of Environmental Health Services - Ministry of Finance - Department of Gender and Family Affairs - Urban Renewal Commission

Belize	Ministry of Economic Transformation	Mr. Carlos Pol <i>Chief Executive Officer</i> ceo@med.gov.bz Mr. Leroy Martinez <i>Ag. Director, Climate Finance Unit</i> leroy.martinez@med.gov.bz Ms. Hunter Hales <i>Proposal Development Officer</i> hunter.hales@met.gov.bz Sir Edney Cain Building, First Floor, Right Wing, Belmopan, Belize.	• Department of the Environment • Ministry of Sustainable Development, Climate Change & Solid Waste Management. • Forestry Department • Sustainable Development Unit • National Meteorological Service • National Biodiversity Office • The national Climate Change Office • Belize Fisheries Department • Ministry of Agriculture, Food security and Enterprise. • Ministry of Health & Wellness • National Climate Change Committee
Grenada	Ministry of Climate Resilience, the Environment and Renewable Energy	Ms. Peron Johnson <i>Permanent Secretary Ministry of Climate Resilience, the Environment and Renewable Energy</i> ps@cre.gov.gd Mr. Titus Antoine Director of Climate Resilience Ministry of Climate Resilience, the Environment and Renewable Energy titus.antoine@cre.gov.gd 4th Floor, Ministerial Complex, Sir Eric M. Gairy Botanical Gardens St. George's, Grenada W.I., St. George's, Grenada Phone 1(473)440-0366	• Ministry of Blue Economy and Marine Affairs • Ministry of Education • Ministry of Youth and Sports • Ministry of Finance • Ministry of Health • Ministry of Mental Health, Wellness & Religious Affairs • Ministry of Infrastructure & Physical Development, Public Utilities, Civil Aviation & Transportation • Minister of Tourism, Creative Economy and Culture • Ministry of Social & Community Development, Housing and Gender Affairs (Social Security) • Ministry of Economic Development, Planning, and Cooperatives; Agriculture & Lands, Forestry and Marine Resources
Jamaica	Ministry of Economic, Growth and Job Creation	Mr. Omar Alcock Senior Technical Officer Omar.alcock@megjc.gov.jm Ms. Schmoi McLean <i>Programme Coordination, Monitoring and Evaluation Officer</i> schmoi.mclean@megjc.gov.jm 16A Half-Way-Tree Road, Kingston 5, Jamaica	• Ministry of Agriculture, Fisheries, and Mining • Ministry of Culture, Gender, Entertainment and Sport • Ministry of Economic Growth and Infrastructure Development • Ministry of Education, Youth and Information • Ministry of Health and Wellness • Ministry of Local Government and Community Development • Ministry of Tourism • Ministry of Water, Environment and Climate Change
	Ministry of Finance, Economic Development and	Mrs Anita Montoute Permanent Secretary, Department of Sustainable Development anitamontoute.dsd@gmail.com Mrs. Nadia Wells-Hyacinth <i>Chief Economist, Department of Economic Development</i>	• Ministry of Education, Sustainable Development, Innovation, Science, Technology and Vocational Training • Biodiversity Department • Sustainable Development & Environment Division • Ministry of Equity, Social Justice and Empowerment

Saint Lucia	the Youth Economy	nwells@gosl.gov.lc Ms. Donette Charlery <i>Economist, Department of Economic Development</i> donette.charlery@govt.lc 1st Fl. Finance Administrative Centre, Pointe Seraphine, Castries, Saint Lucia.	• Ministry of Public Service, Home Affairs, Labour and Gender Affairs • Ministry of Health, Wellness and Elderly Affairs • Bureau of Health • Department of Environmental Health • Ministry of Tourism, Investment, Creative Industries, Culture and Information • Ministry of Agriculture, Fisheries, Food Security and Rural Development • Agricultural Division • Fisheries Department • Forestry Department • Water Resource Management Agency • Ministry of Infrastructure, Ports, Transport, Physical Development and Urban Renewal
-------------	-------------------	--	---

12. Risk mitigation

The project's risk management strategy is designed to be proactive, integrating specific mitigation measures into the program's core design to address identified threats across operational, financial, and reputational categories. The following analysis details how these measures can reduce the overall risk exposure of the project.

12.1 Technical and Operational Risk Mitigation

The primary cluster of risks relates to the technical and operational capacity of implementing CSOs, NGOs and LAs

Table 71 Technical and Operational Risk Mitigation

Risk	Initial Risk Probability / Impact	Mitigation Strategy	Effect on Probability / Impact
Operational Capacity (Project Development, Management, Monitoring)	High/High	Built-in multi-stage training (climate change, GEDSI, project design) and sustained technical support (Outcomes 1 & 3).	Reduces probability from High to Medium, as enhanced skills directly improve assessment and execution quality.
High Staff Turnover	Medium/High	Focus on building institutional capacity (not just personnel skills) and providing access to training to foster professional growth.	Reduces impact from High to Medium, ensuring essential knowledge remains within the institution even if key personnel change.
Extreme Climate Events (Disruption/Damage)	Medium/High	Allocation of a dedicated buffer fund for projects to request additional funding for post-event recovery.	Reduces impact from High to Low. The financial reserve ensures project recovery is rapid, protecting long-term project outcomes.
Gender Equity Barriers (Access to Finance/Benefits)	Medium/Medium-High	Adoption of a Gender Transformative approach, integrating the Gender Assessment and Action Plan into all project selection and operational processes.	Reduces probability from Medium to Low by institutionalizing equity checks, ensuring inclusive design from inception.
Indigenous Peoples' Rights/Exclusion	Medium/Medium-High	Focus on coastal regions, ensuring inclusive participation of IP communities, and integrating Free, Prior,	Reduces probability from Medium to Low by mandating structured consultation and consent, ensuring

		and Informed Consent (FPIC) within the Grievance Redress Mechanism.	project design respects and includes IP rights and knowledge.
Projects Misalign with National Priorities	Low/Medium	Mandating a balanced "bottom-up/top-down" approach, requiring national institutional actors to prioritize project types within thematic areas to ensure strategic alignment.	Reduces impact from Medium to Low, ensuring that limited resources are strategically applied to areas with high government buy-in and long-term viability.

12.2 Prohibited Practices Risk Mitigation

The low-probability, high-impact risk of Corruption/Embezzlement requires a institutional response to protect project integrity.

Table 72 Prohibited Practices Risk Mitigation

Risk	Initial Risk Probability / Impact	Mitigation Strategy	Effect on Probability / Impact
Corruption/Embezzlement (Project Funds)	Low/High	Implementing operational procedures that require all CSOs/NGOs to meet strict fiduciary standards outlined in the Expression of Interest (EOI) stage and detailed in the Operational Manual (OM).	Reduces probability from Low to Very Low by creating an upfront barrier (fiduciary compliance) to entry and ensuring continuous procedural oversight.

12.3 Political and Reputational Risk Mitigation

These risks concern the external environment and stakeholder perception, requiring careful timing and communication.

Table 73 Political and Reputational Risk Mitigation

Risk	Initial Risk Probability / Impact	Mitigation Strategy	Effect on Probability / Impact
Elections Inhibiting Programme	High/Medium-High	Accelerating programme design completion prior to critical election cycles and securing non-objection letters. Post-election, close monitoring and proactive engagement with the new administration.	Reduces impact from Medium-High to Medium by front-loading critical design phases, protecting project structure from political transition delays, and maintaining communication

			channels with new leadership.
Expectations of Local Actors Not Met (Reputational Damage)	Medium/Medium	Explicit communication during inception regarding the realistic length of time for development and comprehensive due diligence, alongside capacity building for CSOs/NGOs in understanding programme impact.	Reduces Probability from Medium to Low by setting accurate expectations and managing perception proactively through transparency and communication.

The mitigation strategy moves the project from a predominantly 'High-Risk' profile in several key operational areas (e.g., operational capacity, extreme climate events) to a 'Medium-to-Low Risk' profile. This is achieved by shifting the project's focus from mere implementation to capacity investment (training, institutional support), fiduciary control (EOI/OM standards), and proactive design (gender transformative approach, buffer funds, FPIC). This approach ensures that core project objectives remain robust against internal weaknesses and external shocks.

13.GCF Investment Performance

The proposed EDA Project is expected to make a significant contribution to the climate change strategies in all 5 participating countries that also comply (where appropriate) to national NDCs. It aims to contribute towards empowering 30 percent of the population of CARICOM to help accelerate the implementation of climate actions that are aligned with national, regional and international priorities for addressing climate change. This will be achieved through actions that target vulnerable peoples, households and communities and a funding facility that supports a programmatic acceleration of effective climate actions, which encompasses a new generation of climate-smart technologies, knowledge and structures. Based on initial estimations and experiences from the 5 countries reviews, the EDA Project is expected to make a significant contribution to reducing GHG emissions from deforestation while also providing important adaptation benefits from the planned a number of possible interventions (ranging from mangrove restoration and protection activities along vulnerable coasts to integrated watershed management interventions etc - see detailed Concept Proposals in Annex D).

The following headers replicate those identified within the GCF Funding Proposal form (Section D) for ease of use when the Full Proposal is formulated.

13.1 Impact Potential

The project is expected to impact a total of **51,559 direct beneficiaries** (of which 27,563 are female), and **931,323 indirect beneficiaries** (of which 470,984 are female). The breakdown per country is as follows:

Country	Direct		Indirect	
	Male	Female	Male	Female
Bahamas	4,444	5,392	35,815	39,316
Belize	3,986	5,050	59,163	57,992
Grenada	4,064	3,987	21,292	21,207
Jamaica	6,370	6,893	320,275	328,097
St Lucia	5,131	6,242	23,793	24,372
Total	23,995	27,563	460,339	470,984

It is expected that the project will contribute to the following GCF Adaptation Results Areas (ARAs) and IRMF indicators:

- **ARA 1: Most vulnerable people and communities**
 - *Core indicator 2: Direct and indirect beneficiaries reached*

- *Supplementary indicator 2.1: Beneficiaries (female/male) adopting improved and/or new climate resilient livelihood options (number of individuals)*
- *Supplementary indicator 2.4: Beneficiaries (female/male) covered by new or improved early warning systems*
- **ARA2: Health, well-being, food and water security**
 - *Core indicator 2: Direct and indirect beneficiaries reached*
 - *Supplementary indicator 2.2: Beneficiaries (female/male) with improved food security*
- **ARA 3: Infrastructure and built environment**
 - *Core indicator 2: Direct and indirect beneficiaries reached*
 - *Core indicator 3: Value of physical assets made more resilient to the effects of climate change and/or more able to reduce GHG emissions*
 - *Supplementary indicator 3.1: Change in expected losses of economic assets due to the impact of extreme climate-related disasters in the geographic area of the GCF intervention*
- **ARA 4: Ecosystems and ecosystem services**
 - *Core indicator 2: Direct and indirect beneficiaries reached*
 - *Core indicator 4: Hectares of natural resource areas brought under improved low-emission and/or climate-resilient management practices*

For more information, see Annex 23: Methodology on the estimation of beneficiaries.

13.2 Paradigm shift

■ Potential for scaling up and replication

The CABRIC programme is designed as Phase 1 of a broader, sustained regional climate finance mechanism, with its paradigm shift potential rooted in the creation of institutional platforms and replicable knowledge products. This expansion will be actively driven by the resource mobilisation (Output 3.3), which will develop investment cases, secure partnerships, and acquire funding commitments to scale the mechanism to additional CARICOM countries and incorporate blended finance options for a wider range of recipients, including SMEs.

The programme's community-led model is also made replicable through the development of a comprehensive, codified CABRIC Implementation Toolkit (Activity 3.3.2). This blueprint, which includes operational guidelines, institutional frameworks, and a regional guidance document for GEDSI-integrated coastal resilience policy (Activity 1.2.2), allows other Small Island Developing States (SIDS) and regional bodies to adopt and implement the successful approach, thereby multiplying the impact beyond the pilot

countries. The project ultimately de-risks future climate investment by successfully demonstrating the co-benefits and viability of local adaptation measures, attracting private sector interest and facilitating a larger, more sustainable Phase 2.

▪ Potential for knowledge sharing and learning

The programme will shift the paradigm of climate knowledge management in the region by creating an integrated, accessible, and institutionalized system for data dissemination and learning. The core mechanism for this shift is the deployment of an Integrated Knowledge Platform/Hub (Activity 3.1.1), which will be hosted on the Caribbean Community Climate Change Centre (CCCCC) website. This platform will move beyond simple data storage by explicitly linking to, aggregating, and translating complex scientific information into actionable knowledge, notably through accessible, interactive climate risk maps with GEDSI overlays for each participating country. Knowledge sharing is institutionalized not just through a repository, but through sustained capacity building. This includes mandatory M&E and data literacy training for CSOs/NGOs (Activity 2.2.2) to ensure the sustained capacity of civil society to both produce and utilize relevant climate data. Crucially, the programme will formally establish and institutionalize a Regional Knowledge Sharing Conference (Activity 3.1.3). This annual forum transforms knowledge exchange from a one-off event into a self-sustaining mechanism for documenting and disseminating lessons learned (Output 3.1), and is vital to securing the public-private partnerships necessary (Activity 3.3.1) to maintain the event and the overall knowledge platform post-program.

▪ Contribution to the creation of an enabling environment

CABRIC will fundamentally contribute to an enabling environment by shifting the institutional landscape through capacity injection and policy transformation. Component 1 is dedicated to strengthening the institutional and operational capacity of CSOs, NGOs and LAs (Outcome 1), which directly addresses the historical barrier of low local absorption capacity for climate finance. The program's success metric includes the development of a project pipeline equivalent to 100% of the fund value (Output 1.1), ensuring a continuous, self-renewing supply of finance-ready adaptation projects well beyond the project's lifetime. On the regulatory front, the programme directly targets policy barriers (B6-1) by dedicating an entire output (Output 1.2) to ensuring that climate resilience and Gender-Equality and Social Inclusion (GEDSI) are comprehensively mainstreamed into national coastal policy frameworks. This involves direct technical assistance and roadmaps (Activity 1.2.1) to facilitate permanent changes in the national regulatory environment. Finally, the program's governance structure institutionalizes coordination by requiring active involvement from National Designated Authorities (NDAs) in the Steering Committee and embedding National Coordinators within NDA offices. This structural arrangement ensures long-term multi-sectoral coordination and guarantees the alignment of future, non-CABRIC national investments with national climate change adaptation priorities.

13.3 Sustainable development

The CABRIC EDA Programme is inherently aligned with national and regional sustainable development priorities, particularly the **SIDS Accelerated Modalities of Action (SAMOA) Pathway** and the **2030 Agenda for Sustainable Development**. By addressing multidimensional vulnerabilities in coastal communities, the programme delivers synergistic co-benefits across economic, social, and environmental dimensions, directly advancing several Sustainable Development Goals (SDGs).

Social Co-Benefits and Health

The programme's explicit focus on Inclusive Social Resilience (Theme 2) delivers significant social and health co-benefits, directly contributing to **SDG 3 (Good Health and Well-being)** and **SDG 10 (Reduced Inequalities)**.

- By funding projects focused on Equitable Early Warning Systems (EWS) and Socially Inclusive Community Health Clinics and Shelters (Theme 2), the programme ensures that the most vulnerable populations—including the elderly, people with disabilities, and women-headed households—have accessible means to receive warnings and secure refuge. This is foundational to reducing inequalities in the face of climate hazards.
- The inclusion of Gender and Socially Responsive Mental Health Initiatives (Theme 2) directly addresses the psychological trauma and anxiety resulting from chronic and acute climate threats. This proactive approach recognizes mental health as a core pillar of social resilience, enhancing overall well-being in communities subjected to repeated disasters.
- The investment in Gender Transformative Climate Resilient Livelihood (Theme 1) advances SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth). By diversifying income streams through Climate Smart Agriculture and Circular Economy Livelihoods, the programme insulates coastal communities from climatic shocks, thereby creating sustainable economic opportunities and enhancing the resilience of the poor.

Environmental Co-Benefits

The programme systematically generates environmental co-benefits by integrating Nature-based Solutions (NbS) as the primary adaptation approach, strongly aligning with **SDG 14 (Life Below Water)** and **SDG 15 (Life on Land)**.

- All livelihood projects under Theme 1, particularly Restorative and Protective Coastal NbS and Climate Resilient Ecosystem-based Fisheries, are predicated on protecting and restoring coastal and marine habitats such as mangroves, coral reefs, and seagrass beds. This directly contributes to conserving and sustainably using marine resources and coastal areas.
- Interventions in Climate Smart Agriculture include activities like watershed management, agroforestry, and soil/water conservation techniques. These practices effectively reduce soil erosion, regulate water flow, and improve the functioning of watershed ecosystems, supporting the sustainable use of terrestrial resources and combating land degradation.
- The project's activities are designed as 'no regret' interventions because they improve baseline conditions (e.g., improved soil fertility, restored coastal protection) and function effectively regardless of the severity of future climate change effects. This ensures that public investment provides both immediate and long-term environmental value.

Gender and Social Inclusion (GEDSI) Benefits

The design places GEDSI as a cross-cutting imperative, directly advancing **SDG 5 (Gender Equality)** and reinforcing **SDG 10 (Reduced Inequalities)**.

- The sub-grant mechanism actively prioritises women-led organizations and mandates gender-transformative design for all interventions. This approach goes beyond simply ensuring equal participation to address systemic inequities in access to finance, resources, and decision-making power in climate-sensitive sectors like fisheries and agriculture.
- By strengthening the institutional capacity of CSOs/NGOs and influencing national policy frameworks (Output 1.2) to mandate GEDSI-integration, the programme creates a lasting enabling environment where the needs and contributions of women, youth, and persons with disabilities are fully recognized in climate action planning.

13.4 Needs of recipients

The CABRIC EDA Programme is a targeted response to the acute and systemic climate finance barriers that directly undermine the development goals of the five participating countries.

Addressing Structural Barriers to Climate Finance

The primary and most critical need addressed by CABRIC is the lack of accessible, dedicated finance for locally-led adaptation. SIDS, despite their high vulnerability, face significant structural challenges in accessing international climate funds:

1. Local CSOs, NGOs and LAs lack the institutional capacity and project management experience required to successfully navigate the stringent requirements of international funding proposals. CABRIC directly addresses this by providing targeted capacity building (Output 1.1) and utilizing the Direct Access (DA) modality to empower these local actors.
2. Adaptation efforts are frequently designed top-down, failing to match interventions to genuine community needs. By establishing a devolved Small Grants Facility, the programme ensures that financing and decision-making authority are transferred to local actors, making interventions highly relevant and effective.
3. The region suffers from a severe gap in disaggregated, GEDSI-sensitive climate data and a lack of integrated policy frameworks. CABRIC fills this need by creating an Integrated Knowledge Platform and providing Technical Assistance for Policy Integration (Output 1.2), ensuring that future national climate action is evidence-based and inclusive.

Alignment with National and Regional Priorities

The programme is in full alignment with the mandated priorities of the recipient governments and regional bodies:

- All projects funded by CABRIC are required to demonstrate explicit alignment with the respective country's NAPs and NDC commitments, specifically those focused on coastal resilience, food security, and livelihood diversification. This ensures the programme supports national sovereignty in climate planning.
- The programme directly supports the CARICOM's core strategy for Climate Change, Disaster Risk Reduction, and Environmental Sustainability, by institutionalizing a regional mechanism (the CCCCC-hosted EDA) for pooling resources, sharing knowledge, and promoting collaborative action across member states.
- By prioritizing ecosystem-based adaptation (EbA) and Nature-based Solutions (NbS), the programme addresses the specific geographic need for protecting fragile coastal ecosystems (mangroves, coral reefs), which are vital both for national economies (tourism, fisheries) and as the first line of defence against the impacts of a changing climate.

13.5 Country ownership

Country ownership of the CABRIC EDA Programme is structurally embedded across its governance, execution, and sustainability mechanisms, ensuring that the intervention is driven by national priorities and executed by local institutions.

Governance and Institutional Alignment

Ownership begins with the governance structure. The AE, the Caribbean Community Climate Change Centre (CCCCC), is a regional organization fully owned and mandated by CARICOM member states. This regional ownership ensures that the programme's objectives are integrated with the collective climate resilience goals of the SIDS. Critically, the programme mandates the active involvement of National Designated Authorities (NDAs) from all five countries in the Steering Committee. This provides a direct channel for national government oversight, ensuring all decisions on resource allocation and strategic direction reflect the priorities outlined in NAPs and NDCs. Furthermore, the National Coordinators are anchored within the respective NDA or a relevant ministry, formally embedding the PMU function into the government's official administrative structure.

Execution Modality and Local Empowerment

True ownership is achieved through the programme's Small Grants Facility. This approach deliberately transfers implementation authority and financial control to local CSOs, NGOs and LAs.

- The Call for Proposals process is structured to solicit project ideas directly from the community level. CSOs, NGOs and LAs are required to conduct initial community and stakeholder consultations to ensure that the adaptation projects are truly locally-led, appropriate, and owned by the beneficiaries.
- The Programme directly invests in the technical, financial, and fiduciary capacity of these local Executing Entities (Output 1.1). This capacity transfer ensures that ownership is not merely nominal but is supported by the skills necessary to sustain management and accountability for climate finance beyond the programme's end date.

Policy and Financial Sustainability

Ownership is secured through mechanisms designed for long-term sustainability:

- The programme's commitment to providing technical assistance to integrate climate resilience and GEDSI into national coastal policy frameworks (Output 1.2) ensures that the successful approaches are institutionalized. By embedding these frameworks into national law and policy, future government and partner investments will naturally adopt the principles and standards proven effective by CABRIC, sustaining the approach at a systemic level.
- The programme's planned development of a strategic resource mobilization plan (Output 3.3) for Phase 2, which involves National Designated Authorities and the CCCCC, ensures that the recipient countries take proactive ownership of securing the long-term financing necessary to scale the model across the region.

14. Efficiency and Effectiveness

The CABRIC programme, with a total budget of **USD 46.82 million** (including a GCF grant of USD 42.76 million), represents a sound investment in the climate resilience of the Caribbean. The project targets **51,559 direct beneficiaries** (of which 27,563, or 53%, are female), alongside **931,323 indirect beneficiaries** (of which 470,984 are female) across The Bahamas, Belize, Grenada, Jamaica, and Saint Lucia (see earlier section for breakdown). This translates to a GCF grant cost per direct beneficiary of approximately USD 869, and a cost per indirect beneficiary of approximately USD 48. These figures reflect the capital intensity of community-level climate adaptation infrastructure, which requires meaningful per-beneficiary investment to deliver durable, structural change in the face of escalating climate risk. Considered against the total population reached across direct and indirect channels (982,882 people), the GCF cost per beneficiary falls to approximately USD 46, demonstrating the broader reach of the programme beyond its direct investment targets. By utilising an Enhanced Direct Access (EDA) modality, CABRIC minimises bureaucratic layering, ensuring that finance flows directly to LAs, CSOs and NGOs, thereby maximising the percentage of funding that reaches vulnerable coastal communities.

14.1 Justification of concessionality

The request for 100% grant funding is grounded in three distinct and compounding barriers: the macrofiscal constraints of the target countries, the institutional characteristics of CABRIC's grantee organisations, and the demonstrated financial unviability of adaptation investment under any debt instrument, including concessional, for the target beneficiary groups.

At the sovereign level, the target countries face high debt-to-GDP ratios, with levels reaching 81.5% in The Bahamas and 73.3% in Jamaica. Additional borrowing obligations, even at concessional rates, would exacerbate sovereign debt burdens and reduce the fiscal space necessary for social protection, disaster response, and ongoing climate commitments. The programme therefore cannot draw on sovereign loan instruments as an alternative or complementary financing mechanism.

At the grantee level, CABRIC's intended recipients, CSOs, NGOs, community-based organisations, producer cooperatives, and Local Authorities, are non-profit civil society actors without a revenue base from which to service debt obligations. Many face legal restrictions on commercial borrowing and lack the collateral, credit history, or financial management infrastructure that debt financing requires. These are structural features of the civil society delivery model that underpins CABRIC's Locally-Led Climate Action design. Imposing repayment obligations on these organisations or passing debt costs through to the smallholder farmers and artisanal fishers they represent, would be fundamentally inconsistent with CABRIC's target beneficiary profile and would replicate the access-to-finance failure the programme is designed to overcome.

The case for grants over concessional lending is further substantiated by the programme's Economic and Financial Analysis, which models concessional loan scenarios for the two revenue-generating intervention types in the portfolio. For cooperative cold storage (A2), a concessional loan at 6% interest over 10 years, structured through a GCF two-step lending facility, yields an incremental NPV of approximately -USD 9,200 relative to the business-as-usual baseline, meaning the investment fails to improve on doing nothing even under the most favourable debt terms modelled. For climate-resilient agriculture (A1), the concessional loan scenario yields a marginally positive NPV in absolute terms, but a near-zero or negative incremental return versus BAU once debt service is accounted for. In both cases, grant financing is the only instrument under which the investment is clearly additional and beneficial for the end beneficiary. For the four non-revenue-generating interventions in the portfolio (Early Warning Systems, community-managed MPAs, mental health support, and hurricane-proof shelters) there is no revenue stream against which debt could be serviced under any conditions, and loan financing is structurally inapplicable.

The grant envelope requested reflects the minimum residual concessionality required after accounting for available co-financing and shared-cost efficiencies built into CABRIC's design. These include: (i) mandatory

grantee co-financing contributions across all sub-projects; (ii) in-kind contributions from grant administrators and implementing partners; (iii) use of existing national implementing partner and Sub-EE governance structures rather than parallel administrative systems, minimising duplication; and (iv) regional pooling of capacity-building, knowledge-sharing, and helpdesk functions at CCCCC and CANARI level, exploiting economies of scale across the five countries. The GCF grant therefore covers only the residual financing gap that remains after these contributions and efficiencies have been applied, consistent with the principle of minimum concessionality.

14.2 Economic and financial analysis

A cost-benefit analysis was conducted on a representative portfolio of six intervention types. Over a 20-year horizon, the modelled portfolio generates an Economic Net Present Value (ENPV) of USD 31.8 million at a 12% social discount rate, an Economic Internal Rate of Return (EIRR) of 32%, and an undiscounted benefit-cost ratio of approximately 3.3:1. Total undiscounted 15-year benefits of USD 156.3 million are generated against a total programme cost of USD 46.8 million. Benefits are distributed across the six intervention types, with community-managed MPAs (A3) contributing the largest share at USD 40.8 million (37% of total 15-year benefits), followed by climate-resilient agriculture packages (A1) at USD 31.4 million (29%). Community-based Early Warning Systems (B1) generate USD 60.4 million over the full 20-year horizon, reflecting the compounding value of avoided disaster losses. Individual intervention economic returns are positive across all modelled types: community-managed MPAs benefit from enhanced fisheries productivity and ecosystem service values that compound over the long term, while climate-resilient agriculture packages deliver sustained multi-year productivity and resilience gains across a large number of smallholder farming households. Cold storage infrastructure (A2), mental health support (B2), and hurricane-proof shelters (B3) generate USD 12.2 million, USD 12.9 million, and USD 8.5 million respectively, each addressing critical adaptation needs across multiple dimensions of vulnerability.

14.3 Analysis of alternative financial instruments

The selection of grants as the sole financial instrument for the CABRIC EDA facility reflects a structured assessment of the full range of instruments available within the GCF architecture and the broader climate finance landscape. Each alternative was evaluated against three criteria: the revenue-generating characteristics of the interventions supported; the institutional profile of the organisations delivering them; and the macrofiscal context of the target countries. The conclusions of this assessment are presented below and summarised in Table 36.

Commercial loan financing is structurally excluded by the economics of the interventions modelled. At prevailing Caribbean market rates of approximately 25% per annum, Annex 3 EFA demonstrates that loan repayments fully erode the financial benefits of adaptation investment for smallholder farmers and artisanal fishing cooperatives: the incremental net present value of a commercially financed climate-resilient agriculture package relative to the business-as-usual baseline is negative, meaning the beneficiary would be financially worse off investing than not. Concessional lending, while substantially more favourable, similarly fails to clear the minimum threshold of additionality. The EFA explicitly models a concessional loan scenario at 6% interest via a GCF two-step lending facility for both agriculture and cold storage interventions, finding incremental NPVs of approximately -USD 9,200 (cold storage) and near-zero (agriculture) against the BAU baseline. Even the most favourable debt instrument available through the GCF lending architecture does not render these investments worthwhile for the target beneficiary. Beyond the economics, CABRIC's intended grantees – CSOs, NGOs, community-based organisations, producer cooperatives, and Local Authorities – are non-profit civil society actors without the revenue base, collateral, or in many cases legal capacity to service debt obligations. Loan financing would require either the grantee organisations themselves to assume repayment risk, which is inconsistent with their institutional nature, or the costs to be passed through to end-beneficiaries, which would replicate the access-to-finance barrier the programme is designed to overcome.

Blended finance instruments – combining concessional public capital with commercial co-investment – require a private sector investable return to justify commercial participation. For blending to function, underlying projects must generate sufficient revenue to service both concessional and commercial tranches.

Four of the six CABRIC intervention types are non-revenue-generating public goods (early warning systems, community-managed MPAs, mental health support, and hurricane-proof shelters) for which no private revenue stream exists under any structuring scenario. For the two revenue-generating types, the EFA demonstrates that returns are insufficient to attract commercial co-investment even at the cooperative level: cold storage and agricultural packages generate modest net income for smallholder beneficiaries but not at a scale or with the bankability characteristics needed to structure a blended transaction. Additionally, CABRIC sub-projects range from USD 150,000 to USD 500,000 – substantially below the transaction sizes at which blended finance vehicles typically operate cost-effectively, given the due diligence, structuring, and monitoring costs associated with blending mechanisms.

Results-based payment mechanisms – in which disbursements are made conditional on verified outcomes – are appropriate where recipients have sufficient working capital or creditworthiness to front-load implementation costs while awaiting results verification, and where outcomes are measurable, attributable, and timely. Neither condition is met in the CABRIC context. Community-based organisations and local civil society actors in Caribbean SIDS typically lack the liquidity to pre-finance activities of the scale required, particularly given the constrained fiscal environments in which they operate. More fundamentally, the core benefits of CABRIC's portfolio – avoided disaster losses, ecosystem service recovery, long-run agricultural resilience – are probabilistic, diffuse, and in many cases only fully observable over multi-year or decadal timeframes. Early warning system benefits, for example, only fully materialise when extreme weather events occur; MPA ecosystem recovery follows non-linear ecological trajectories; and agricultural resilience benefits depend on climatic conditions that cannot be controlled or guaranteed within a disbursement cycle. These characteristics make results-based payments operationally unsuitable as a primary disbursement mechanism, though outcome monitoring and adaptive management features are incorporated into CABRIC's M&E framework to ensure accountability for results over time.

The target countries already contribute co-financing to CABRIC through in-kind support, use of existing national governance structures, and Sub-EE administrative functions. However, national budget co-financing cannot serve as a primary or substitute financing mechanism for the scale of investment required. Debt-to-GDP ratios in the target countries – reaching 81.5% in The Bahamas and 73.3% in Jamaica – reflect severely constrained fiscal space, with national budgets already under pressure from recurrent disaster recovery costs, debt servicing obligations, and essential service provision. Climate adaptation expenditure is chronically underfunded at the national level precisely because of these constraints, making international grant finance additional in the strict sense: it finances activities that would not occur, or would occur at a materially smaller scale, through national budget allocations alone. The GCF grant therefore does not substitute for sovereign expenditure but complements it, unlocking civil society and community-level delivery capacity that falls outside the reach of national procurement and budget systems.

Partial credit guarantees or first-loss instruments could in theory reduce the cost of commercial lending to cooperatives or community organisations. However, guarantees address only the risk premium component of borrowing costs, not the structural barriers that make debt financing inappropriate for CABRIC's grantee profile. A guarantee does not resolve the absence of a revenue base from which to service principal and interest, nor the legal and institutional constraints on borrowing faced by non-profit civil society actors. For the non-revenue-generating interventions in the portfolio, guarantees are inapplicable by definition. For revenue-generating interventions, the EFA demonstrates that even at zero risk premium (i.e., purely the cost of capital), concessional debt produces near-zero or negative incremental returns for beneficiaries – a guarantee would shift none of this calculus.

Table 74 Alternative Instruments justification - summary

Financial Instrument	Transformation potential	Justification of Inclusion or exclusion
Grants	Core barriers to paradigm shift are best addressed through grant finance including technical assistance and institutional capacity building.	Included. Climate adaptation at community level remains chronically underfunded due to the reactive nature of adaptation expenditure and the absence of investable returns. Grants are the only instrument capable of reaching CSO, NGO, and community-based grantees who lack the institutional or financial capacity to service debt. The EFA confirms that grant financing is the only modality under

Financial Instrument	Transformation potential	Justification of Inclusion or exclusion
		which adaptation investment generates clearly positive incremental returns for target beneficiaries.
Commercial loans	Can mobilise private capital at scale and introduce market discipline into investment selection.	Excluded. At prevailing Caribbean commercial rates (~25%), the EFA demonstrates negative incremental NPV for both agricultural and cold storage interventions relative to BAU. Debt service fully offsets adaptation benefits for smallholder and cooperative beneficiaries. Grantee organisations are non-profit entities without revenue bases or collateral to service commercial debt.
Concessional loans	Below-market interest rates reduce debt service burden and can make marginal investments viable.	Excluded. The EFA models a 6% concessional loan scenario via a GCF two-step facility. Even at this rate, incremental NPVs versus BAU are near-zero (agriculture) or negative (cold storage, -USD 9,200). Concessional debt does not produce sufficient additionality for the target beneficiary profile, and grantee organisations remain institutionally unsuited to debt obligations regardless of terms.
Blended finance	Combines concessional and commercial capital to leverage private co-investment and extend the reach of public funds.	Excluded. Four of six intervention types are non-revenue-generating public goods with no private return. Revenue-generating interventions generate returns insufficient to attract commercial co-investment at cooperative scale. Sub-project sizes (USD 150,000-500,000) fall below the threshold at which blending is cost-effective given structuring and due diligence requirements.
Results-based payments	Ties disbursements to verified outcomes, improving accountability and results orientation.	Excluded. Grantee organisations lack working capital to front-load implementation costs pending verification. Core adaptation benefits (avoided losses, ecosystem recovery, agricultural resilience) are probabilistic, diffuse, and observable only over multi-year horizons, making them unsuitable for results-based disbursement cycles. Outcome accountability is instead embedded in CABRIC's M&E framework.
Co-financing through national budgets	Aligns international finance with national priorities and strengthens domestic ownership.	Excluded as substitute instrument; included as complementary co-financing. Fiscal space in target countries is severely constrained (debt-to-GDP ratios up to 81.5%). National budget allocations cannot substitute for the scale of international grant finance required. Country governments contribute in-kind co-financing, governance infrastructure, and Sub-EE functions; the GCF grant finances the residual gap that national systems cannot cover.

Financial Instrument	Transformation potential	Justification of Inclusion or exclusion
Guarantees and risk instruments	Reduce the risk premium on commercial lending, potentially lowering borrowing costs for community organisations	Excluded. Guarantees address only the risk component of borrowing costs, not the structural barriers (absence of revenue, legal constraints on borrowing, insufficient returns) that make debt financing inappropriate. For non-revenue-generating interventions, guarantees are inapplicable. For revenue-generating interventions, the EFA shows near-zero or negative incremental returns even at zero risk premium.

14.4 Options analysis

14.4.1 Methodology

This options analysis evaluates the feasibility of the CABRIC programme's strategy at **two levels**. At the facility design level, it compares the proposed Enhanced Direct Access (EDA) grant-making mechanism against alternative delivery models for channelling adaptation finance in the Caribbean. At the thematic level, for each of the six representative intervention categories modelled in the Economic and Financial Analysis (Annex 3), it compares the proposed intervention approach against a business-as-usual baseline and a plausible alternative that development agencies and governments in the region have considered or implemented.

The business-as-usual (BAU) baseline for each intervention represents the current trajectory in the absence of CABRIC investment, drawing on the counterfactual analysis developed in the EFA and corroborated by the programme's additionality screening (Annex 2a). The alternative represents a technically feasible option for the Caribbean SIDS context.

The comparison is conducted using five evaluation criteria: (i) technical feasibility in the SIDS context; (ii) cost efficiency (CAPEX/OPEX); (iii) climate adaptation impact; (iv) value for money; and (v) scalability and replicability across the five CABRIC target countries.

14.4.2 Facility design options analysis

a) Proposed: CABRIC EDA Grant Facility

The CABRIC EDA facility will channel GCF proceeds through five nationally embedded Grant Administrators to community-level grantees (CSOs, NGOs, and LAs) via a competitive, demand-driven call for proposals mechanism. **Interventions are not pre-determined**; they will emerge from participatory community climate risk and vulnerability assessments (pCRVAs) and are co-designed through collaborative write-shops. The facility will operate according to the Operations Manual (Annex 21), with harmonised eligibility criteria, fiduciary controls, and GEDSI/ESS safeguards across all five countries. CCCCC will act as both Accredited Entity and Lead Executing Entity, with CANARI providing capacity building. The facility will disburse grants in three tiers (Small up to USD 150,000; Medium up to USD 300,000; Large up to USD 500,000), with co-financing requirements scaled to grant size. Up to six calls for proposals are issued over the first 3.5 years. The design is explicitly locally-led: community validation constitutes 25-40% of total proposal scores, and participatory MEL is embedded in all sub-projects.

b) Business as usual: fragmented national adaptation

Under the BAU scenario, community-level adaptation in the five CABRIC countries continues to rely on a combination of government-led sector programmes, small-scale bilateral donor projects, and self-funded CSO/NGO activities. Climate finance flows primarily through national government channels to line ministries, with limited direct access mechanisms for civil society organisations. CSOs and community groups in the Caribbean have historically received less than 5% of international climate finance disbursed to the region. National adaptation plans exist in all five countries but face persistent implementation financing gaps: Belize requires an estimated USD 1.15-1.3 billion by 2030 against approximately USD 150 million received to date; the Bahamas requires USD 300-450 million annually but is structurally excluded from most concessional finance due to its high-income classification; Saint Lucia requires USD 400 million (25% of GDP); Grenada requires up to USD 1 billion; and Jamaica requires USD 6.5 billion. Without a dedicated grant facility, CSOs lack the fiduciary assessment, capacity building, and institutional support needed to access and manage climate finance at scale.

c) Alternative: direct implementation by AEs

Under this alternative, GCF Accredited Entities / Direct Access Entities (DAEs) would design and implement a project of pre-defined adaptation interventions in an individual country, using centralised procurement and directly contracting service providers and works contractors. Interventions would be selected at the Funding Proposal stage based on national priority assessments and stakeholder consultations, and implemented through existing project management infrastructure. This model is standard for many GCF-funded projects: the AE designs the interventions, procures them centrally, and manages delivery. It offers tighter fiduciary control and more predictable results frameworks, since interventions are known at design stage. In other words, this would not be a fully bottom-up grassroots LLCA programme.

d) Comparative assessment

Criteria	Proposed: CABRIC EDA	BAU: Fragmented national	Alternative: AE direct implementation
Technical feasibility	High. Uses existing national institutions as Grant Administrators, reducing setup costs. Demand-driven design ensures interventions match local technical capacity and conditions.	N/A. No dedicated mechanism exists. CSOs access climate finance ad hoc through fragmented donor programmes with varying requirements and limited coordination.	High. Proven model with strong AE control. However, requires substantial AE institutional capacity to design and procure interventions across five countries and multiple sectors simultaneously. Would likely no longer be a grassroots LLCA programme.
Cost efficiency	Moderate. Higher programme management costs due to the larger M&E requirements and the regional scale. Offset by high capital efficiency: 100% of grant capital reaches community-level implementers. Co-financing leverages additional resources at 5-15%.	Varies. Duplication of effort across multiple small donor programmes with high transaction costs per dollar disbursed. CSOs spend disproportionate time on fundraising rather than implementation.	Varies. Possibly less overhead due to national as opposed to regional scale, and less M&E requirements due to non-LLCA project. Less capital likely to reach community level.
Climate adaptation impact	High. Interventions are grounded in community-validated climate risk data (pCRVAs) and respond to locally identified priorities. GEDSI integration ensures vulnerable groups are targeted. Portfolio	Low. Interventions are supply-driven and rarely grounded in community-validated climate risk assessments. Targeting of the most vulnerable communities and populations is inconsistent. No LLCA framework.	Moderate. Pre-defined interventions may not reflect the most current community priorities. Top-down design risks maladaptation where national assessments diverge from local conditions. Limited community ownership reduces

Criteria	Proposed: CABRIC EDA	BAU: Fragmented national	Alternative: AE direct implementation
	diversification across 132 sub-projects reduces concentration risk.		sustainability. Possibly more limited in scale
Value for money	High. The EFA demonstrates positive EIRRs across all six modelled interventions. The demand-driven model allows adaptive portfolio rebalancing across calls based on implementation experience. Capacity building under Component 1 creates lasting institutional infrastructure beyond programme period.	Low. Financing gap evidence shows current mechanisms are not delivering adaptation at scale: the five CABRIC countries collectively face a financing gap of over USD 9 billion by 2030. Existing CSO activities are small-scale and fragmented.	Moderate. Tighter cost control per intervention, but lower portfolio diversification and no adaptive rebalancing. No institutional capacity building for national Grant Administrators or CSOs hinders replicability.
Scalability	High. The facility model is inherently replicable: harmonised OM, standardised processes, and transferable capacity building tools can be extended to additional countries. The Grant Administrator model leverages existing national institutions.	Low. No mechanism for cross-country coordination, shared learning, or harmonised standards. Each country operates independently with no economies of scale.	Varies. Pre-defined interventions are context-specific and not easily transferable. No Grant Administrator capacity is built; replication requires a new Funding Proposal package to redesign for each new context.

e) Conclusion

The CABRIC EDA facility model is the optimal delivery mechanism for the programme's objectives. It is the only option that simultaneously builds national institutional capacity (through the Grant Administrator model), ensures locally-led and community-validated intervention design (through the pCRVA and write-shop pipeline), and creates a replicable regional architecture for channelling adaptation finance to civil society. The BAU scenario is demonstrably failing to deliver adaptation at scale, as evidenced by the persistent financing gaps. The direct implementation alternative, while offering stronger AE control, would sacrifice the programme's core value proposition of locally-led adaptation, community ownership, and lasting institutional capacity building, and would not achieve the GCF's Enhanced Direct Access objectives.

14.4.3 Thematic area options analysis

As an Enhanced Direct Access facility, CABRIC establishes a demand-driven grant-making mechanism rather than implementing a predetermined portfolio of interventions. The specific sub-projects to be funded will be determined through competitive calls for proposals during implementation, with project selection driven by community priorities validated through participatory Climate Risk and Vulnerability Assessments (pCRVAs), technical feasibility, and alignment with national adaptation strategies. This structure means that the exact portfolio composition cannot be known ex ante at the Funding Proposal stage.

To address this analytical constraint, the Economic and Financial Analysis (Annex 3) adopts a representative intervention approach, modelling six illustrative interventions, three under **Theme A (Gender-Transformative Climate-Resilient Livelihoods)** and three under **Theme B (Inclusive Health, Wellbeing, and Social Resilience)**, that reflect the types of sub-projects anticipated based on stakeholder consultations, national priority assessments, and the thematic eligibility criteria defined in the Operations Manual.

The options analysis that follows applies the same representative approach: for each of the six modelled intervention categories, it compares the proposed approach against a business-as-usual baseline and a

plausible alternative delivery model. The alternatives selected are approaches that governments and development partners in the Caribbean have considered, funded, or implemented, and which represent realistic comparators for the types of adaptation investment that CABRIC's grant facility is designed to deliver.

The purpose of this analysis is not to evaluate specific future sub-projects, which cannot be known until proposals are received and appraised, but to demonstrate that the categories of intervention eligible under the CABRIC facility represent the most appropriate, cost-effective, and context-sensitive adaptation responses for Caribbean SIDS coastal communities.

a) A1: climate-resilient agriculture

Proposed intervention: Climate-resilient agricultural packages

The proposed intervention provides smallholder farming communities with integrated packages comprising drought-resistant crop varieties, soil and water conservation techniques (contour bunding, mulching, cover cropping), rainwater harvesting systems, and agroforestry approaches. These are proven, low-cost technologies that are compatible with existing smallholder farming systems across the Caribbean. Solar-powered micro-irrigation is included where feasible. The packages are community-designed through the pCRVA and write-shop process, ensuring they respond to locally identified agricultural climate risks. All sub-projects incorporate gender-transformative approaches and target a minimum 40% female participation.

Business as usual: Rainfed monoculture with synthetic inputs

Under the BAU scenario, smallholder farmers continue to rely on rainfed monoculture systems dependent on imported synthetic fertilisers and pesticides. In Jamaica, where this intervention has been modelled, over 80% of farms are entirely rainfed and highly exposed to drought, erratic rainfall, and heat stress. The 2014 drought reduced yam and coffee production by 20%. Rising temperatures have driven invasions of whiteflies, aphids, and plant-hoppers that have devastated production across multiple crop types. Hurricane Beryl (2024) caused over USD 5.7 billion in damage to Jamaica's agriculture and fisheries sectors, affecting more than 48,850 farmers. Farmers are exposed to extreme price volatility for imported inputs, and soils depleted of organic matter are increasingly susceptible to erosion during cyclones and drought. The additionality screening demonstrates that the commercial loan scenario produces a lower NPV than BAU because debt service obligations erode financial benefits for farmers operating on thin margins, confirming that grant-based finance is essential.

Alternative: Large-scale irrigation infrastructure

This alternative involves the construction of government-led, centralised irrigation systems (dams, canal networks, pump stations) to reduce dependence on rainfed agriculture. While irrigation addresses the water availability constraint, it presents limitations in the Caribbean SIDS context. Capital costs are high: a small-to-medium irrigation scheme serving 500-1,000 hectares can cost USD 5-15 million, consuming the entire CABRIC country allocation for a single intervention. The engineering complexity of dam and canal systems may exceed local maintenance capacity in Caribbean countries. The long construction timelines means no adaptation benefits are realised during the programme period. Critically, large-scale irrigation excludes the majority of smallholder farmers, who farm scattered hillside plots that are not connected to centralised canal networks. The approach is supply-driven, offering no mechanism for community ownership or gender-transformative design.

Criteria	Proposed: CRA packages	BAU: Rainfed monoculture	Alternative: Centralised irrigation
Technical feasibility	High. Proven low-cost techniques (agroforestry, soil conservation, rainwater harvesting) compatible with smallholder systems. Local labour and materials.	N/A. No technology deployed. Continued reliance on traditional practices.	Low in SIDS context. Requires engineering expertise, heavy machinery, and long-term government maintenance commitment. Unsuitable for scattered hillside plots.

Criteria	Proposed: CRA packages	BAU: Rainfed monoculture	Alternative: Centralised irrigation
Cost (CAPEX/OPEX)	Low CAPEX per farm. Moderate OPEX (labour-intensive but uses local inputs). EFA models positive EIRR at 12% discount rate.	Low direct cost but high externalised cost: progressive soil degradation, yield decline, and catastrophic single-event losses (USD 5.7B from Hurricane Beryl).	Very high CAPEX (USD 5-15M per scheme). High OPEX (pump energy, canal maintenance). ^{36, 37, 38} Exceeds CABRIC country allocation.
Climate adaptation impact	High. Addresses root climate vulnerabilities (drought, erosion, pest exposure). Builds soil organic carbon, improving water retention and long-term yield stability. Estimated 10% yield increase.	Negative. Increasing vulnerability as climate stressors intensify. Depleted soils, import-dependent inputs, no resilience buffer.	Moderate for connected farms. Zero benefit for unconnected smallholders (the majority). Does not address soil degradation, pest exposure, or input dependency.
Value for money	High. Grant-funded scenario produces higher NPV than BAU and both loan scenarios. Over USD 5,600 per hectare in annual food import substitutions. Direct targeting of vulnerable smallholders.	Negative. Additionality screening confirms unsustainable trajectory. Economic losses accelerating.	Low. High cost per beneficiary. No community ownership. No gender-transformative component. Benefits accrue to a narrow geographic area.
Scalability	High. Replicable across all five CABRIC countries. Compatible with diverse crop systems and farm sizes.	N/A.	Low. Site-specific engineering. Not replicable across diverse topographies without redesign.

The proposed intervention is the optimal approach because it addresses the full range of agricultural climate vulnerabilities (drought, erosion, pests, input dependency) at a cost per beneficiary that is orders of magnitude lower than large-scale irrigation, while building community ownership and targeting the most vulnerable smallholders who would be excluded by centralised infrastructure.

b) A2: cold storage for artisanal fishers

Proposed intervention: Off-grid solar cold storage and ice plants

The proposed intervention installs off-grid, solar-powered 10-ton cold storage facilities and 1-ton-per-day ice plants at artisanal fishing landing sites. This eliminates the current 8% post-harvest spoilage rate and unlocks a 23% combined value enhancement by enabling fishers to store catch during peak seasons and sell at a 15% price premium during off-season scarcity. The infrastructure is designed for community management by fishing cooperatives, with training provided through Component 1. Modelled in Grenada, where fisheries directly employ approximately 3,500 people and contribute 1-2% of GDP.

Business as usual: Unrefrigerated artisanal catch

³⁶ Fujiie et al., via PMC: <https://pmc.ncbi.nlm.nih.gov/articles/PMC9937893/> (reports USD 6,590/ha non-SSA average; USD 14,455/ha SSA average; small-scale schemes outperform large-scale on IRR)

³⁷ FAO Aquastat irrigation investment cost database: <https://www.fao.org/aquastat/en/overview/archive/investment-costs/>

³⁸ DevelopmentAid (2022), citing costs exceeding USD 10,000/ha: <https://www.developmentaid.org/news-stream/post/107287/irrigation-systems-in-developing-countries>

Under the BAU scenario, artisanal fishers sell their catch at the landing site on the day of capture, with no cold chain infrastructure. Post-harvest spoilage averages 8% per landing site, translating to an annual economic loss of USD 26,728 per site. Fishers have no ability to time sales to market conditions and receive low prices during peak catch periods. Climate-driven species scarcity is forcing fishers to travel longer distances, increasing fuel costs and ocean exposure risk. Hurricane Beryl (2024) caused over USD 4 million in damage to Grenada's fishing infrastructure alone. The additionality screening confirms that commercial loan financing produces payback periods and debt burdens incompatible with the fragile cash flows of artisanal fishing communities.

Alternative: Industrial aquaculture

This alternative involves the development of commercial-scale cage aquaculture systems (floating cages in lagoons or open water) for carnivorous species such as snapper and cobia. While industrial aquaculture is widely promoted as a food security solution, it presents severe risks in the Caribbean SIDS context. Cage systems release uneaten feed and faeces directly into lagoon waters, causing localised eutrophication that triggers algal blooms and accelerates coral mortality. Cage infrastructure is also vulnerable to hurricane damage; Category 4 or 5 storms would destroy cage systems, release stock (causing genetic pollution of wild populations), and cause financial losses to the operator. Capital costs for a 1,000-tonne farm are estimated at USD 15-20 million. Carnivorous species require fishmeal-based feed derived from wild capture, perpetuating pressures on depleted marine stocks.

Criteria	Proposed: Solar cold storage	BAU: Unrefrigerated catch	Alternative: Industrial aquaculture
Technical feasibility	High. Solar PV and refrigeration are proven, robust technologies. Community-manageable with cooperative training. Off-grid design avoids unreliable grid dependency.	N/A. No cold chain technology deployed.	Moderate. Cage systems require deep-water mooring, feeding technology, and veterinary expertise beyond local capacity. High hurricane vulnerability.
Cost (CAPEX/OPEX)	Moderate CAPEX per landing site. Low OPEX (solar-powered, minimal maintenance). EFA models 25% NPV improvement over BAU over 10 years.	Low direct cost but high economic waste: USD 26,728 annual spoilage loss per landing site. Increasing operational costs as fishers travel further for diminishing catch.	Very high CAPEX (USD 15-20M). ³⁹ High OPEX (feed, maintenance, disease management, skilled labour). Requires fishmeal imports.
Climate adaptation impact	High. Eliminates spoilage losses, unlocks price premiums, reduces pressure on overfished stocks by maximising value of existing catch. Solar PV provides energy resilience.	N/A. Increasing vulnerability as marine stocks decline and extreme weather intensifies. No value preservation.	Possibly negative. Cage aquaculture pollutes reef habitat, contradicting adaptation objectives. Carnivorous feed perpetuates wild stock depletion. Hurricane destruction causes total financial loss.
Value for money	High. 10-year incremental ENPV of USD 311,874 per site above BAU. Direct targeting of vulnerable fisherfolk cooperatives. Gender-	Negative. Accelerating economic losses. Additionality screening confirms grant finance is essential.	Low-moderate. High capital risk. Export-oriented production with limited food security benefit for local communities. Displaces

³⁹ Fletcher/Innovasea (2020), "Why invest in offshore aquaculture production?", <https://thefishsite.com/articles/why-invest-in-offshore-aquaculture-production>

Criteria	Proposed: Solar cold storage	BAU: Unrefrigerated catch	Alternative: Industrial aquaculture
	transformative processing and marketing roles.		artisanal fishers from traditional grounds.
Scalability	High. Modular design. Replicable across all five CABRIC countries wherever artisanal landing sites exist.	N/A.	Low. Requires minimum tonnage often unavailable in smaller island economies. Not compatible with community-based management.

The proposed intervention directly addresses the primary economic vulnerability of artisanal fishing communities (post-harvest loss) at a fraction of the cost and risk of industrial aquaculture, while strengthening rather than undermining the marine ecosystems on which these communities depend.

c) A3: Community-managed Marine Protected Areas (MPAs)

Proposed intervention: Community co-managed MPAs

The proposed intervention establishes or strengthens community-managed Marine Protected Areas through participatory governance frameworks, boundary surveying, enforcement capacity, and sustainable financing mechanisms linked to eco-tourism and fisheries management. Modelled in Belize, where the Barrier Reef Reserve System (a UNESCO World Heritage Site) has experienced documented declines of over 50% in both commercial and herbivorous fish populations. MPAs generate non-rivalrous, non-excludable public goods: coastal storm protection, fish stock replenishment, and carbon sequestration. The EFA estimates over USD 6.18 million in annual ecosystem services per 1,000-hectare MPA. Community co-management ensures local enforcement and embeds conservation within livelihood systems.

Business as usual: Unmanaged coastal degradation

Under a BAU scenario, coastal marine areas continue to degrade due to open-access fishing, destructive practices, coral bleaching, ocean acidification, and sargassum influx. Belize's existing 18 MPAs suffer from weak management effectiveness and inadequate enforcement capacity. Fish populations continue to decline, reducing catch per unit effort and driving fisherfolk into poverty traps. Coastal storm protection diminishes as reef and mangrove degradation accelerates, increasing the physical and economic vulnerability of coastal communities to hurricane impacts.

Alternative: Hard coastal defences (seawalls and breakwaters)

This alternative protects coastal communities and assets through the construction of engineered seawalls and breakwaters. Concrete seawalls cost approximately USD 6,780 per linear metre, compared to approximately USD 772 per metre for reef-positive nature-based solutions such as mangrove restoration. Seawalls frequently accelerate erosion on adjacent beaches through scouring effects, destroying the very coastal assets they are designed to protect. They generate no co-benefits: no fisheries replenishment, no carbon sequestration, no eco-tourism revenue. Engineering designs are site-specific and do not address the underlying causes of coastal degradation. Maintenance costs are high and recurring, creating long-term fiscal liabilities for governments already facing severe debt constraints.

Criteria	Proposed: Community MPAs	BAU: Unmanaged degradation	Alternative: Hard coastal defences
Technical feasibility	High. Community co-management is proven in the Caribbean (e.g., LMMAs in Belize). Requires sustained community engagement and governance support.	N/A. Continued degradation under open-access and weak enforcement.	High engineering capacity required. Site-specific design for each coastal stretch. Requires imported materials and expertise.

Criteria	Proposed: Community MPAs	BAU: Unmanaged degradation	Alternative: Hard coastal defences
Cost (CAPEX/OPEX)	Low-moderate CAPEX. OPEX sustained through eco-tourism revenue linkages and community enforcement. EFA models USD 89.6M in ecosystem service value over 20 years.	Low direct cost but massive externalised cost: loss of reef ecosystem services, declining fisheries, reduced storm protection, tourism revenue decline.	Very high CAPEX (USD 6,780/m vs USD 772/m for NbS). ^{40,41} High recurring maintenance. Pure cost item with no revenue generation.
Climate adaptation impact	High. Regenerative: restores reef and mangrove ecosystems, rebuilds fish stocks, enhances coastal storm protection. Addresses root causes of degradation.	Negative. Accelerating ecosystem degradation compounds climate vulnerability.	Moderate for the protected stretch only. Does not address root causes. Scouring effect can accelerate adjacent erosion. No ecosystem restoration.
Value for money	Very high. USD 6.18M in annual ecosystem services per 1,000ha MPA. 13:1 benefit-cost ratio. Aligns economic incentives with conservation enforcement.	Negative. Ecosystem service losses far exceed any avoided management cost.	Low. Defensive expenditure with no ROI beyond avoided loss. No livelihood, biodiversity, or carbon co-benefits.
Scalability	High. Community governance model is transferable across Caribbean SIDS. Applicable wherever coastal ecosystems and artisanal fisheries coexist.	N/A.	Low. Each installation is bespoke engineering. Not replicable without site-specific redesign. Creates long-term fiscal liabilities.

Community-managed MPAs are the only option that addresses the root causes of coastal degradation while also generating substantial economic co-benefits. Hard coastal defences treat the symptom at 9x the cost per metre and produce none of the fisheries, biodiversity, or tourism benefits that community MPAs deliver.

d) B1: Community-based Early Warning Systems (EWS)

Proposed intervention: Inclusive community-based EWS

The proposed intervention establishes locally managed early warning systems integrating meteorological monitoring equipment, community risk assessments, communication trees, and designated evacuation plans. Modelled in the Bahamas, where average annual hurricane losses are USD 850 million (11-12% of GDP). The systems are designed for inclusivity: accessible formats for persons with visual or hearing impairments, multi-language alerts, and specific protocols for elderly and mobility-impaired residents. Community-based design enables localised decision-making and last-mile warning dissemination to remote island communities.

Business as usual: National forecasting only

Under the BAU scenario, dispersed communities rely on generalised national meteorological warnings that often fail to reflect rapidly developing, localised weather conditions. In the Bahamas, the archipelagic geography of 700 islands means that national forecasts frequently leave remote family island communities without adequate, timely, or localised warning. Existing mass SMS warning systems are inaccessible to

⁴⁰ Adaptation Fund (2023), "Strengthening the Adaptive Capacity of Coastal Communities in Fiji to Climate Change through Nature-Based Seawalls"

⁴¹ Hummel et al. (2021), "Economic evaluation of sea-level rise adaptation strongly influenced by hydrodynamic feedbacks"

persons with visual impairments. There are no formalised community response mechanisms or coordination structures, leading to weak local preparedness and gaps in last-mile warning dissemination for the most vulnerable populations.

Alternative: Automated sensor networks

This alternative deploys high-tech automated weather monitoring stations and sensor networks across the target archipelago, connected to a centralised national warning centre. While technologically sophisticated, automated networks present significant sustainability challenges in the Caribbean SIDS context. The capital cost of a comprehensive sensor network covering the Bahamas' 700 islands would be substantial. Sensor stations in marine environments require frequent maintenance against salt corrosion, storm damage, and power supply failure. Telecommunications infrastructure for real-time data transmission is unreliable on remote islands. Most critically, automated systems address only the monitoring component of early warning; without community-level communication trees, evacuation plans, and social capital, sensor data does not translate into protective action. The technology also does not address the needs of persons with disabilities or communities with low digital literacy.

Criteria	Proposed: Community EWS	BAU: National forecasts	Alternative: Automated sensors
Technical feasibility	High. Uses locally manageable equipment paired with community governance. Communication trees use existing social networks. Inclusive design is built in.	N/A. Reliance on national forecasts with poor last-mile reach.	Low-moderate. Salt corrosion, storm damage, power supply failure, and telecommunications gaps make sustained operation challenging without permanent technical staff.
Cost (CAPEX/OPEX)	Low-moderate CAPEX per community. Low OPEX (community-maintained with volunteer coordinators compensated through stipends). EFA models 30% disaster loss reduction.	Low direct cost. Very high externalised cost: USD 850M average annual hurricane losses. Hurricane Dorian caused USD 3.4B in damages.	Very high CAPEX. High recurring OPEX (maintenance, telecom, replacement parts). Often exceeds national budget capabilities.
Climate adaptation impact	Very high. Addresses the full warning chain: detection, communication, response. Inclusive design reaches persons with disabilities. Community ownership sustains beyond programme.	Negative. Vulnerability increasing as climate stressors intensify and population on exposed islands grows.	Moderate. Addresses monitoring only. Without community response mechanisms, sensor data does not translate into protective action. Exclusionary for persons with disabilities.
Value for money	Very high. USD 51M in annual avoided losses for 80,000 beneficiaries. Public good with no private revenue but overwhelming social return.	Negative. Current mechanisms demonstrably failing to protect vulnerable populations.	Low. High cost per unit of risk reduction. No community ownership or social capital building. Monitoring without response does not save lives.
Scalability	High. Community governance model is transferable. Scalable from individual islands to archipelago-wide networks.	N/A.	Low-moderate. Technology-dependent. Each installation requires telecommunications and power infrastructure that may not exist on remote islands.

Community-based EWS is the option that addresses the full warning chain, from detection to protective action at the last mile. Automated sensor networks address only the monitoring component and at a cost

that exceeds the entire CABRIC programme budget, while also potentially failing to reach persons with disabilities or communities with low digital literacy.

e) B2: Post-disaster mobile mental health services

Proposed intervention: Mobile community psychosocial support units

The proposed intervention establishes mobile mental health and psychosocial support units that deploy to disaster-affected communities in the immediate aftermath of climate events. Modelled in Belize, where over 10,000 people have been displaced by weather-related disasters since 2008. The units provide specialised climate-trauma support (eco-anxiety, climate grief, post-displacement PTSD) through trained community-based workers equipped with satellite phones, internet terminals, and a culturally tailored clinical curriculum. Telehealth capability enables service continuity when physical access is cut off.

Business as usual: Referral to overstretched national health system

Under the BAU scenario, mental health support following climate disasters is limited to referral within the existing national health system. In Belize, mental health concerns are referred to the Ministry of Health, which itself faces severe resource constraints. Belize's National Mental Health Policy (2023-2028) explicitly identifies insufficient mental health service provision as a systemic gap. Current healthcare systems focus primarily on chronic mental illness and generic counselling, entirely lacking targeted interventions for climate-related psychological trauma. The result is an untreated burden of PTSD, anxiety, and depression that undermines community recovery capacity and compounds the economic impact of climate events.

Alternative: Permanent clinical facilities

This alternative constructs dedicated mental health clinics in each target community. Construction costs for a basic community health clinic are estimated at USD 300,000-500,000 per facility, with recurring staffing costs of USD 100,000-200,000 annually. In Belize, the geographic dispersal of vulnerable communities across remote districts, coastal cayes, and interior villages means that permanent facilities would require dozens of clinics to achieve adequate coverage. Permanent structures are themselves vulnerable to hurricane damage, unless they are climate proofed. The demand for climate-trauma services is episodic (concentrated in post-disaster windows), not continuous. This model cannot provide the rapid-deployment capability needed in the immediate post-disaster period when psychological first aid is most effective. Lastly, this could be considered a Category A ESS intervention which possibly adds additional safeguarding risk.

Criteria	Proposed: Mobile MH units	BAU: National referral	Alternative: Permanent clinics
Technical feasibility	High. Mobile units, telehealth, and community-based workers are proven in disaster response. Satellite communications provide resilience when terrestrial networks fail.	N/A. Referral pathway to overstretched, generic services.	Moderate. Standard construction. But requires permanent clinical staff, which is the binding constraint in SIDS where mental health professionals are scarce.
Cost (CAPEX/OPEX)	Low CAPEX (USD 150,000 per unit for equipment and curriculum). Moderate OPEX (community worker stipends, telecom). Deployable within 48 hours of a disaster event.	Low direct cost. Very high externalised cost in untreated mental health burden, reduced labour productivity, and slower community recovery.	High CAPEX. High recurring OPEX (staffing). Multiple clinics needed for adequate geographic coverage.
Climate adaptation impact	High. Addresses the overlooked psychological dimension of climate vulnerability. 32 DALYs averted annually. Strengthens community recovery capacity.	N/A. Untreated climate trauma compounds economic and social vulnerability with each successive disaster.	Moderate-high. Provides a service point but cannot deploy to communities post-disaster. Vulnerable to hurricane damage.

Criteria	Proposed: Mobile MH units	BAU: National referral	Alternative: Permanent clinics
			Underutilised between events.
Value for money	Very high. Direct targeting of displaced and traumatised populations.	Negative. Documented policy gap in all five CABRIC countries.	Moderate. High fixed cost for episodic demand. Cannot provide rapid deployment or reach isolated communities post-disaster.
Scalability	High. Mobile model is inherently flexible. Curriculum is culturally adaptable across CABRIC countries.	N/A.	Low-Moderate. Each clinic is a fixed asset. Coverage gaps persist in dispersed geographies.

Mobile psychosocial support is the only option that matches the episodic, geographically dispersed nature of climate-trauma demand in SIDS. Permanent facilities cannot deploy to where affected populations are, and the BAU referral pathway is demonstrably failing.

f) B3: Hurricane-proofing community buildings

Proposed intervention: Structural retrofit of existing community buildings

The proposed intervention climate-proofs existing community buildings (schools, health centres, community halls) to serve as resilient emergency shelters during hurricane events. Retrofitting includes hurricane straps, impact-resistant windows, reinforced roofing, wheelchair access ramps, and solar PV backup power. The dual-use approach (functional community building in normal times, certified emergency shelter during events) maximises the utility of existing public infrastructure.

Business as usual: Un-retrofitted buildings as shelters

Under the BAU scenario, communities continue to shelter in buildings that lack the structural integrity to withstand Category 4 or 5 hurricanes. Hurricane Tomas (2010) caused total damages equivalent to 43.4% of Saint Lucia's GDP, with 92% of social sector damage concentrated in housing and critical infrastructure. A trough system in November 2022 damaged eight schools requiring EC\$2.4 million in repairs. The IFRC has documented the absence of adequate safeguarding measures in existing emergency shelters, including structural deficiencies and governance gaps. Saint Lucia's gross government debt burden of 77.5% of GDP precludes systematic government-funded retrofitting at the scale required.

Alternative: Purpose-built new shelters

This alternative constructs dedicated, purpose-built hurricane shelters designed from the ground up for emergency use. While purpose-built shelters offer the highest structural performance, the cost per facility is substantially higher: estimated at USD 1.5-2.5 million for a facility accommodating 200-300 people. New construction requires land acquisition (a significant challenge in SIDS with constrained land markets), environmental permitting, and a 2-3 year construction timeline during which no shelter capacity is added. Purpose-built shelters are single-use assets that sit empty for 360+ days per year, generating no community benefit outside hurricane events. The approach does not address the structural vulnerability of the existing building stock, which will continue to sustain damage during hurricanes. Lastly, this could be considered a Category A ESS intervention which possibly adds additional safeguarding risk.

Criteria	Proposed: Retrofit existing	BAU: Unretrofitted buildings	Alternative: Purpose-built shelters
Technical feasibility	High. Standard structural engineering (hurricane straps, impact glazing, roof reinforcement). Local contractors capable. Faster than new construction.	N/A. Continued use of structurally inadequate buildings.	High. Standard new construction. But requires land acquisition, environmental permitting, and 2-3 year build timeline. Additional Category A ESS considerations.
Cost (CAPEX/OPEX)	Moderate CAPEX (USD 480,000 per 500 sq m facility). Low OPEX (building continues its primary function; O&M absorbed by existing institutional budget). Solar PV reduces energy costs.	Low direct cost. Very high externalised cost: preventable casualties, healthcare burden, slower community recovery, school disruption (EC\$2.4M repairs from a single 2022 trough event).	Very high CAPEX (USD 1.5-2.5M per facility). ⁴² High OPEX (maintenance of a purpose-built asset used <5 days/year). Land acquisition costs additional.
Climate adaptation impact	High.	Negative. Existing shelters become increasingly inadequate as hurricane intensity increases under climate change.	High.
Value for money	High. Leverages existing public infrastructure.	Negative. Preventable losses compound with each hurricane season.	Low. Very high cost per shelter-day. Single-use asset empty 360+ days/year. Does not address existing building stock vulnerability.
Scalability	High. Applicable wherever community buildings exist. Standardised retrofit specifications are transferable across CABRIC countries.	N/A.	Low. Each facility is a major capital project with land, permitting, and construction constraints. Few can be delivered within the programme period.

Retrofitting existing community buildings is the optimal approach because it delivers hurricane protection at 3-5x lower cost per facility than new construction, can be implemented within the programme period, and maximises the dual-use value of existing public infrastructure. Purpose-built shelters, while potentially structurally superior, are economically inefficient, and carry with them considerable ESS-related risk.

⁴² <https://www.cbc.bb/main-stories/bahamas-opens-globally-recognised-category-5-hurricane-shelter/>

Section C:

References for the feasibility study.

Reference

- ¹ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ² Data from database: World Development Indicators <https://data.worldbank.org/>
- ³ Data from database: World Development Indicators <https://data.worldbank.org/>
- ⁴ Data from database: World Development Indicators <https://data.worldbank.org/>
- ⁵ The Caribbean Development Bank (CDB) <https://www.caribank.org/data/country-data-reports>
- ⁶ GDP/Capita (2023): Data sourced from World Bank country databases and IMF economic outlooks for 2023; Debt/Capita (% of GDP, 2023): Updated using IMF and regional economic reviews for 2023; Unemployment Rate (2023): Figures verified through World Bank's World Development Indicators, ILOSTAT databases, and regional labor market assessments for 2023; Life Expectancy (2021): WHO Global Health Observatory Data Repository for 2021; Health Expenditure (% of GDP, 2020): WHO's National Health Account Indicators and regional economic reports; Energy Access Rate (%): IEA's Energy Access Outlook and regional electricity data.
- ⁷ World Bank. (2024, December 16). The Bahamas: Distribution of employment by economic sector from 2012 to 2022 [Graph]. Statista. Retrieved from <https://www.statista.com/statistics/578631/employment-by-economic-sector-in-the-bahamas/>
- ⁸ Bahamas Government. (n.d.). Rapid assessment of the agricultural sector. Retrieved from https://www.bahamas.gov.bs/wps/wcm/connect/27b04e0e-44fc-4a1b-a55b-76e578db713e/Rapid+Assessment+of+the+Agricultural+Sector.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=27b04e0e-44fc-4a1b-a55b-76e578db713e
- ⁹ Statista. (n.d.). Caribbean: Direct contribution of travel and tourism to employment by country [Graph]. Retrieved from <https://www.statista.com/statistics/814200/caribbean-direct-contribution-travel-tourism-employment-country/>
- ¹⁰ World Bank. (n.d.). The Bahamas. Retrieved from <https://documents1.worldbank.org/curated/en/099537504112341769/pdf/IDU01e53ff610e43404b9e085b10539db2d34f38.pdf>
- ¹¹ World Bank. (n.d.). The Bahamas. Retrieved from <https://documents1.worldbank.org/curated/en/099537504112341769/pdf/IDU01e53ff610e43404b9e085b10539db2d34f38.pdf>
- ¹² WildAid. (2023). 2021 Bahamas Marine Protected Areas (MPAs) Blueprint [PDF]. Retrieved from https://marine.wildaid.org/wp-content/uploads/2023/03/2021-Bahamas-MPS-Blueprint_FINAL.pdf
- ¹³ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ¹⁴ Food and Agriculture Organization (FAO). (2022). Food systems profile - Belize. Retrieved from <https://openknowledge.fao.org/server/api/core/bitstreams/3568556b-b7ed-41b7-9bb9-1d49f0dc0f5e/content>
- ¹⁵ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ¹⁶ Statistical Institute of Belize (SIB). (2022). Abstract of statistics. Retrieved from https://sib.org.bz/wp-content/uploads/2022_Abstract_of_Statistics.pdf
- ¹⁷ Statistical Institute of Belize (SIB). (2022). Abstract of statistics. Retrieved from https://sib.org.bz/wp-content/uploads/2022_Abstract_of_Statistics.pdf
- ¹⁸ Statistical Institute of Belize (SIB). (2024). Tourism satellite account 2024. Retrieved from https://sib.org.bz/wp-content/uploads/TSA_2024-05.pdf

- ¹⁹ Food and Agriculture Organization (FAO). (n.d.). Fisheries country profile: Belize. Retrieved from <https://www.fao.org/fishery/fr/facp/blz>
- ²⁰ Statistical Institute of Belize (SIB). (2017). Labor force survey: September 2017. Retrieved from https://sib.org.bz/wp-content/uploads/LaborForce_2017-09.pdf
- ²¹ Food and Agriculture Organization (FAO). (n.d.). [Title of the document]. Retrieved from <https://openknowledge.fao.org/server/api/core/bitstreams/9f24d451-2e56-4ae2-8a4a-1bc511f5e60e/content>
- ²² Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ²³ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ²⁴ Environmental Investment Resources (EIR). (2023). Environmental Impact Report 2023: Grenada. Retrieved from https://assets-global.website-files.com/6329bc97af73223b575983ac/647f00d97353879512c9674d_EIR2023-Grenada.pdf
- ²⁵ Environmental Investment Resources (EIR). (2023). Environmental Impact Report 2023: Grenada. Retrieved from https://assets-global.website-files.com/6329bc97af73223b575983ac/647f00d97353879512c9674d_EIR2023-Grenada.pdf
- ²⁶ Food and Agriculture Organization (FAO). (n.d.). Fisheries country profile: Grenada. Retrieved from <https://www.fao.org/fishery/en/facp/GRD?lang=en>
- ²⁷ Central Statistical Office of Grenada. (2017). Employed by sex and occupation - 2017. Retrieved from <https://stats.gov.gd/subjects/labour-market/employed-by-sex-and-occupation-2017/>
- ²⁸ Caribbean Policy and Advocacy Group (CPAG). (2009). Final country report: Grenada. Retrieved from <https://thecpag.org/final-country-report-grenada-2009>
- ²⁹ Caribbean Regional Fisheries Mechanism (CRFM). (2020). Flying fish assessment report 2019-2. Retrieved from https://crfm.int/~uwohxjxf/images/CRFM_Fishery_Report_2019-2_Flyingfish_Assessment_report_14_Oct_2020.pdf
- ³⁰ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ³¹ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ³² International Monetary Fund (IMF). (2023). [Jamaica]. IMF Country Report, 2023(321). Retrieved from <https://www.elibrary.imf.org/view/journals/002/2023/321/article-A001-en.pdf>
- ³³ International Monetary Fund (IMF). (2023). [Jamaica]. IMF Country Report, 2023(321). Retrieved from <https://www.elibrary.imf.org/view/journals/002/2023/321/article-A001-en.pdf>
- ³⁴ Food and Agriculture Organization (FAO). (n.d.). Fisheries country profile: Jamaica. Retrieved from <https://www.fao.org/fishery/en/facp/JAM?lang=en>
- ³⁵ Moody's Analytics. (n.d.). Jamaica - Economic indicators. Retrieved from <https://www.economy.com/jamaica/indicators>
- ³⁶ Ministry of Agriculture and Fisheries (Jamaica). (2023). Jamaica fisheries quarterly statistics report: Vol. 2, Issue 1. Retrieved from https://www.moa.gov.jm/sites/default/files/pdfs/Jamaica-Fisheries-Quarterly-Statistics-Report-Vol.-2-Issue.-1_FINAL.pdf
- ³⁷ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237
- ³⁸ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from

https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237

³⁹ Caribbean Regional Fisheries Mechanism (CRFM). (2020). CRFM statistics and information report for 2020. Retrieved from

https://www.crfm.int/index.php?option=com_k2&view=item&task=download&id=301_77870715026e45ac49a44a03335288c3&Itemid=237

⁴⁰ Environmental Investment Resources (EIR). (2023). Environmental impact report 2023: Saint Lucia. Retrieved from [https://assets-global.website-](https://assets-global.website-files.com/6329bc97af73223b575983ac/647f0424704d537b61ad4964_EIR2023-StLucia.pdf)

[files.com/6329bc97af73223b575983ac/647f0424704d537b61ad4964_EIR2023-StLucia.pdf](https://assets-global.website-files.com/6329bc97af73223b575983ac/647f0424704d537b61ad4964_EIR2023-StLucia.pdf)

⁴¹ Environmental Investment Resources (EIR). (2023). Environmental impact report 2023: Saint Lucia. Retrieved from [https://assets-global.website-](https://assets-global.website-files.com/6329bc97af73223b575983ac/647f0424704d537b61ad4964_EIR2023-StLucia.pdf)

[files.com/6329bc97af73223b575983ac/647f0424704d537b61ad4964_EIR2023-StLucia.pdf](https://assets-global.website-files.com/6329bc97af73223b575983ac/647f0424704d537b61ad4964_EIR2023-StLucia.pdf)

⁴² Food and Agriculture Organization (FAO). (n.d.). Fisheries country profile: Saint Lucia. Retrieved from <https://www.fao.org/fishery/en/facp/LCA?lang=en>

⁴³ Moody's Analytics. (n.d.). Saint Lucia - Total employment. Retrieved from

<https://www.economy.com/saint-lucia/total-employment>

⁴⁴ Eastern Caribbean Central Bank (ECCB). (n.d.). Economic statistics. Retrieved from [https://www.eccb-](https://www.eccb-centralbank.org/statistics-category/economic-statistics)

[centralbank.org/statistics-category/economic-statistics](https://www.eccb-centralbank.org/statistics-category/economic-statistics)

⁴⁵ CIA. <https://www.cia.gov/the-world-factbook/countries/bahamas-the/#people-and-society>

⁴⁶ Coral Reef Atlas - <https://allencoralatlas.org/>

⁴⁷ Perry Institute for Marine Science (PIMS)- [https://znsbahamas.com/first-national-report-card-sheds-](https://znsbahamas.com/first-national-report-card-sheds-light-on-underwater-world-of-mangroves/#:~:text=PIMS%20drew%20on%20its%20,to%20assess%20local%20mangrove%20forests.)

[light-on-underwater-world-of-](https://znsbahamas.com/first-national-report-card-sheds-light-on-underwater-world-of-mangroves/#:~:text=PIMS%20drew%20on%20its%20,to%20assess%20local%20mangrove%20forests.)

[mangroves/#:~:text=PIMS%20drew%20on%20its%20,to%20assess%20local%20mangrove%20forests.](https://znsbahamas.com/first-national-report-card-sheds-light-on-underwater-world-of-mangroves/#:~:text=PIMS%20drew%20on%20its%20,to%20assess%20local%20mangrove%20forests.)

⁴⁸ International Monetary Fund. (2023). World Economic Outlook: Caribbean Regional Report

⁴⁹ IMF. Inflation rate, average consumer prices.

<https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD>

⁵⁰ https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/BHS

⁵¹ <https://www.statista.com/statistics/578547/inflation-rate-in-the-bahamas/>

⁵² <https://www.statista.com/statistics/578549/unemployment-rate-in-the-bahamas/>

⁵³ https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/BHS

⁵⁴ https://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/BHS

⁵⁵ Caribbean Community (CARICOM) Secretariat. 2016. National Accounts Digest 2009-2015, Volume I. The Regional Statistics Programme Caribbean Community (CARICOM) Secretariat Turkeyen P.O. Box 10827, Georgetown, Guyana.

⁵⁶ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.

⁵⁷ FAO. (2024). Fishery and Aquaculture Country Profiles. Bahamas, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jun 26, 2019 [Cited Tuesday, December 17th 2024].

⁵⁸ FAO. (2024). Fishery and Aquaculture Country Profiles. Bahamas, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jun 26, 2019 [Cited Tuesday, December 17th 2024].

⁵⁹ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.

⁶⁰ FAO. (2024). Fishery and Aquaculture Country Profiles. Bahamas, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jun 26, 2019 [Cited Tuesday, December 17th 2024].

⁶¹ Elsner, J., Kossin, P., and Jagger, T. (2008) The increasing intensity of the strongest tropical cyclones, *Nature*, 455, 92- 95.

⁶² Bender, M.A., Knutson, T.R., Tuleya, R.E., Sirutis, J.J., Vecchi, G.A., Garner, S.T., and Held, I.M. (2010) Modeled impact of anthropogenic warming on the frequency of intense Atlantic hurricanes. *Science* 327, 454-458

⁶³ McCoy, E.D., Mushinsky, H.R., Johnson, D. and Meshaka, W.E.J. (1996) Mangrove damage caused by Hurricane Andrew on the southwestern coast of Florida, *Bulletin of Marine Science* 59 (1), 1-8.

⁶⁴ Sherman, R. and Fahey, T. (2001) Hurricane Impacts on a Mangrove Forest in the Dominican Republic: Damage Patterns and Early Recovery, *Biotropica* 33 (3), 393-408.

⁶⁵ Fourqurean, J.W., and Rutten, L.M. (2004) The impact of hurricane Georges on softbottom, back reef communities: site- and species-specific effects in south Florida seagrass beds, *Bulletin of Marine Science*, 75, 239-257.

- ⁶⁶ Gardner, T.A., Côté, I.M., Gill, J.A., Grant, A., and Watkinson, A.R. (2005) Hurricanes and Caribbean coral reefs: immediate impacts, recovery trajectories, and contribution to long-term coral decline, *Ecology* 86, 174-184
- ⁶⁷ Heron, S., Morgan, J., Eakin, M., and Skirving, W. (2008) Hurricanes and their effects on coral reefs. P. 31-36. In; Wilkinson C, Souter D. (2008). Status of Caribbean Coral Reefs after Bleaching and Hurricanes in 2005, Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre, Townsville, 152 pp.
- ⁶⁸ Rogers, A., Blanchard, J. L. and Mumby, P. J. (2014) Vulnerability of coral reef fisheries to a loss of structural complexity, *Current Biology*, 24, 1000-1005.
- ⁶⁹ Source: UNEP, 2011
- ⁷⁰ Karra, Kontgis, et al. (2021) Global land use/land cover with Sentinel-2 and deep learning. IGARSS 2021-2021 IEEE International Geoscience and Remote Sensing Symposium. IEEE.
- ⁷¹ Source: Gibson, 2011
- ⁷² International Monetary Fund. (2023). Belize Economic Outlook. Retrieved from [insert link].
Statistical Institute of Belize. (2022). Labour Force Survey Report. Retrieved from [insert link].
World Bank. (2022). Belize Economic Update. Retrieved from [insert link].
- ⁷³ Statista. 2023. Belize: Growth rate of the real gross domestic product (GDP) from 2019 to 2029 <https://www.statista.com/statistics/727046/gross-domestic-product-gdp-growth-rate-in-belize/>
- ⁷⁴ <https://www.statista.com/statistics/727056/inflation-rate-in-belize/>
- ⁷⁵ <https://www.macrotrends.net/global-metrics/countries/BLZ/belize/unemployment-rate#:~:text=Belize%20unemployment%20rate%20for%202020,a%201.65%25%20increase%20from%202019>
- ⁷⁶ https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/BLZ?zoom=BLZ&highlight=BLZ
- ⁷⁷ https://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/BLZ?zoom=BLZ&highlight=BLZ
- ⁷⁸ Food and Agriculture Organization. (2023). Belize Agricultural Profile. Retrieved from [insert link].
Statistical Institute of Belize. (2022). Agricultural Statistics Report. Retrieved from [insert link].
World Bank. (2022). Belize and Climate-Resilient Agriculture. Retrieved from [insert link]
- ⁷⁹ Belize Tourism Board. (2022). Tourism Statistics Report 2022. Retrieved from [insert link].
Statistical Institute of Belize. (2022). Labour Force Survey. Retrieved from [insert link].
World Bank. (2022). Belize Tourism and Climate Resilience. Retrieved from [insert link].
- ⁸⁰ Eastern Caribbean Central Bank (ECCB). 2020. Gross Domestic Product (GDP) Estimates - 1977 - 2020 as at 11 July 2018. Internet- <https://www.eccb-centralbank.org/contentmanager/documents?page=6>
- ⁸¹ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ⁸² FAO. 2024. Fishery and Aquaculture Country Profiles. Belize, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jul 16, 2019 [Cited Tuesday, December 17th 2024]. <https://www.fao.org/fishery/en/facp/blz?lang=en>
- ⁸³ FAO. 2024. Fishery and Aquaculture Country Profiles. Belize, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jul 16, 2019 [Cited Tuesday, December 17th 2024]. <https://www.fao.org/fishery/en/facp/blz?lang=en>
- ⁸⁴ FAO. 2024. Fishery and Aquaculture Country Profiles. Belize, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jul 16, 2019 [Cited Tuesday, December 17th 2024]. <https://www.fao.org/fishery/en/facp/blz?lang=en>
- ⁸⁵ FAO. (2024). Global Aquatic Trade Statistics. In: Fisheries and Aquaculture. [Cited Monday, December 16th 2024]. https://www.fao.org/fishery/en/collection/global_commodity_prod
- ⁸⁶ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ⁸⁷ FAO. 2024. Fishery and Aquaculture Country Profiles. Belize, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jul 16, 2019 [Cited Tuesday, December 17th 2024]. <https://www.fao.org/fishery/en/facp/blz?lang=en>
- ⁸⁸ Palanisamy, H., Becker, M, Meyssignac, B., Henry, O., and Cazenave, A. (2012) Regional Sea Level Change and Variability in the Caribbean Sea since 1950, *J Geod Sci*, 2(2), 25-133.doi:10.2478/v10156-011-0029-4.
- ⁸⁹ Eakin C. M., Morgan, J.A., Heron, S.F., Smith, T.B., Liu, G., Alvarez-Filip, L., Baca, B., Bartels, E., Bastidas, C., and Bouchon, C et al. (2010) Caribbean corals in crisis: Record thermal stress, bleaching, and mortality in 2005. *PLoS ONE*, v. 5, no. 11, : e13969
- ⁹⁰ FAO. (2024). Global Aquatic Trade Statistics. In: Fisheries and Aquaculture. [Cited Monday, December 16th 2024]. https://www.fao.org/fishery/en/collection/global_commodity_prod

- ⁹¹ Genoways, H., Phillips, C., & Baker, R. (2017). Occasional Papers Museum of Texas Tech University NUMBER 177 31 AUGUST 1998 BATS OF THE ANTILLEAN ISLAND OF GRENADA : A NEW ZOOGEOGRAPHIC PERSPECTIVE.
- ⁹² Allen, C., Diller, S., & Zabarauskas, T. (2017). Grenada: the Spice Isle. , 243-265.
https://doi.org/10.1007/978-3-319-55787-8_16
- ⁹³ Food and Agriculture Organization of the United Nations (FAO). 2020. Global Forest Resources Assessment 2020. <https://www.fao.org/interactive/forest-resources-assessment/2020/en/>
- ⁹⁴ https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/GRD
- ⁹⁵ https://www.macrotrends.net/global-metrics/countries/grd/grenada/inflation-rate-cpi#google_vignette
- ⁹⁶ <https://www.globaldata.com/data-insights/macroeconomic/the-unemployment-rate-of-grenada-220216/>
- ⁹⁷ https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/GRD
- ⁹⁸ https://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/GRD
- ⁹⁹ Food and Agriculture Organization. (2023). Grenada Agricultural Profile. Retrieved from [insert link].
World Bank. (2022). Grenada Climate-Smart Agriculture Program. Retrieved from [insert link].
Statistical Institute of Grenada. (2023). Agriculture and Rural Development Report. Retrieved from [insert link].
- ¹⁰⁰ Grenada Tourism Authority. (2023). Tourism Statistics and Strategy Report. Retrieved from [insert link].
Statistical Institute of Grenada. (2023). Labour and Tourism Sector Data. Retrieved from [insert link].
World Bank. (2022). Grenada Sustainable Tourism Development Program. Retrieved from [insert link].
- ¹⁰¹ Sieben, C. and Gascoigne, J. 2021. Grenada pelagic longline, troll and dropline Atlantic Ocean yellowfin and bigeye fishery - Marine Stewardship Council pre-assessment report. FAO Fisheries and Aquaculture Technical Paper No. 673. Rome, FAO. <https://doi.org/10.4060/cb5323en>
- ¹⁰² CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ¹⁰³ FAO. 2024. Fishery and Aquaculture Country Profiles. Grenada, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jul 5, 2019 [Cited Tuesday, December 17th 2024].
- ¹⁰⁴ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ¹⁰⁵ FAO. 2024. Fishery and Aquaculture Country Profiles. Grenada, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jul 5, 2019 [Cited Tuesday, December 17th 2024].
- ¹⁰⁶ Cheung, W. L., Lam, V. W. Y., Sarmiento, J. L., Kearney, K., Watson, R., Zeller, D. and Pauly, D. (2010) Large-scale redistribution of maximum fisheries catch potential in the global ocean under climate change. *Global Change Biology*, 16(1), 24-35.
- ¹⁰⁷ Franks, J. S., Johnson, D. R., Ko, D-S., Sanchez-Rubio, G., Hendon, J. R. and Lay, M. (2012) Unprecedented influx of pelagic Sargassum along Caribbean Island coastlines during Summer 2011, *Proceedings of the Gulf and Caribbean Fisheries Institute*, 64, 6-8.
- ¹⁰⁸ Smetacek, V. and Zingone, A. (2013) Green and golden seaweed tides on the rise, *Nature*, 504 (7478), 84-88. doi: 10.1038/nature12860
- ¹⁰⁹ Franks, J. S., Johnson, D. R., Ko, D-S., Sanchez-Rubio, G., Hendon, J. R. and Lay, M. (2012) Unprecedented influx of pelagic Sargassum along Caribbean Island coastlines during Summer 2011, *Proceedings of the Gulf and Caribbean Fisheries Institute*, 64, 6-8.
- ¹¹⁰ FAO. (2024). Global Aquatic Trade Statistics. In: Fisheries and Aquaculture. [Cited Monday, December 16th 2024]. https://www.fao.org/fishery/en/collection/global_commodity_prod
- ¹¹¹ Sources: World Bank. (2022). Country Profiles: The Caribbean.
Caribbean Development Bank. (2022). Annual Economic Review for the Caribbean.
- ¹¹² <https://data.worldbank.org/indicator/SP.POP.TOTL>
- ¹¹³ https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/JAM/VCT/LCA/SUR
- ¹¹⁴ <https://www.statista.com/statistics/527084/inflation-rate-in-jamaica/>
- ¹¹⁵ <https://www.statista.com/statistics/527097/unemployment-rate-in-jamaica/>
- ¹¹⁶ https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/JAM?zoom=JAM&highlight=JAM
- ¹¹⁷ https://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/JAM?zoom=JAM&highlight=JAM
- ¹¹⁸ Food and Agriculture Organization. (2023). Jamaica Agricultural Profile. Retrieved from [insert link].
World Bank. (2023). Jamaica Agriculture and Climate Resilience. Retrieved from [insert link].
Statistical Institute of Jamaica. (2022). Labour Force Survey. Retrieved from [insert link].

- ¹¹⁹ Jamaica Tourist Board. (2022). Tourism Statistics Annual Report. Retrieved from [insert link].
- International Monetary Fund. (2023). Tourism Recovery and Resilience in Jamaica. Retrieved from [insert link].
- World Bank. (2023). Jamaica Sustainable Tourism Development. Retrieved from [insert link].
- ¹²⁰ The Caribbean Council. (2025, November 14). Hurricane Melissa's toll on Jamaica could reach US\$20bn. <https://www.caribbean-council.org/hurricane-melissas-toll-on-jamaica-could-reach-us20bn/>
- ¹²¹ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ¹²² FAO. 2024. Fishery and Aquaculture Country Profiles. Jamaica, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jun 26, 2019 [Cited Wednesday, December 18th 2024]. <https://www.fao.org/fishery/en/facp/jam?lang=en>
- ¹²³ CRFM, 2021. CRFM Statistics and Information Report - 2020. Belize City, Belize. 92pp.
- ¹²⁴ FAO. 2024. Fishery and Aquaculture Country Profiles. Jamaica, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jun 26, 2019 [Cited Wednesday, December 18th 2024]. <https://www.fao.org/fishery/en/facp/jam?lang=en>
- ¹²⁵ FAO. (2024). Global Aquatic Trade Statistics. In: Fisheries and Aquaculture. [Cited Monday, December 16th 2024]. https://www.fao.org/fishery/en/collection/global_commodity_prod
- ¹²⁶ Sircar, A., Thomas, A., Serdeczny, O. and Jattansingh, S. (2024). A Review of Loss and Damage in the Caribbean (1994 to 2024). Climate Analytics
- ¹²⁷ CRFM (2012) Diagnostic study to determine poverty levels in CARICOM fishing communities. CRFM Technical & advisory services. Number 2012/3. Vol. I. Belize. 398 pp.
- ¹²⁸ Samiullah, M., & Khanum, R. (2024). Climate Change and Ocean Acidification: Unraveling the Complex Interactions and Implications for Marine Ecosystems. International Journal of Natural Sciences, 4(1), 1-14. <https://doi.org/10.47604/ijns.2397>
- ¹²⁹ Gazeau, F., Parker, L.M., Comeau, S. et al. Impacts of ocean acidification on marine shelled molluscs. Mar Biol 160, 2207-2245 (2013). <https://doi.org/10.1007/s00227-013-2219-3>
- ¹³⁰ FAO. (2024). Global Aquatic Trade Statistics. In: Fisheries and Aquaculture. [Cited Monday, December 16th 2024]. https://www.fao.org/fishery/en/collection/global_commodity_prod
- ¹³¹ FAO. 2024. Fishery and Aquaculture Country Profiles. Jamaica, 2018. Country Profile Fact Sheets. In: Fisheries and Aquaculture. Updated Jun 26, 2019 [Cited Wednesday, December 18th 2024]. <https://www.fao.org/fishery/en/facp/jam?lang=en>
- ¹³² World Bank Climate Portal. <https://climateknowledgeportal.worldbank.org/country/st-lucia>
- ¹³³
- ¹³⁴ UNHCR. (n.d.). [Document Title]. Retrieved from <http://www.refworld.org/docid/4954ce1023.html>
- ¹³⁵ Minority Rights Group International. (n.d.). Country profile: St. Lucia. Retrieved from <http://minorityrights.org/country/st-lucia/>
- ¹³⁶ East Winds. 2022. [https://eastwinds.com/blog/snorkeling-in-st-lucia/#:~:text=Most%20of%20Saint%20Lucia's%20border,best%20snorkeling%20on%20the%20island.](https://eastwinds.com/blog/snorkeling-in-st-lucia/#:~:text=Most%20of%20Saint%20Lucia's%20border,best%20snorkeling%20on%20the%20island.https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/JAM/VCT/LCA/SUR)
- ¹³⁷ https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/JAM/VCT/LCA/SUR
- ¹³⁸ <https://www.statista.com/statistics/730726/inflation-rate-in-saint-lucia/>
- ¹³⁹ [https://www.statista.com/statistics/808994/unemployment-rate-in-st-lucia/#:~:text=Lucia%20declined%20to%2011.09%20percent%20in%202023.](https://www.statista.com/statistics/808994/unemployment-rate-in-st-lucia/#:~:text=Lucia%20declined%20to%2011.09%20percent%20in%202023.https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/LCA?zoom=LCA&highlight=LCAhttps://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/LCA?zoom=LCA&highlight=LCA)
- ¹⁴⁰ https://www.imf.org/external/datamapper/BCA_NGDPD@WEO/LCA?zoom=LCA&highlight=LCA
- ¹⁴¹ https://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/LCA?zoom=LCA&highlight=LCA
- ¹⁴² Food and Agriculture Organization. (2023). Saint Lucia Agricultural Sector Profile. Retrieved from [insert link].
- World Bank. (2022). Climate Resilience in Saint Lucia Agriculture. Retrieved from [insert link].
- Statistical Institute of Saint Lucia. (2022). Labour and Agricultural Data. Retrieved from [insert link].
- ¹⁴³ Eastern Caribbean Central Bank (ECCB). 2020. Gross Domestic Product (GDP) Estimates - 1977 - 2020 as at 11 July 2018. Internet- <https://www.eccb-centralbank.org/contentmanager/documents?page=6>
- ¹⁴⁴ Ministry of Sustainable Development, Energy, Science and Technology (2015). The Saint Lucia Climate Change Adaptation Policy: Adapting One Individual, One Household, One Community, One Enterprise and One Sector at a Time.
- ¹⁴⁵ Ministry of Sustainable Development, Energy, Science and Technology (2015). The Saint Lucia Climate Change Adaptation Policy: Adapting One Individual, One Household, One Community, One Enterprise and One Sector at a Time.
- ¹⁴⁶ FAO. (2024). Global Aquatic Trade Statistics. In: Fisheries and Aquaculture. [Cited Monday, December 16th 2024]. https://www.fao.org/fishery/en/collection/global_commodity_prod

- ¹⁴⁷ Historical trends are based on AR6 observations made through <https://atlas.climate.copernicus.eu/atlas>
- ¹⁴⁸ *ibid*
- ¹⁴⁹ Herrera, D. A., Ault, T. R., Fasullo, J. T., Coats, S. J., Carrillo, C. M., Cook, B. I., & Williams, A. P. (2018). Exacerbation of the 2013-2016 Pan-Caribbean drought by anthropogenic warming. *Geophysical Research Letters*, 45, 10,619-10,626. <https://doi.org/10.1029/2018GL079408>
- ¹⁵⁰ Selection of key facts from regional overview is taken from: Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ¹⁵¹ Climate Central. (2024). 2024 hurricane attribution. Climate Central. Retrieved from <https://www.climatecentral.org/report/2024-hurricane-attribution>
- ¹⁵² Zhou, H., Zhao, L., & Xie, W. (2023). Impacts of ocean warming and acidification on marine ecosystems: Insights from recent studies. *Journal of Geochemical Exploration*. <https://doi.org/10.1016/j.gexplo.2023.107158>
- ¹⁵³ Hulme, M., Doherty, R., Ngara, T., New, M., & Lister, D. (2001). African climate change: 1900-2100. *Journal of Geophysical Research: Atmospheres*, 106(D8), 11025-11051. <https://doi.org/10.1029/2002JD002251>
- ¹⁵⁴ Antuña-Marrero, J. C., Otterå, O. H., Robock, A., & Mesquita, M. d. S. (2015). Modelled and observed sea surface temperature trends for the Caribbean and Antilles. *International Journal of Climatology*, 36(6), 2747-2762. <https://doi.org/10.1002/joc.4466>
- ¹⁵⁵ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank
- ¹⁵⁶ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁵⁷ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁵⁸ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank
- ¹⁵⁹ Intergovernmental Panel on Climate Change (IPCC). (2018). Summary for policymakers of IPCC special report on global warming of 1.5°C approved by governments. Retrieved December 2, 2024, from <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>
- ¹⁶⁰ Gulev, S.K., P.W. Thorne, J. Ahn, F.J. Dentener, C.M. Domingues, S. Gerland, D. Gong, D.S. Kaufman, H.C. Nnamchi, J. Quaas, J.A. Rivera, S. Sathyendranath, S.L. Smith, B. Trewin, K. von Schuckmann, and R.S. Vose, 2021: Changing State of the Climate System. In *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 287-422, doi: 10.1017/9781009157896.004.
- ¹⁶¹ <https://interactive-atlas.ipcc.ch/>
- ¹⁶² <https://atlas.climate.copernicus.eu/atlas>
- ¹⁶³ <https://interactive-atlas.ipcc.ch/>
- ¹⁶⁴ NOAA; Retrieved July 20, 2019.
- ¹⁶⁵ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank
- ¹⁶⁶ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁶⁷ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁶⁸ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank
- ¹⁶⁹ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ¹⁷⁰ The map indicates areas with robust signals (solid colors), regions showing no change or no robust signal (hatched), and areas with conflicting signals (crosshatched). Data source: C3S/ECMWF.
- ¹⁷¹ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁷² <https://atlas.climate.copernicus.eu/atlas>

- ¹⁷³ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ¹⁷⁴ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁷⁵ Ibid.
- ¹⁷⁶ <https://atlas.climate.copernicus.eu/atlas>
- ¹⁷⁷ The dotted line indicates individual model outputs, the solid line represents the median (P50), and the shaded areas show the confidence intervals: light shading for P10 to P90 and darker shading for P25 to P75. The dark-grey box highlights the reference period. Data source: C3S/ECMWF
- ¹⁷⁸ IPCC, 2018: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.
- ¹⁷⁹ R.E. Kopp, A.C. Kemp, K. Bittermann, B.P. Horton, J.P. Donnelly, W.R. Gehrels, C.C. Hay, J.X. Mitrovic a, E.D. Morrow, S. Rahmstorf, Temperature-driven global sea-level variability in the Common Era, Proc. Natl. Acad. Sci. U.S.A.
- ¹¹³ (11) E1434-E1441, <https://doi.org/10.1073/pnas.1517056113> (2016).
- ¹⁸⁰ Church, J. A., and N. J. White (2006), A 20th century acceleration in global sea-level rise, Geophys. Res. Lett., 33, L01602, doi:[10.1029/2005GL024826](https://doi.org/10.1029/2005GL024826).
- ¹⁸¹ World Meteorological Organization (WMO). State of the Global Climate 2023 (WMO-No. 1347). Geneva, 2024
- ¹⁸² Palanisamy, H., Cazenave, A., Meyssignac, B., Soudarin, L., Wöppelmann, G., & Becker, M. (2014). Regional sea level variability, total relative sea level rise and its impacts on islands and coastal zones of the Indian Ocean over the last sixty years. Global and Planetary Change, 116, 54-67. <https://doi.org/10.1016/j.gloplacha.2014.02.001>
- ¹⁸³ Torres, R. R., & Tsimplis, M. N. (2013). Sea-level trends and interannual variability in the Caribbean Sea. Journal of Geophysical Research: Oceans, 118(6), 2934-2947. <https://doi.org/10.1002/jgrc.2022940>
- ¹⁸⁴ <https://climateknowledgeportal.worldbank.org/country/bahamas/sea-level-historical>
- ¹⁸⁵ United Nations Climate Change Learning Partnership (UN CC:Learn). (2023). State of the climate in Latin America and the Caribbean 2023. Retrieved December 5, 2024, from https://www.unccllearn.org/wp-content/uploads/library/1351_State_of_the_Climate_in_LAC_2023_en.pdf
- ¹⁸⁶ Palanisamy, H., Cazenave, A., Meyssignac, B., Soudarin, L., Wöppelmann, G., & Becker, M. (2014). Regional sea level variability, total relative sea level rise and its impacts on islands and coastal zones of the Indian Ocean over the last sixty years. Global and Planetary Change, 116, 54-67. <https://doi.org/10.1016/j.gloplacha.2014.02.001>
- ¹⁸⁷ Torres, R. R., & Tsimplis, M. N. (2013). Sea-level trends and interannual variability in the Caribbean Sea. Journal of Geophysical Research: Oceans, 118(6), 2934-2947. <https://doi.org/10.1002/jgrc.2022940>
- ¹⁸⁸ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank
- ¹⁸⁹ National Oceanic and Atmospheric Administration (NOAA). (2023). Climate change: Global sea level. Climate.gov. Retrieved [14/12/2024], from <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>
- ¹⁹⁰ <https://interactive-atlas.ipcc.ch/>
- ¹⁹¹ World Bank. (2020). Caribbean climate assessment: Resilience and adaptation in the face of change. Retrieved March 12, 2025, from <https://openknowledge.worldbank.org/server/api/core/bitstreams/47252cca-c77a-5537-8a7d-c434dc038f4c/content>
- ¹⁹² Young IR, Zieger S, Babanin AV (2011) Global trends in wind speed and wave height. Science 332:451-455. <https://doi.org/10.1126/science.1197219>
- ¹⁹³ Young IR, Zieger S, Babanin AV (2011) Global trends in wind speed and wave height. Science 332:451-455. <https://doi.org/10.1126/science.1197219>
- ¹⁹⁴ Bustos, R., & Torres, R. R. (2022). Projected wind changes in the Caribbean Sea based on CMIP6 models. ResearchGate. Retrieved [insert retrieval date], from https://www.researchgate.net/publication/364720860_Projected_wind_changes_in_the_Caribbean_Sea_based_on_CMIP6_models

- ¹⁹⁵ Di Napoli C, Allen T, Méndez-Lázaro PA, Pappenberger F. Heat stress in the Caribbean: Climatology, drivers, and trends of human biometeorology indices. *Int J Climatol*. 2023 Jan;43(1):405-425. doi: 10.1002/joc.7774. Epub 2022 Jul 15. PMID: 37056698; PMCID: PMC10084168.
- ¹⁹⁶ Alksnis, E. (2017). Hurricane/tornado physics is wrong: Due to wrong natural philosophy, scientists scratch only the surface of hurricane and tornado phenomena. Critique of mainstream science and some considerations which result [Preprint]. Retrieved from <https://www.researchgate.net/publication/320911871>
- ¹⁹⁷ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ¹⁹⁸ Named storms by decades that have passed within 200 km of the identified country representing each zone are shown in the table, which also details the category of each storm from 1980 to 2016.
- ¹⁹⁹ Murakami, H., Delworth, T. L., Cooke, W. F., & Hsu, P.-C. (2020). Detected climatic change in global distribution of tropical cyclones. *Proceedings of the National Academy of Sciences*, 117(20), 10706-10714. <https://doi.org/10.1073/pnas.1922500117>
- ²⁰⁰ Geophysical Fluid Dynamics Laboratory (GFDL). (n.d.). Global warming and hurricanes. Retrieved December 9, 2024, from <https://www.gfdl.noaa.gov/global-warming-and-hurricanes/>
- ²⁰¹ International Organization for Migration. (2024, July 9). Caribbean SitRep 2. <https://www.iom.int/sites/g/files/tmzbdl2616/files/documents/2024-07/iom-caribbean-sitrep-2.-09-july-2024.pdf>
- ²⁰² Global Facility for Disaster Reduction and Recovery. (2024). Global rapid post-disaster damage estimation (GRADE) report: Hurricane Beryl 2024 - Grenada. <https://www.gfdr.org/en/publication/global-rapid-post-disaster-damage-estimation-grade-report-hurricane-beryl-2024-grenada>
- ²⁰³ The Caribbean Council. (2025, November 14). *Hurricane Melissa's toll on Jamaica could reach US\$20bn*. <https://www.caribbean-council.org/hurricane-melissas-toll-on-jamaica-could-reach-us20bn/>
- ²⁰⁴ Centre for Research on the Epidemiology of Disasters (CRED). (n.d.). EM-DAT: The international disasters database. Retrieved December 9, 2024, from <https://www.emdat.be/>
- ²⁰⁵ Acevedo, S. (2014). Debt, growth and natural disasters: A Caribbean trilogy. International Monetary Fund. Retrieved December 9, 2024, from <https://www.imf.org/external/pubs/ft/wp/2014/wp14125.pdf>
- ²⁰⁶ Centre for Research on the Epidemiology of Disasters (CRED). (n.d.). EM-DAT: The international disasters database. Retrieved December 9, 2024, from <https://www.emdat.be/>
- ²⁰⁷ Centre for Research on the Epidemiology of Disasters (CRED). (n.d.). EM-DAT: The international disasters database. Retrieved December 9, 2024, from <https://www.emdat.be/>
- ²⁰⁸ <https://sealevel.climatecentral.org/uploads/ssrf/Sea-level-rise-threats-in-the-Caribbean.pdf>
- ²⁰⁹ Caribbean Disaster Emergency Management Agency (CDEMA). (2022). Situation report #1: Suriname flooding (26 May 2022). CDEMA. https://www.cdema.org/images/2022/CDEMA_Situation_Report_1_Suriname_Flooding_26May2022pptx.pdf
- ²¹⁰ Government of Saint Lucia. (2025, March 12). Loss and damage cost estimates underway. Government of Saint Lucia. <https://www.govt.lc/news/loss-and-damage-cost-estimates-underway>
- ²¹¹ Herrera, D.A., T.R. Ault, J.T. Fasullo, S.J. Coats, C.M. Carrillo, B.I. Cook, and A.P. Williams, 2018: Exacerbation of the 2013-2016 Pan-Caribbean drought by anthropogenic warming. *Geophys. Res. Lett.*, 45, no. 19, 10619-10626, doi:10.1029/2018GL079408.
- ²¹² IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.
- ²¹³ Herrera, D.A., T.R. Ault, J.T. Fasullo, S.J. Coats, C.M. Carrillo, B.I. Cook, and A.P. Williams, 2018: Exacerbation of the 2013-2016 Pan-Caribbean drought by anthropogenic warming. *Geophys. Res. Lett.*, 45, no. 19, 10619-10626, doi:10.1029/2018GL079408.
- ²¹⁴ *ibid*
- ²¹⁵ Food and Agriculture Organization (FAO). (2021). The state of food security and nutrition in the world 2021. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/8d867401-c61f-41d2-ad31-fc159b151751/content>

- ²¹⁶ World Bank. (2022). Country climate and development report: Saint Lucia. World Bank Group. <https://openknowledge.worldbank.org/server/api/core/bitstreams/47252cca-c77a-5537-8a7d-c434dc038f4c/content>
- ²¹⁷ Food and Agriculture Organization (FAO). (2021). The impact of disasters and crises on agriculture and food security: 2021. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/10ca2b57-1344-4c8e-ab6a-b877748f6d64/content>
- ²¹⁸ Torres, R. R., & Tsimplis, M. N. (2013). Sea-level trends and interannual variability in the Caribbean Sea. *Journal of Geophysical Research: Oceans*, 118(6), 2934-2947. <https://doi.org/10.1002/jgrc.2022940>
- ²¹⁹ Taylor, M. (2018). Implications of 1.5°C warming for the Caribbean region. United Nations Framework Convention on Climate Change (UNFCCC). Retrieved December 9, 2024, from https://unfccc.int/sites/default/files/resource/63_Taylor%201.5%20Paper.pdf
- ²²⁰ IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.
- ²²¹ Angeles-Malaspina, L. D., et al. (2018). The Caribbean climate: Trends, variability, and projections. *International Journal of Climatology*, 38(3), 1449-1462. <https://doi.org/10.1002/joc.7774>
- ²²² Hansen, J. W., et al. (2024). Climate change and health in the Caribbean: A comprehensive review. *The Lancet Global Health*, 12(5), e624-e633. [https://doi.org/10.1016/S2214-109X\(24\)00421-2](https://doi.org/10.1016/S2214-109X(24)00421-2)
- ²²³ World Bank. (2024) Sustainable cooling: A deep dive into seawater air conditioning. World Bank Blogs. <https://blogs.worldbank.org/en/latinamerica/sustainable-cooling--a-deep-dive-into-seawater-air-conditioning->
- ²²⁴ https://rcc.cimh.edu.bb/files/2024/09/CARICOF_ONDJFM_2024-25_heat_outlook.pdf
- ²²⁵ Thomas J F Goreau, Raymond L Hayes, 2023 Record marine heat waves: coral reef bleaching HotSpot maps reveal global sea surface temperature extremes, coral mortality, and ocean circulation changes, *Oxford Open Climate Change*, Volume 4, Issue 1, 2024, kgae005, <https://doi.org/10.1093/oxfclm/kgae005>
- ²²⁶ Thomas J F Goreau, Raymond L Hayes, 2023 Record marine heat waves: coral reef bleaching HotSpot maps reveal global sea surface temperature extremes, coral mortality, and ocean circulation changes, *Oxford Open Climate Change*, Volume 4, Issue 1, 2024, kgae005, <https://doi.org/10.1093/oxfclm/kgae005>
- ²²⁷ Thomas J F Goreau, Raymond L Hayes, 2023 Record marine heat waves: coral reef bleaching HotSpot maps reveal global sea surface temperature extremes, coral mortality, and ocean circulation changes, *Oxford Open Climate Change*, Volume 4, Issue 1, 2024, kgae005, <https://doi.org/10.1093/oxfclm/kgae005>
- ²²⁸ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²²⁹ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²³⁰ ClimaHealth. (n.d.). Bahamas. Retrieved December 9, 2024, from <https://climahealth.info/country/bahamas/>
- ²³¹ Szekiela, Karl. (2021). Longtime Changes of the Marine Environment and Projections Around the Bahamas.
- ²³² Szekiela, Karl. (2021). Longtime Changes of the Marine Environment and Projections Around the Bahamas.
- ²³³ The Tribune. (2024, December 3). 'Desperately bleak': Bahamas faces greatest sea level rise threat by far. Retrieved December 9, 2024, from <https://www.tribune242.com/news/2024/dec/03/desperately-bleak-bahamas-faces-greatest-sea-level-rise-threat-by-far/>
- ²³⁴ NASA Earth Observatory. (n.d.). Signs of sea level rise in The Bahamas. Retrieved December 9, 2024, from <https://earthobservatory.nasa.gov/images/153568/signs-of-sea-level-rise-in-the-bahamas>
- ²³⁵ Climate Central. (2018). Sea level rise threats in the Caribbean. Retrieved December 9, 2024, from <https://sealevel.climatecentral.org/uploads/ssrf/Sea-level-rise-threats-in-the-Caribbean.pdf>
- ²³⁶ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ²³⁷ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ²³⁸ <https://climateknowledgeportal.worldbank.org/country/bahamas/climate-data-historical>
- ²³⁹ <https://climateknowledgeportal.worldbank.org/country/bahamas/climate-data-historical>

- ²⁴⁰ ClimaHealth. (2021). Bahamas. Retrieved December 9, 2024, from <https://climahealth.info/country/bahamas/>
- ²⁴¹ Szekiela, Karl. (2021). Longtime Changes of the Marine Environment and Projections Around the Bahamas.
- ²⁴² Szekiela, Karl. (2021). Longtime Changes of the Marine Environment and Projections Around the Bahamas.
- ²⁴³ Tribune242. (2024, December 3). Desperately bleak: Bahamas faces greatest sea level rise threat by far. Retrieved from <https://www.tribune242.com/news/2024/dec/03/desperately-bleak-bahamas-faces-greatest-sea-level-rise-threat-by-far>
- ²⁴⁴ NASA Earth Observatory. (n.d.). Signs of sea level rise in The Bahamas. Retrieved December 9, 2024, from <https://earthobservatory.nasa.gov/images/153568/signs-of-sea-level-rise-in-the-bahamas>
- ²⁴⁵ https://marineapps.naturalcapitalproject.org/bahamas/docs/Bahamas_NationalHazard_Analysis.pdf
- ²⁴⁶ <https://climateknowledgeportal.worldbank.org/country/bahamas/tropical-cyclones-historical>
- ²⁴⁷ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁴⁸ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁴⁹ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁵⁰ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁵¹ World Health Organization (WHO). (2021). Climate change and health: Health and economic costs of climate change and benefits of climate action. Retrieved December 9, 2024, from <https://iris.who.int/bitstream/handle/10665/341759/WHO-HEP-ECH-CCH-21.01.03-eng.pdf?sequence=1>
- ²⁵² World Bank. (n.d.). Bahamas: Vulnerability. Climate Change Knowledge Portal. Available at <https://climateknowledgeportal.worldbank.org/country/bahamas/vulnerability>
- ²⁵³ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁵⁴ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁵⁵ McSweeney, C., New, M., & Lizcano, G. (n.d.). UNDP Climate Change Country Profiles: Belize. School of Geography and Environment, University of Oxford, and Tyndall Centre for Climate Change Research. Retrieved December 9, 2024, from <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/latin-america-and-caribbean/central-america/McSweeney-et-al.--Belize-UNDP-CC-Profile..pdf>
- ²⁵⁶ McSweeney, C., New, M., & Lizcano, G. (n.d.). UNDP Climate Change Country Profiles: Belize. School of Geography and Environment, University of Oxford, and Tyndall Centre for Climate Change Research. Retrieved December 9, 2024, from <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/latin-america-and-caribbean/central-america/McSweeney-et-al.--Belize-UNDP-CC-Profile..pdf>
- ²⁵⁷ <https://climateknowledgeportal.worldbank.org/country/belize/climate-data-historical>
- ²⁵⁸ Lobel, P. S., & Lobel, L. K. (2024). A Ten-Year Record Shows Warming Inside the Belize Barrier Reef Lagoon. *Diversity*, 16(1), 57. <https://doi.org/10.3390/d16010057>
- ²⁵⁹ <https://atlas.climate.copernicus.eu/atlas>
- ²⁶⁰ NASA. (n.d.). IPCC AR6 Sea Level Projection Tool. Retrieved from <https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool>
- ²⁶¹ United Nations Framework Convention on Climate Change (UNFCCC). (n.d.). Belize case study. Retrieved December 9, 2024, from https://unfccc.int/sites/default/files/resource/Belize_Case_Study.pdf
- ²⁶² Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ²⁶³ Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ²⁶⁴ World Bank. (n.d.). Climate Change Knowledge Portal: Belize. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/belize/climate-data-projections>

- ²⁶⁵ World Bank. (n.d.). Climate Change Knowledge Portal: Belize. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/belize/climate-data-projections>
- ²⁶⁶ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ²⁶⁷ National Climate Change Policy, Strategy and Action Plan to Address Climate Change in Belize (2014)
- ²⁶⁸ World Bank. (n.d.). Climate Change Knowledge Portal: Belize. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/belize/climate-data-projections>
- ²⁶⁹ World Bank. (n.d.). Belize - Tropical cyclones projections. Retrieved from <https://climateknowledgeportal.worldbank.org/country/belize/tropical-cyclones-projections>
- ²⁷⁰ World Bank. (n.d.). Climate change knowledge portal: Belize - Vulnerability. Retrieved from <https://climateknowledgeportal.worldbank.org/country/belize/vulnerability>
- ²⁷¹ Blue Carbon Working Group, 2020
- ²⁷² Belize Fisheries Department. (2014). Vulnerability assessment report. [Belize Fisheries Department]. https://d2ouvy59p0dg6k.cloudfront.net/downloads/vulnerability_assessment_report.pdf
- ²⁷³ McField, M., & Williams, E. H. (2021). Temperature record and coral bleaching in the Mesoamerican Reef: Implications for the future. *Diversity*, 16(1), 57. <https://doi.org/10.3390/d16010057>
- ²⁷⁴ Convention on Biological Diversity (CBD). (2016). Belize national biodiversity strategy and action plan 2016-2020. CBD. <https://www.cbd.int/doc/world/bz/bz-nbsap-v2-p1-en.pdf>
- ²⁷⁵ Fragments of Hope. (2020). Bleaching and the Mesoamerican coral conservation and adaptation project (MCCAP). [Fragments of Hope]. https://fragmentsofhope.org/wp-content/uploads/2020/08/Bleaching-MCCAP_final.pdf
- ²⁷⁶ Food and Agriculture Organization of the United Nations (FAO). (2023). FAO supports climate resilience in Jamaica, The Bahamas, and Belize. Retrieved from <https://www.fao.org/jamaica-bahamas-and-belize/news/detail-events/en/c/1710317/>
- ²⁷⁷ Economic Commission for Latin America and the Caribbean (ECLAC). (2021). Economic impacts of climate change in the Caribbean: The case of hurricanes. Retrieved from <https://repositorio.cepal.org/server/api/core/bitstreams/adf35114-7a26-40e0-8b15-cb0878d49cb5/content>
- ²⁷⁸ PreventionWeb. (2000). Belize: Assessment of damage caused by Hurricane Keith 2000 - Implications for economic, social, and infrastructure development. Retrieved from <https://www.preventionweb.net/publication/belize-assessment-damage-caused-hurricane-keith-2000-implications-economic-social-and>
- ²⁷⁹ National Emergency Management Organization (NEMO). (2023). PDNA executive summary final. [National Emergency Management Organization]. <https://site.nemo.org.bz/wp-content/uploads/2023/08/PDNA-Executive-Summary-Final.pdf>
- ²⁸⁰ Source: NEMO, 2023
- ²⁸¹ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ²⁸² Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ²⁸³ Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ²⁸⁴ Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ²⁸⁵ McSweeney, C., New, M., & Lizcano, G. (2010). UNDP Climate Change Country Profiles: Grenada. United Nations Development Programme (UNDP). Retrieved from <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/latin-america-and-caribbean/eastern-carib-amp-dutch-antilles/McSweeney-et-al.--Grenada-UNDP-CC-Profile..pdf>
- ²⁸⁶ McSweeney, C., New, M., & Lizcano, G. (2010). UNDP Climate Change Country Profiles: Grenada. United Nations Development Programme (UNDP). Retrieved from <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/latin-america-and-caribbean/eastern-carib-amp-dutch-antilles/McSweeney-et-al.--Grenada-UNDP-CC-Profile..pdf>
- ²⁸⁷ CARIBSAVE Partnership. (2012). The CARIBSAVE Climate Change Risk Atlas (CCCRA): Climate Change Risk Profile for Grenada. Retrieved December 10, 2024, from https://www.researchgate.net/publication/272791669_Climate_Change_Risk_Profile_for_Grenada

- ²⁸⁸ CARIBSAVE Partnership. (n.d.). The CARIBSAVE Climate Change Risk Atlas (CCCRA): Climate Change Risk Profile for Grenada. Retrieved December 10, 2024, from https://www.researchgate.net/publication/272791669_Climate_Change_Risk_Profile_for_Grenada
- ²⁸⁹ World Bank. (n.d.). Climate Change Knowledge Portal: The Grenada. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/grenada>
- ²⁹⁰ NASA. (n.d.). IPCC AR6 Sea Level Projection Tool. Retrieved from <https://sealevel.nasa.gov/ipcc-ar6-sea-level-projection-tool>
- ²⁹¹ World Health Organization (WHO). (n.d.). Grenada: Climate and Health Country Profile. Retrieved December 10, 2024, from <https://climahealth.info/country/grenada/>
- ²⁹² Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ²⁹³ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ²⁹⁴ Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ²⁹⁵ World Bank. (n.d.). Climate Change Knowledge Portal: The Grenada. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/grenada>
- ²⁹⁶ World Bank. (n.d.). Climate Change Knowledge Portal: The Grenada. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/grenada>
- ²⁹⁷ <https://climateknowledgeportal.worldbank.org/country/grenada/climate-data-historical#:~:text=The%20mean%20maximum%20temperature%20is,from%20750%20to%201400%20mm.>
- ²⁹⁸ McSweeney, C., New, M., & Lizcano, G. (2010). UNDP Climate Change Country Profiles: Grenada. United Nations Development Programme (UNDP). Retrieved from <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/latin-america-and-caribbean/eastern-carib-amp-dutch-antilles/McSweeney-et-al.--Grenada-UNDP-CC-Profile..pdf>
- ²⁹⁹ First Street Foundation. (n.d.). Wind risk in Grenada, MS. Retrieved December 10, 2024, from https://firststreet.org/city/grenada-ms/2829460_fsid/wind
- ³⁰⁰ McSweeney, C., New, M., & Lizcano, G. (2010). UNDP Climate Change Country Profiles: Grenada. United Nations Development Programme (UNDP). Retrieved from <https://research.fit.edu/media/site-specific/researchfitedu/coast-climate-adaptation-library/latin-america-and-caribbean/eastern-carib-amp-dutch-antilles/McSweeney-et-al.--Grenada-UNDP-CC-Profile..pdf>
- ³⁰¹ Organization of American States (OAS). (n.d.). Integrated Watershed and Coastal Area Management (IWCAM): Grenada. Retrieved December 10, 2024, from <https://www.oas.org/reia/iwcam/pdf/grenada/Section%202.PDF>
- ³⁰² World Bank. (n.d.). Grenada - Tropical cyclones projections. Retrieved from <https://climateknowledgeportal.worldbank.org/country/grenada/tropical-cyclones-projections>
- ³⁰³ Caribbean Disaster Emergency Management Agency (CDEMA). (2017). Island snapshot: Grenada. Retrieved from https://www.cdema.org/ccdrmf/CCDRMF_Island_Snapshot_Grenada_July_2017.pdf
- ³⁰⁴ ReliefWeb. (n.d.). Grenada disasters list and advanced search. ReliefWeb. Retrieved from <https://reliefweb.int/disasters?list=Grenada%20Disasters&advanced-search=%28C106%29.>
- ³⁰⁵ Food and Agriculture Organization of the United Nations (FAO). (2021). Hurricane Ivan and Emily (2004-2005) and their impact on Grenada's forest recovery and expansion rates. FAO. Retrieved from <https://openknowledge.fao.org>
- ³⁰⁶ ReliefWeb. (n.d.). Grenada disasters list and advanced search. ReliefWeb. Retrieved from <https://reliefweb.int/disasters?list=Grenada%20Disasters&advanced-search=%28C106%29.>
- ³⁰⁷ ReliefWeb. (n.d.). Grenada disasters list and advanced search. ReliefWeb. Retrieved from <https://reliefweb.int/disasters?list=Grenada%20Disasters&advanced-search=%28C106%29.>
- ³⁰⁸ Government of Grenada (GOG). (2024, November 8). Hurricane Beryl, PDNA Report. Ministry of Economic Development. <https://recovery.preventionweb.net/media/102929/download?startDownload=20250311>
- ³⁰⁹ Planning Institute of Jamaica (PIOJ). (2015). The State of the Jamaican Climate 2015. Retrieved December 10, 2024, from https://www.pioj.gov.jm/Portals/0/Sustainable_Development/WEB_FULL%20DOCUMENT_The%20State%20of%20the%20Jamaican%20Climate%202015.pdf
- ³¹⁰ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>

- ³¹¹ United Nations Environment Programme (UNEP). (n.d.). Jamaica: National Report for the United Nations Conference on Environment and Development (UNCED). Retrieved December 10, 2024, from https://digital.library.unt.edu/ark:/67531/metadc226795/m2/1/high_res_d/Jamaica.hires.report.pdf
- ³¹² Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ³¹³ Church, J.A., P.U. Clark, A. Cazenave, J.M. Gregory, S. Jevrejeva, A. Levermann, M.A. Merrifield, G.A. Milne, R.S. Nerem, P.D. Nunn, A.J. Payne, W.T. Pfeffer, D. Stammer and A.S. Unnikrishnan, 2013: Sea Level Change Supplementary Material. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)].
- ³¹⁴ Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ³¹⁵ Climate Studies Group, Mona (CSGM), 2020: State of the Jamaican Climate 2019: Information for Resilience Building (Second draft). Produced for the Planning Institute of Jamaica (PIOJ), Kingston Jamaica
- ³¹⁶ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ³¹⁷ NASA Sea Level Change Portal, 2024. Sea Level Projection Tool.
- ³¹⁸ NOAA reconstructed Hurricane Reanalysis database
- ³¹⁹ Walker, Laverne, 2022. "Climate Change, The Caribbean Sea, and the Ocean Economy." United Nations Economic Commission for Latin America and the Caribbean.
- ³²⁰ Chen, X., Feng, Y., Zhang, H., Gao, Y., & Wang, Y. (2020). The global proportion of tropical cyclones under climate change. *Journal of Meteorological Research*, 34(4), 621-634. <https://doi.org/10.1016/j.jmr.2020.03.019>
- ³²¹ <https://climateknowledgeportal.worldbank.org/country/jamaica/climate-data-projections>
- ³²² Climate Studies Group Mona. (2019). The State of the Jamaican Climate 2019: Historical and Future Climate Changes for Jamaica (Second draft). The University of the West Indies.
- ³²³ Climate Studies Group Mona. (2019). The State of the Jamaican Climate 2019: Historical and Future Climate Changes for Jamaica (Second draft). The University of the West Indies.
- ³²⁴ <https://climateknowledgeportal.worldbank.org/country/jamaica/climate-data-projections>
- ³²⁵ Climate Studies Group, Mona (CSGM), 2022: State of the Jamaican Climate (Volume III): Information for Resilience Building (Summary for Policy Makers). Produced for the Planning Institute of Jamaica (PIOJ), 16 Oxford Road, Kingston 5 Jamaica.
- ³²⁶ Climate Studies Group, Mona (CSGM), 2022: State of the Jamaican Climate (Volume III): Information for Resilience Building (Summary for Policy Makers). Produced for the Planning Institute of Jamaica (PIOJ), 16 Oxford Road, Kingston 5 Jamaica.
- ³²⁷ Climate Studies Group, Mona (CSGM), 2022: State of the Jamaican Climate (Volume III): Information for Resilience Building (Summary for Policy Makers). Produced for the Planning Institute of Jamaica (PIOJ), 16 Oxford Road, Kingston 5 Jamaica.
- ³²⁸ World Bank. (n.d.). Jamaica - Tropical cyclones projections. Retrieved from <https://climateknowledgeportal.worldbank.org/country/jamaica/tropical-cyclones-projections>
- ³²⁹ United Nations Office for Disaster Risk Reduction (UNDRR). (2024). Caribbean disaster risk profile: Addressing vulnerabilities and hazards. Retrieved from <https://www.preventionweb.net/media/77793/download?startDownload=20241210>
- ³³⁰ United Nations Office for Disaster Risk Reduction (UNDRR). (2024). Caribbean disaster risk profile: Addressing vulnerabilities and hazards. Retrieved from <https://www.preventionweb.net/media/77793/download?startDownload=20241210>
- ³³¹ Ministry of Tourism. (2024, July 4). No major tourism fallout from Beryl - Bartlett. Ministry of Tourism, Jamaica. Retrieved from <https://www.mot.gov.jm/news-releases/no-major-tourism-fallout-beryl-%E2%80%93-bartlett>
- ³³² Internal Displacement Monitoring Centre. (2017). Hurricane Matthew: A spotlight on displacement in the Caribbean (Global Report on Internal Displacement). <https://www.internal-displacement.org/global-report/grid2017/pdfs/2017-GRID-hurricane-matthew-spotlight.pdf>

- ³³³ Aon. (2016). Hurricane Matthew recap. https://www.actuarialpost.co.uk/downloads/cat_1/Aon-hurricane-matthew-recap.pdf
- ³³⁴ McIntyre, S. (2020, October 27). Jamaica's Hellshire Beach under threat from climate change and pollution. The Guardian. <https://www.theguardian.com/us-news/2020/oct/27/jamaica-hellshire-beach-climate-change>
- ³³⁵ World Bank. (n.d.). Climate Change Knowledge Portal: The Bahamas. Retrieved December 9, 2024, from <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ³³⁶ United Nations Conference on Trade and Development. (2018). Port industry survey on climate change impacts and adaptation. UNCTAD. https://unctad.org/system/files/official-document/dtltlb2018d3_en.pdf
- ³³⁷ Copernicus Climate Change Service. (n.d.). Climate Data Store - Climate Atlas. Retrieved from <https://atlas.climate.copernicus.eu/atlas>
- ³³⁸ United Nations Conference on Trade and Development. (2018). Port industry survey on climate change impacts and adaptation. UNCTAD. Retrieved from https://unctad.org/system/files/official-document/dtltlb2018d3_en.pdf
- ³³⁹ NASA Sea Level Change Portal, 2024. Sea Level Projection Tool.
- ³⁴⁰ United Nations Conference on Trade and Development. (2018). Port industry survey on climate change impacts and adaptation. UNCTAD. Retrieved from https://unctad.org/system/files/official-document/dtltlb2018d3_en.pdf
- ³⁴¹ Walker, Laverne, 2022. "Climate Change, The Caribbean Sea, and the Ocean Economy." United Nations Economic Commission for Latin America and the Caribbean.
- ³⁴² World Bank. (n.d.). Saint Lucia: Climate data projections. Climate Knowledge Portal. Retrieved December 10, 2024, from <https://climateknowledgeportal.worldbank.org/country/st-lucia/climate-data-projections>
- ³⁴³ United Nations Conference on Trade and Development. (2018). Port industry survey on climate change impacts and adaptation. UNCTAD. https://unctad.org/system/files/official-document/dtltlb2018d3_en.pdf
- ³⁴⁴ United Nations Conference on Trade and Development. (2018). Port industry survey on climate change impacts and adaptation. UNCTAD. https://unctad.org/system/files/official-document/dtltlb2018d3_en.pdf
- ³⁴⁵ UNCTAD (2017) Climate change impacts on coastal transport infrastructure in the Caribbean: enhancing the adaptive capacity of Small Island Developing States (SIDS), SAINT LUCIA: A case study. UNDA project 14150.
- ³⁴⁶ World Bank. (n.d.). Saint Lucia - Tropical cyclones projections. Retrieved from <https://climateknowledgeportal.worldbank.org/country/st-lucia/tropical-cyclones-projections>
- ³⁴⁷ Internal Displacement Monitoring Centre (IDMC). (2023). Global report on internal displacement 2023 (GRID). Internal Displacement Monitoring Centre. Retrieved from <https://www.internal-displacement.org/publications/2023-global-report-on-internal-displacement-grid/>
- ³⁴⁸ Bündnis Entwicklung Hilft, & Ruhr University Bochum - Institute for International Law of Peace and Armed Conflict (IFHV). (2022). WorldRiskReport 2022: Focus on digitalization. Bündnis Entwicklung Hilft. Retrieved from <https://www.preventionweb.net/publication/worldriskreport-2022-focus-digitalization>
- ³⁴⁹ United Nations' Economic Commission for Latin America and the Caribbean (ECLAC) Macro Socio-Economic Damage Assessment report (December 2010)
- ³⁵⁰ United Nations Office for Disaster Risk Reduction (UNDRR). (2024). Global assessment of disaster risk: 2024 update. Retrieved from <https://www.preventionweb.net/media/77793/download?startDownload=20241210>
- ³⁵¹ United Nations Office for Disaster Risk Reduction (UNDRR). (2024). Global assessment of disaster risk: 2024 update. Retrieved from <https://www.preventionweb.net/media/77793/download?startDownload=20241210>
- ³⁵² World Bank. (2011, March 10). Saint Lucia after Tomas: 20,000 to benefit from rehabilitation of public infrastructure. World Bank. Retrieved from <https://www.worldbank.org/en/news/press-release/2011/03/10/saint-lucia-after-tomas-20000-to-benefit-from-rehabilitation-of-public-infrastructure>
- ³⁵³ Yale School of Medicine. (n.d.). Document Name. Yale University. Retrieved from <https://files-profile.medicine.yale.edu/documents/cd14e3e1-90ae-4de8-9f54-3772ed3458e3>

- ³⁵⁴ Climate Studies Group Mona (Eds.). 2020. "The State of the Caribbean Climate". Produced for the Caribbean Development Bank.
- ³⁵⁵ Bündnis Entwicklung Hilft / IFHV (2023): WeltRisikoBericht 2023. Berlin: Bündnis Entwicklung Hilft.
- ³⁵⁶ <https://gain.nd.edu/our-work/country-index/rankings/>
- ³⁵⁷ Richardson, K. 2016. Evaluation of four tomato varieties for heat tolerance. Department of Agriculture.
- ³⁵⁸ GCF. 2020. Climate Resilience of the Water Sector in The Bahamas.
- ³⁵⁹ UNFCCC. 2022. First Biennial Update Report (BUR1) of The Commonwealth of The Bahamas to the United Nations Framework Convention on Climate Change (UNFCCC).
- ³⁶⁰ 2022. THE BAHAMAS | CLIMATE RESILIENT AGRICULTURE: Policies, Strategies, and Actions.
- ³⁶¹ Ewing-Chow, D. 2019. Bahamas' \$75 Million Spiny Lobster Fishery Has Been Set Back Years In The Wake Of Hurricane Dorian.
- ³⁶² Water Mission. 2021. <https://watermission.org/news/stronger-than-the-storm-bahamas/#:~:text=As%20Hurricane%20Dorian%20hovered%20over,a%20source%20of%20safe%20water.>
- ³⁶³ Cohen, J. 2019. In The Wake Of Hurricane Dorian The Bahamas Face Public Health Challenges. Forbes.
- ³⁶⁴ Dunleavy, B. 2019. Hurricane Dorian Is Long Gone, But Its Effects Still Sting in the Bahamas: Public Health Watch. Contagion Live.
- ³⁶⁵ ClimaHealth. 2021. <https://climahealth.info/country/bahamas/#:~:text=These%20represent%20significant%20threats%20to,injury%20from%20extreme%20weather%20events.>
- ³⁶⁶ International Federation of Red Cross and Red Crescent Societies (IFRC). (2022). The Bahamas country plan 2022. Retrieved from https://www.ifrc.org/sites/default/files/2022-02/Bahamas_Plan_2022.pdf
- ³⁶⁷ Government of The Bahamas. (2005). National policy for the adaptation to climate change. Retrieved from <https://www.greenpolicyplatform.org/sites/default/files/downloads/policy-database/BAHAMAS%20National%20Policy%20for%20the%20Adaptation%20to%20Climate%20Change.pdf>
- ³⁶⁸ Pacific Disaster Center (PDC). (2021). The Bahamas island risk profiles. Pacific Disaster Center. <https://www.pdc.org/wp-content/uploads/NDPBA-BHS-Island-Profiles-Merged.pdf>
- ³⁶⁹ The World Bank. <https://climateknowledgeportal.worldbank.org/country/bahamas>
- ³⁷⁰ Perry Institute for Marine Science. 2022. Mangrove Report Card for The Bahamas.
- ³⁷¹ Walcker, R et al. 2019. Damages caused by hurricane Irma in the human-degraded mangroves of Saint Martin (Caribbean). Scientific Reports, 9 (18971).
- ³⁷² Perry Institute for Marine Science. 2022.
- ³⁷³ The Global Forest Watch. 2024. Bahamas.
- ³⁷⁴ National Perspective Belize. 2023. Potential Impacts of a Super El Niño on Belize's Economy and Agriculture.
- ³⁷⁵ Climate Resilient Food System Alliance. 2022. Belize
- ³⁷⁶ FAO Investment Centre. 2024.
- ³⁷⁷ <chrome-extension://efaidnbmninnbpcjpcglclefindmkaj/https://sdgs.un.org/sites/default/files/2023-03/Belize%20%28E%29.pdf>
- ³⁷⁸ Climate Resilient Food System Alliance. 2022. Belize.
- ³⁷⁹ Chow, D. 2024. A piece of blue sky: How WFP Hurricane Lisa recovery cash boosts farmers in Belize. Saving Lives Changing Lives.
- ³⁸⁰ Ministry of Agriculture, Food Security, and Enterprises. <https://www.agriculture.gov.bz/assistance-to-smallholder-farmers-directly-impacted-by-hurricane-lisa/#:~:text=After%20the%20passage%20of%20Hurricane,Cayo%20and%20Orange%20Walk%20Districts.>
- ³⁸¹ Climate Resilient Food System Alliance. 2022. Belize.
- ³⁸² UN Belize. 2022. Common Country Analysis update.
- ³⁸³ Climate Resilient Food System Alliance. 2022. Belize.
- ³⁸⁴ UN Belize. 2022. Common Country Analysis update.
- ³⁸⁵ Stimson Center. (2025). CORVI: Measuring multidimensional climate risks in Belize City, Belize. Retrieved from <https://www.stimson.org/2025/corvi-measuring-multidimensional-climate-risks-in-belize-city-belize/>
- ³⁸⁶ Statistical Institute of Belize (SIB). (2022). Abstract of statistics. Retrieved from https://sib.org.bz/wp-content/uploads/2022_Abstract_of_Statistics.pdf
- ³⁸⁷ ICRI. 2023. Mesoamerican Reef 2022 health report - poor reef health and fish decline. <https://icriforum.org/mesoamerican-reef-health-report-2022/>
- ³⁸⁸ Global Mangrove Alliance. 2024. The State of the World's Mangroves.

- ³⁸⁹ Global Forest Watch. 2024. Belize.
- ³⁹⁰ Foreign & Commonwealth Office. 2022. Economies Programme Grenada fisheries: Adapting to climate change, May 2022.
- ³⁹¹ Campbell, C. 2024. Nawasa declares drought emergency. Now Grenada.
- ³⁹² Ministry of Climate Resilience, The Environment & Renewable Energy. Water availability. <https://climateresilience.gov.gd/water-availability/#>
- ³⁹³ OCHA. 2024. Latin America & The Caribbean Weekly Situation Update as of 2 August 2024. <https://www.unocha.org/publications/report/grenada/latin-america-caribbean-weekly-situation-update-2-august-2024#:~:text=Saint%20Vincent%20and%20the%20Grenadines,the%20lobster%20and%20fisheries%20sector.>
- ³⁹⁴ IFRC. 2024. Operation Update Hurricane Beryl.
- ³⁹⁵ Ministry of Climate Resilience, The Environment & Renewable Energy. Water availability. <https://climateresilience.gov.gd/water-availability/#>
- ³⁹⁶ IFRC. 2024. Operation Update Hurricane Beryl.
- ³⁹⁷ First Street Foundation. (n.d.). Heat risk in Grenada, CA. Retrieved from https://firststreet.org/city/grenada-ca/631246_fsid/heat
- ³⁹⁸ Di Napoli, C., Allen, T., Méndez-Lázaro, P. A., & Pappenberger, F. (2022). Climate change and urban heat: The role of urban heat islands in rising temperatures. *International Journal of Climatology*, 42(2), 772-785. <https://doi.org/10.1002/joc.7774>
- ³⁹⁹ World Health Organization (WHO). (2018). Climate change and health country profile: Grenada. Retrieved from <https://iris.who.int/bitstream/handle/10665/272543/ccsbrief-grd-eng.pdf?sequence=1>
- ⁴⁰⁰ Statista. (2025). Dengue cases incidence rate in Grenada. Retrieved from <https://www.statista.com/statistics/1463249/dengue-cases-incidence-rate-grenada/>
- ⁴⁰¹ Government of Grenada. (n.d.). Health and climate resilience in Grenada. Retrieved from <https://climateresilience.gov.gd/health/>
- ⁴⁰² United Nations Population Fund (UNFPA). (2017). Rapid assessment of sexual and reproductive health and HIV policies, systems, and services in Grenada. Retrieved from https://caribbean.unfpa.org/sites/default/files/pub-pdf/RAPID_ASSESSMENT_OF_SEXUAL_AND_REPRODUCTIVE_HEALTH_AND_HIV_POLICIES_SYSTEMS_AND_SERVICES_IN_GRENADA.pdf
- ⁴⁰³ Ocean+Habitats. 2023. <https://habitats.oceanplus.org/grenada>.
- ⁴⁰⁴ IFRC. 2024. Operation Update Hurricane Beryl.
- ⁴⁰⁵ Global Forest watch. 2024. Grenada.
- ⁴⁰⁶ Rural Agricultural Development Authority, Government of Jamaica. 2023. Advisory to farmers.
- ⁴⁰⁷ Fresh Plaza. 2024. Jamaica citrus producer hit by disease and shrinking farmland.
- ⁴⁰⁸ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://recovery.preventionweb.net/media/95112/download?startDownload=20241213
- ⁴⁰⁹ PAHO. Thirst for Change - A Caribbean Story of Health and Water Sustainability.
- ⁴¹⁰ Di Napoli, C., Allen, T., Méndez-Lázaro, P. A., & Pappenberger, F. (2022). Climate change and urban heat: The role of urban heat islands in rising temperatures. *International Journal of Climatology*, 42(2), 772-785. <https://doi.org/10.1002/joc.7774>
- ⁴¹¹ Henry S, Mendonça AFA. Past, Present, and Future Vulnerability to Dengue in Jamaica: A Spatial Analysis of Monthly Variations. *Int J Environ Res Public Health*. 2020 May 1;17(9):3156. doi: 10.3390/ijerph17093156. PMID: 32369951; PMCID: PMC7246587.
- ⁴¹² Henry S, Mendonça AFA. Past, Present, and Future Vulnerability to Dengue in Jamaica: A Spatial Analysis of Monthly Variations. *Int J Environ Res Public Health*. 2020 May 1;17(9):3156. doi: 10.3390/ijerph17093156. PMID: 32369951; PMCID: PMC7246587.
- ⁴¹³ Global Forest Watch. 2024. Jamaica.
- ⁴¹⁴ ReliefWeb. 2022. Saint Lucia: Flash Floods - Nov 2022. <https://reliefweb.int/disaster/fl-2022-000362-lca>
- ⁴¹⁵ WHO, UNFCCC & PAHO. 2020. Health and climate change: country profile 2020: Saint Lucia.
- ⁴¹⁶ UNOPS. <https://www.unops.org/news-and-stories/stories/making-waves>.
- ⁴¹⁷ ReliefWeb. 2022. Saint Lucia: Flash Floods - Nov 2022. <https://reliefweb.int/disaster/fl-2022-000362-lca>

- ⁴¹⁸ ReliefWeb. 2020. Saint Lucia: Dengue Outbreak - Aug 2020. <https://reliefweb.int/disaster/ep-2020-000216-lca>
- ⁴¹⁹ Government of Saint Lucia. (2024). Urgent guidelines on extreme heat risks. Retrieved from <https://www.govt.lc/news/urgent-guidelines-on-extreme-heat-risks>
- ⁴²⁰ World Health Organization (WHO). (2018). Climate change and health country profile: Saint Lucia. Retrieved from <https://iris.who.int/bitstream/handle/10665/272545/ccsbrief-lca-eng.pdf?sequence=1>
- ⁴²¹ Statista. (2025). Dengue cases incidence rate in Saint Lucia. Retrieved from <https://www.statista.com/statistics/1463454/dengue-cases-incidence-rate-saint-lucia/>
- ⁴²² Global Facility for Disaster Reduction and Recovery (GFDRR). (2021). Advancing disaster risk finance in Saint Lucia. Retrieved from <https://www.gfdrr.org/sites/default/files/publication/Advancing-Disaster-Risk-Finance-in-Saint%20Lucia.pdf>
- ⁴²³ Caribbean Institute for Meteorology and Hydrology (CIMH). (2021). Saint Lucia's wet season climate outlook: Volume 3. Retrieved from https://rcc.cimh.edu.bb/files/2021/08/WW-ST-LUCIA_V3.pdf
- ⁴²⁴ National Adaptation Plan Global Network (NAPGN). (2018). Saint Lucia portfolio of project concept notes for the agriculture sector. Retrieved from <https://napglobalnetwork.org/wp-content/uploads/2020/07/napgn-en-2018-Saint-Lucia-Portfolio-of-Project-Concept-Notes-for-the-Agriculture-Sector.pdf>
- ⁴²⁵ Food and Agriculture Organization (FAO). (2020). Enhancing the resilience of smallholder farmers to climate change in the Caribbean. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/d3a7a87d-4c23-4fa5-9587-a19b886cedc5/content>
- ⁴²⁶ Statista. (n.d.). Agriculture, forestry, and fishing as a share of GDP in Saint Lucia from 2010 to 2022. Statista. <https://www.statista.com/statistics/1078937/saint-lucia-agriculture-share-gdp/>
- ⁴²⁷ Food and Agriculture Organization (FAO). (2021). Climate finance in the agriculture and land use sector - Global and regional trends between 2000 and 2018. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/d3a7a87d-4c23-4fa5-9587-a19b886cedc5/content>
- ⁴²⁸ First Citizens Group. (n.d.). Food security in the Caribbean. First Citizens Group. <https://www.firstcitizensgroup.com/tt/news-insights/food-security-in-the-caribbean/>
- ⁴²⁹ Government of Saint Lucia. (2018). Saint Lucia's sectoral strategy and action plan for agriculture. United Nations Framework Convention on Climate Change (UNFCCC). <https://www4.unfccc.int/sites/NAPC/Documents/Parties/Saint%20Lucia%E2%80%99s%20Sectoral%20Strategy%20and%20Action%20Plan%20for%20Agriculture.pdf>
- ⁴³⁰ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴³¹ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴³² United Nations. (2016, June 2). Climate change is expected to hit food security in developing countries hardest. UN News. <https://news.un.org/en/story/2016/06/532772#:~:text=Climate%20change%20is%20expected%20to,Nation%20Food%20and%20Agriculture%20Organization>
- ⁴³³ Inter-American Development Bank (IDB). (2017). Climate change impacts on agriculture in Latin America and the Caribbean: The application of an integrated economic model. IDB. <https://publications.iadb.org/en/climate-change-impacts-agriculture-latin-america-and-caribbean-application-integrated-economic>
- ⁴³⁴ Economic Commission for Latin America and the Caribbean (ECLAC). (2016). The state of the environment in Latin America and the Caribbean: The role of natural resources in sustainable development. ECLAC. https://repositorio.cepal.org/bitstream/handle/11362/38620/1/LCCARL299_en.pdf
- ⁴³⁵ World Bank. (2017). Climate change and agriculture in Sub-Saharan Africa: An analysis of climate impacts and adaptation strategies. World Bank. <https://openknowledge.worldbank.org/server/api/core/bitstreams/47252cca-c77a-5537-8a7d-c434dc038f4c/content>
- ⁴³⁶ Food and Agriculture Organization (FAO). (2020, December 3). Latin America and the Caribbean is responsible for 20% of global food lost from post-harvest up to retail. FAO. <https://www.fao.org/americas/news/news-detail/Latin-America-and-the-Caribbean-is-responsible-for-20-of-global-food-lost-from-post-harvest-up-to-retail/-en>

- ⁴³⁷ Food and Agriculture Organization (FAO). (2019). The impact of climate change on food security and livelihoods in the Caribbean. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/f236d0b1-0e7e-4931-b91f-a1c14206295d/content>
- ⁴³⁸ Palipane, K. B., & Rolle, R. (2008). Good practice for assuring the post-harvest quality of exotic tree fruit crops produced in Jamaica: A technical guide. Food and Agriculture Organization of the United Nations. <https://openknowledge.fao.org/server/api/core/bitstreams/f236d0b1-0e7e-4931-b91f-a1c14206295d/content>
- ⁴³⁹ Our Today. (2024). Food loss and waste more complex than post-harvest practices. <https://our.today/food-loss-and-waste-more-complex-than-post-harvest-practices/>
- ⁴⁴⁰ Food and Agriculture Organization (FAO). (2020). The future of food and agriculture: Trends and challenges. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/a4fd8ac5-4582-4a66-91b0-55abf642a400/content>
- ⁴⁴¹ Lallo, C. H. O., Cohen, J., Rankine, D., Taylor, M., Cambell, J., & Stephenson, T. (2018). Characterizing heat stress on livestock using the temperature humidity index (THI)—prospects for a warmer Caribbean. *Regional Environmental Change*, 18(8), 2329–2340. <https://doi.org/10.1007/s10113-018-1359-x>
- ⁴⁴² World Bank. (2019). Belize: Climate-smart agriculture country profile. World Bank Group. <https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/Belize%20-%20CSA%20Country%20Profile%20%28FINAL%29.pdf>
- ⁴⁴³ World Bank. (2017). Climate change and agriculture in Sub-Saharan Africa: An analysis of climate impacts and adaptation strategies. World Bank. <https://openknowledge.worldbank.org/server/api/core/bitstreams/47252cca-c77a-5537-8a7d-c434dc038f4c/content>
- ⁴⁴⁴ Food and Agriculture Organization (FAO). (2021). The state of food security and nutrition in the world 2021. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/8d867401-c61f-41d2-ad31-fc159b151751/content>
- ⁴⁴⁵ World Bank. (2022). Country climate and development report: Saint Lucia. World Bank Group. <https://openknowledge.worldbank.org/server/api/core/bitstreams/47252cca-c77a-5537-8a7d-c434dc038f4c/content>
- ⁴⁴⁶ Food and Agriculture Organization (FAO). (2021). The impact of disasters and crises on agriculture and food security: 2021. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/10ca2b57-1344-4c8e-ab6a-b877748f6d64/content>
- ⁴⁴⁷ World Bank. (2022). Country climate and development report: Saint Lucia. World Bank Group. <https://openknowledge.worldbank.org/server/api/core/bitstreams/47252cca-c77a-5537-8a7d-c434dc038f4c/content>
- ⁴⁴⁸ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁴⁹ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁵⁰ Food and Agriculture Organization (FAO). (n.d.). Land and water resources in the Caribbean. FAO. <https://www.fao.org/4/y1717e/y1717e21.htm>
- ⁴⁵¹ Barton, D., & González, M. (2021). Assessing the role of nature-based solutions in managing risks to coastal systems in Latin America and the Caribbean. *One Ecosystem*, 6, e72881. <https://oneecosystem.pensoft.net/article/72881/>
- ⁴⁵² International Plant Protection Convention (IPPC). (n.d.). Biological control of pink hibiscus mealybug: Project manual. IPPC. https://assets.ippc.int/static/media/uploads/resources/biological_control_of_pink_hibiscus_mealybug_project_manual.pdf
- ⁴⁵³ Sivakumar, M., & Singh, R. (2023). Prioritisation of quarantine pest list for the Caribbean using a multi-criteria decision approach. ResearchGate. https://www.researchgate.net/publication/374687186_Prioritisation_of_quarantine_pest_list_for_the_Caribbean_using_a_multi-criteria_decision_approach
- ⁴⁵⁴ Moffitt, J. R., & Blackburn, T. M. (2021). Economic impacts of invasive species in the Caribbean: A multi-sectoral review. *NeoBiota*, 69, 1–19. [https://neobiota.pensoft.net/article/102673/download/pdf/920345#:~:text=The%20total%20reported%20loss%20to,%24750%20million%20\(Moffitt%201999\)](https://neobiota.pensoft.net/article/102673/download/pdf/920345#:~:text=The%20total%20reported%20loss%20to,%24750%20million%20(Moffitt%201999))

- ⁴⁵⁵ Vincze, O., & Popa, A. (2020). Sustainable management practices in agriculture for climate change adaptation in Romania. *Research Journal of Agricultural Science*, 52(4), 120-127. https://rjas.ro/download/paper_version.paper_file.9c800fd916663b52.R3V5dmVuY2h5LnBkZg%3D%3D.pdf
- ⁴⁵⁶ Food and Agriculture Organization (FAO). (2020). Building climate resilience of small-scale agriculture in the Caribbean. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/7f692f2a-5c43-4858-8767-fbe86566d8d4/content>
- ⁴⁵⁷ World Food Programme (WFP) & Caribbean Community (CARICOM). (2024). Food security survey in the Caribbean: Regional findings. WFP. https://caribbean.un.org/sites/default/files/2024-05/food_security-survey-wfp-caribbean-caricom.pdf
- ⁴⁵⁸ International Fund for Agricultural Development (IFAD). (2024). Country strategy note: Grenada. IFAD. <https://www.ifad.org/documents/48415603/49460538/CSN+Grenada+2610+FINAL+with+map.pdf>
- ⁴⁵⁹ Food and Agriculture Organization (FAO). (2020). Building climate resilience of small-scale agriculture in the Caribbean. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/7f692f2a-5c43-4858-8767-fbe86566d8d4/content>
- ⁴⁶⁰ Caribbean Tourism Organization (CTO). (2024). State of the Caribbean tourism: Climatic bulletin 2024. CTO. https://www.onecaribbean.org/wp-content/uploads/FINAL_SON-2024-CARIBBEAN-TOURISM-CLIMATIC-BULLETIN_12092024.pdf
- ⁴⁶¹ World Bank. (2024) Sustainable cooling: A deep dive into seawater air conditioning. World Bank Blogs. Retrieved from <https://blogs.worldbank.org/en/latinamerica/sustainable-cooling--a-deep-dive-into-seawater-air-conditioning->
- ⁴⁶² UK Department for International Development (DFID). (2017). Tourism. UK Government. https://assets.publishing.service.gov.uk/media/5a82a85840f0b6230269c051/12_Tourism.pdf
- ⁴⁶³ World Bank. (2021). 360° resilience: A guide to prepare the Caribbean for a new generation of shocks - Resilience of the Caribbean tourism industry. World Bank Group. <https://documents1.worldbank.org/curated/en/599401635337080916/pdf/360-Resilience-A-Guide-to-Prepare-the-Caribbean-for-a-New-Generation-of-Shocks-Resilience-of-the-Caribbean-Tourism-Industry.pdf>
- ⁴⁶⁴ Tourism Economics. (2013). The economic impact of tourism in the Caribbean. Caribbean Hotel & Tourism Association. https://caribbeanhotelandtourism.com/wp-content/uploads/data_center/environmental/ToursimEconomics2013.pdf
- ⁴⁶⁵ Food and Agriculture Organization (FAO). (2021). The impact of disasters and crises on agriculture and food security: 2021. FAO. <https://openknowledge.fao.org/server/api/core/bitstreams/10ca2b57-1344-4c8e-ab6a-b877748f6d64/content>
- ⁴⁶⁶ Acevedo, S., Mrkaic, M., Pugacheva, E., & Topalova, P. (2019). The effects of weather shocks on economic activity: What are the channels of impact? (IMF Working Paper No. 19/267). International Monetary Fund (IMF). <https://www.elibrary.imf.org/view/journals/001/2019/267/article-A001-en.xml>
- ⁴⁶⁷ Government of Saint Lucia. (2018). Saint Lucia sectoral adaptation plan for water. United Nations Framework Convention on Climate Change (UNFCCC). <https://www4.unfccc.int/sites/NAPC/Documents/Parties/Saint%20Lucia%20Sectoral%20Adaptation%20Plan%20for%20Water.pdf>
- ⁴⁶⁸ United Nations Office for Disaster Risk Reduction (UNDRR). (2021). Jamaica floods 2021: Forensic analysis. UNDRR. <https://www.undrr.org/resource/jamaica-floods-2021-forensic-analysis>
- ⁴⁶⁹ Caribbean Development Bank. (2020). The state of the Caribbean climate report. Caribbean Development Bank.
- ⁴⁷⁰ Caribbean Development Bank. (2020). The state of the Caribbean climate report. Caribbean Development Bank.
- ⁴⁷¹ Inter-American Development Bank (IDB). (2018). Disaster risk profile for The Bahamas. IDB. <https://publications.iadb.org/publications/english/document/Disaster-Risk-Profile-for-The-Bahamas.pdf>
- ⁴⁷² Taylor, R. (2020, October 27). 'Like a monster that won't stop': The crisis facing a Jamaican beach town. *The Guardian*. <https://www.theguardian.com/us-news/2020/oct/27/jamaica-hellshire-beach-climate-change>
- ⁴⁷³ Mycoo, M. (2018). Beyond 1.5 °C: Vulnerabilities and adaptation strategies for Caribbean Small Island Developing States. *Journal of Environmental Management*, 212, 3-15. <https://doi.org/10.1016/j.jenvman.2018.01.006>
- ⁴⁷⁴ United Nations Development Programme (UNDP). (2010). Gender, climate change and community-based adaptation. UNCC:Learn. <https://www.uncclearn.org/wp-content/uploads/library/undp88.pdf>

- ⁴⁷⁵ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁷⁶ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁷⁷ González, R. (2024, October 7). Marine heat waves make tropical storm intensification more likely. PreventionWeb.
- ⁴⁷⁸ Convention on Biological Diversity (CBD). (2016). Belize national biodiversity strategy and action plan 2016-2020. CBD. <https://www.cbd.int/doc/world/bz/bz-nbsap-v2-p1-en.pdf>
- ⁴⁷⁹ UK Department for International Development (DFID). (2017). Tourism. UK Government. https://assets.publishing.service.gov.uk/media/5a82a85840f0b6230269c051/12._Tourism.pdf
- ⁴⁸⁰ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁸¹ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁸² United Nations Development Programme (UNDP). (2009). Belize and climate change: The costs of inaction. UNDP. <https://www.undp.org/sites/g/files/zskgke326/files/migration/bz/Belize-and-Climate-Change-The-Costs-of-Inaction.pdf>
- ⁴⁸³ NAP Global Network. (2021). The coral gardeners of Saint Lucia: Local heroes against coral bleaching. NAP Global Network. <https://napglobalnetwork.org/stories/the-coral-gardeners-of-saint-lucia-local-heroes-against-coral-bleaching/>
- ⁴⁸⁴ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁸⁵ United Nations Office for Project Services (UNOPS). (2021). Saint Lucia national infrastructure assessment. UNOPS. <https://content.unops.org/publications/Saint-Lucia-National-Infrastructure-Assessment.pdf>
- ⁴⁸⁶ Caribbean Development Bank. (2020). The state of the Caribbean climate report. [Caribbean Development Bank](#).
- ⁴⁸⁷ Food and Agriculture Organization (FAO). (2022). The state of world fisheries and aquaculture 2022: Towards blue transformation. <https://openknowledge.fao.org/server/api/core/bitstreams/c45f21e7-07f5-4447-8e06-24c7b2dc4a6a/content>
- ⁴⁸⁸ National Oceanic and Atmospheric Administration (NOAA). (n.d.). Nassau grouper. NOAA Fisheries. <https://www.fisheries.noaa.gov/species/nassau-grouper>
- ⁴⁸⁹ Food and Agriculture Organization (FAO). (2020). The state of world fisheries and aquaculture 2020: Sustainability in action. <https://openknowledge.fao.org/server/api/core/bitstreams/6ab7698e-6fc2-478c-b046-a1d7076c1e07/content>
- ⁴⁹⁰ United Kingdom Government. (n.d.). Fish and shellfish. UK Government. https://assets.publishing.service.gov.uk/media/5a820ce7e5274a2e87dc0e2e/8._Fish_and_Shellfish.pdf
- ⁴⁹¹ United Kingdom Government. (n.d.). Fish and shellfish. UK Government. https://assets.publishing.service.gov.uk/media/5a820ce7e5274a2e87dc0e2e/8._Fish_and_Shellfish.pdf
- ⁴⁹² Oxenford, H. A., & Monnereau, I. (2017). Impacts of climate change on fish and shellfish in the coastal and marine environments of Caribbean Small Island Developing States (SIDS). https://www.researchgate.net/publication/316930387_Impacts_of_Climate_Change_on_Fish_and_Shellfish_in_the_Coastal_and_Marine_Environments_of_Caribbean_Small_Island_Developing_States_SIDS
- ⁴⁹³ Earth Journalism Network. (2023). Spawning aggregations in Belize: Signs of life in the seas that need protection. <https://earthjournalism.net/stories/spawning-aggregations-in-belize-signs-of-life-in-the-seas-that-need-protection>
- ⁴⁹⁴ Gupta, S., Wang, Y., & Zhang, X. (2023). Title of the article. Journal Name, Volume(Issue), Page range. National Center for Biotechnology Information. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10024476/>
- ⁴⁹⁵ Food and Agriculture Organization (FAO). (2003). The ecosystem approach to fisheries. <https://www.fao.org/4/y4931b/y4931b07.htm>
- ⁴⁹⁶ Government of Jamaica. (2024). Initial rapid assessment report. Retrieved from https://prddsgofilestorage.blob.core.windows.net/api/event-featured-documents/file/13082024_Jamaica_Initial%20Rapid%20Assessment%20Report.pdf
- ⁴⁹⁷ Food and Agriculture Organization (FAO). (n.d.). Report on the impact of climate change on fisheries and aquaculture. Retrieved from <https://openknowledge.fao.org/server/api/core/bitstreams/3c838b93-e5ae-40ea-af9a-b436de546c8e/content>

- ⁴⁹⁸ Houghton, R. (2023, June 15). Sargassum is choking the Caribbean's white sand beaches, fueling an economic and public health crisis. *The Conversation*. Retrieved from <https://theconversation.com/sargassum-is-choking-the-caribbeans-white-sand-beaches-fueling-an-economic-and-public-health-crisis-230954>
- ⁴⁹⁹ Chakalall, B., & Singh-Renton, S. (2024). Examining climate change impacts on Caribbean fisheries: Challenges and adaptation strategies. *Diversity*, 16(1), 57. Retrieved from <https://www.mdpi.com/1424-2818/16/1/57>
- ⁵⁰⁰ Food and Agriculture Organization (FAO). (2020). The impact of disasters and crises on agriculture and food security: 2020. Retrieved from <https://openknowledge.fao.org/items/341b7b21-2d7f-45a8-998a-0fdc5f2cd5a9>
- ⁵⁰¹ National Oceanic and Atmospheric Administration (NOAA). (2005). The state of coral reef ecosystems of the Caribbean region. Retrieved from https://www.coris.noaa.gov/activities/caribbean_rpt/SCRBH2005_rpt.pdf
- ⁵⁰² International Union for Conservation of Nature (IUCN). (2018). Latin American and Caribbean countries threatened by rising ocean acidity, experts warn. Retrieved from <https://iucn.org/news/secretariat/201804/latin-american-and-caribbean-countries-threatened-rising-ocean-acidity-experts-warn>
- ⁵⁰³ Mumby, P. J., Edwards, A. J., Arias-González, J. E., Lindeman, K. C., Blackwell, P. G., Gall, A., Gorczynska, M. I., Harborne, A. R., Pescod, C. L., Renken, H., Wabnitz, C. C. C., & Llewellyn, G. (2004). How important are mangroves and seagrass beds for coral-reef fish? The nursery hypothesis tested on an island scale. *Marine Ecology Progress Series*, 282, 301-314. Retrieved from <https://www.researchgate.net/publication/238451312>
- ⁵⁰⁴ International Union for Conservation of Nature (IUCN). (2008). Deoxygenation of the oceans: Implications for marine biodiversity and fisheries. Retrieved from <https://portals.iucn.org/library/sites/library/files/documents/08.2%20DEOX.pdf>
- ⁵⁰⁵ Food and Agriculture Organization (FAO). (n.d.). Business case for the sustainable management of marine and coastal resources in Grenada. Retrieved from https://www.fao.org/fileadmin/user_upload/common_oceans/docs/Grenada%20Business%20Case.pdf
- ⁵⁰⁶ UK Government. (n.d.). Fisheries combined. Retrieved from https://assets.publishing.service.gov.uk/media/5a7509eed915d60d3b90a0c/10_Fisheries_combined.pdf
- ⁵⁰⁷ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁰⁸ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁰⁹ World Food Programme (WFP). (2024). Food security survey in the Caribbean: CARICOM countries. Retrieved from https://caribbean.un.org/sites/default/files/2024-05/food_security-survey-wfp-caribbean-caricom.pdf
- ⁵¹⁰ Food and Agriculture Organization (FAO). (2009). The state of the world's fisheries and aquaculture 2008. Retrieved from <https://www.fao.org/4/i0256e/i0256e.pdf>
- ⁵¹¹ Food and Agriculture Organization (FAO). (n.d.). The impact of climate change on agriculture and food security in small island developing states (SIDS). Retrieved from <https://openknowledge.fao.org/server/api/core/bitstreams/9aeb8ade-a623-4954-8adf-204daae3b5de/content>
- ⁵¹² Oxenford, H. A., & Monnereau, I. (2017). Impacts of climate change on fisheries in the coastal and marine environments of Caribbean Small Island Developing States (SIDS). *Caribbean Studies*, 47(2), 23-39. Retrieved from <https://www.researchgate.net/publication/316929805>
- ⁵¹³ Food and Agriculture Organization (FAO). (2009). The state of the world's fisheries and aquaculture 2008. Retrieved from <https://www.fao.org/4/i0256e/i0256e.pdf>
- ⁵¹⁴ World Resources Institute (WRI). (2004). Reefs at risk in the Caribbean: Reefs at risk revisited. Retrieved from http://pdf.wri.org/reefs_caribbean_full.pdf
- ⁵¹⁵ Di Napoli, C., Allen, T., Méndez-Lázaro, P. A., & Pappenberger, F. (2023). Heat stress in the Caribbean: Climatology, drivers, and trends of human biometeorology indices. *International Journal of Climatology*, 43(1), 405-425. <https://doi.org/10.1002/joc.7774>
- ⁵¹⁶ Di Napoli, C., Allen, T., Méndez-Lázaro, P. A., & Pappenberger, F. (2023). Heat stress in the Caribbean: Climatology, drivers, and trends of human biometeorology indices. *International Journal of Climatology*, 43(1), 405-425. <https://doi.org/10.1002/joc.7774>

- ⁵¹⁷ Gordon-Strachan, G. M., Parker, S. Y., Harewood, H. C., Méndez-Lázaro, P. A., Saketa, S. T., & Parchment, K. F. (2025). The 2024 small island developing states report of the Lancet Countdown on health and climate change. *The Lancet Global Health*, 13(1), e146-e166. [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(24\)00421-2/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(24)00421-2/fulltext)
- ⁵¹⁸ Di Napoli, C., Allen, T., Méndez-Lázaro, P. A., & Pappenberger, F. (2023). Heat stress in the Caribbean: Climatology, drivers, and trends of human biometeorology indices. *International Journal of Climatology*, 43(1), 405-425. <https://doi.org/10.1002/joc.7774>
- ⁵¹⁹ Caribbean Public Health Agency. (2021, December 9). CARPHA enhances food safety in the Caribbean through foodborne diseases surveillance and food safety training workshop. <https://carpha.org/More/Media/Articles/ArticleID/548/CARPHA-Enhances-Food-Safety-in-the-Caribbean-through-Foodborne-Diseases-Surveillance-and-Food-Safety-Training-Workshop>
- ⁵²⁰ Climate Resilient Food Systems Alliance. (2022, December). Belize: A case study conducted by the Climate Resilient Food Systems Alliance. United Nations Framework Convention on Climate Change. https://unfccc.int/sites/default/files/resource/Belize_Case_Study.pdf
- ⁵²¹ Gordon-Strachan, G. M., Parker, S. Y., Harewood, H. C., Méndez-Lázaro, P. A., Saketa, S. T., & Parchment, K. F. (2025). The 2024 small island developing states report of the Lancet Countdown on health and climate change. *The Lancet Global Health*, 13(1), e146-e166. [https://doi.org/10.1016/PIIS2214-109X\(24\)00421-2](https://doi.org/10.1016/PIIS2214-109X(24)00421-2)
- ⁵²² OCHA. (2024). Hurricane Beryl: Jamaica situation report no.2 (13 July 2024). ReliefWeb. Retrieved from <https://reliefweb.int/report/jamaica/hurricane-beryl-jamaica-situation-report-no2-13-july-2024>
- ⁵²³ Pan American Health Organization. (2022, November 2). Caribbean food security at risk from the impact of disaster-related events. <https://www.paho.org/en/stories/caribbean-food-security-risk-impact-disaster-related-events>
- ⁵²⁴ Global Americans. (2023, May). Extreme weather events and resilience in the Caribbean. <https://globalamericans.org/wp-content/uploads/2023/05/Extreme-Weather-Events-and-Resilience-in-the-Caribbean.pdf>
- ⁵²⁵ Macpherson, C. C., & Akpinar-Elci, M. (2015). Caribbean heat threatens health, well-being, and the future of humanity. *Public Health Ethics*, 8(2), 196-208. <https://pmc.ncbi.nlm.nih.gov/articles/PMC4498417/>
- ⁵²⁶ Pan American Health Organization. (2023, May 5). Thirst for Change - A Caribbean Story of Health and Water Sustainability. <https://www.paho.org/en/stories/thirst-change-caribbean-story-health-and-water-sustainability>
- ⁵²⁷ Project HOPE. (2019, September 4). Hurricane Dorian: What You Need To Know. <https://www.projecthope.org/news-stories/responses/hurricane-dorian-what-you-need-to-know/>
- ⁵²⁸ Holdsworth, J., Hunte, S.-A., Barker, K., Sherin, J., Rao, M., & Maharaj, S. B. (2023). Safeguarding the Caribbean's future: Making the case to research the direct and indirect impacts of climate change on youth mental health and wellbeing. *Frontiers in Public Health*, 11, 1322831. <https://doi.org/10.3389/fpubh.2023.1322831>
- ⁵²⁹ Macpherson, C. C., & Akpinar-Elci, M. (2015). Caribbean heat threatens health, well-being, and the future of humanity. *Public Health Ethics*, 8(2), 196-208. <https://doi.org/10.1093/phe/phv008>
- ⁵³⁰ UNICEF. (2024, July 5). Eastern Caribbean Hurricane Beryl Situation Report 02. <https://www.unicef.org/media/158941/file/ECA-Sitrep-Beryl-5-July-2024.pdf>
- ⁵³¹ Norris, F. H., & Kaniasty, K. (2008). Disaster preparedness and management in the Caribbean: The need for psychological support. *International Journal of Emergency Mental Health*, 10(2), 105-115. https://www.researchgate.net/publication/7556734_Disaster_preparedness_and_management_in_the_Caribbean_-_The_need_for_psychological_support
- ⁵³² Sah, P. (2022). Disaster management and preparedness in the Caribbean: A focus on mental health. *International Journal of Mental Health Systems*, 16(1), 1-10. <https://doi.org/10.1186/s13033-022-00552-9>
- ⁵³³ Holdsworth, J., Hunte, S.-A., Barker, K., Sherin, J., Rao, M., & Maharaj, S. B. (2023). Safeguarding the Caribbean's future: Making the case to research the direct and indirect impacts of climate change on youth mental health and wellbeing. *Frontiers in Public Health*, 11, 1322831. <https://doi.org/10.3389/fpubh.2023.1322831>
- ⁵³⁴ UNICEF. (2024, April 21). A quiet storm: Climate change and the mental health of Caribbean youth. <https://www.unicef.org/easterncaribbean/stories/quiet-storm-climate-change-and-mental-health-caribbean-youth>

- ⁵³⁵ UNICEF. (n.d.). The hidden impact of climate change on children with disabilities in Belize. Retrieved from <https://www.unicef.org/belize/stories/hidden-impact-climate-change-children-disabilities-belize>
- ⁵³⁶ German Trade and Invest. (2020). Bahamas: Strengthening the healthcare system in response to COVID-19. <https://www.gtai.de/resource/blob/672570/e527dff72955205dd2ea0fa4becdace2/PRO20200908548978.pdf>
- ⁵³⁷ Schäfer, S. M., & Pujol, D. R. (2015). Disaster preparedness in the Caribbean: Strengthening public health systems in the face of future challenges. *International Journal of Environmental Research and Public Health*, 12(5), 4944-4958. <https://pubmed.ncbi.nlm.nih.gov/26199071/>
- ⁵³⁸ Akpinar-Elci, M., & Olayinka, O. (2018). The impact of climate change and air pollution on the Caribbean. In R. Akhtar & C. Palagiano (Eds.), *Climate change and air pollution* (pp. 349-364). Springer International Publishing. <https://www.publichealth.columbia.edu/file/8670/download?token=no-ORe8V>
- ⁵³⁹ Pan American Health Organization. (2024, July 19). Public health situation analysis of Hurricane Beryl in Jamaica, Grenada, and Saint Vincent and the Grenadines. <https://www.paho.org/sites/default/files/2024-09/phsahurricane-beryl-finalfinal-1.pdf>
- ⁵⁴⁰ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁴¹ Ruiz, D., Goodess, C., & Joslyn, O. (2015). Dengue fever in the Belize District. Caribbean Community Climate Change Centre and University of East Anglia. <https://cdkn.org/sites/default/files/files/Cariwig-Case-Study-Health-Sector-DF-Report-Final.pdf>
- ⁵⁴² Pan American Health Organization. (2024, July 19). Public health situation analysis of Hurricane Beryl in Jamaica, Grenada, and Saint Vincent and the Grenadines. <https://www.paho.org/sites/default/files/2024-09/phsahurricane-beryl-finalfinal-1.pdf>
- ⁵⁴³ Caribbean Public Health Agency (CARPHA). (2016). Chapter 3: Vectorborne diseases. In CARPHA State of Public Health 2014-2016. Caribbean Public Health Agency. https://carpha.org/Portals/0/Documents/CARPHA_SoPH_2014_2016_Chapter_3_Vectorborne_diseases.pdf
- ⁵⁴⁴ TravelHealthPro. (2024). Dengue in the Caribbean region. TravelHealthPro. <https://travelhealthpro.org.uk/news/756/dengue-the-caribbean-region>
- ⁵⁴⁵ Kaisar, M. A., Hossain, S., & Islam, M. R. (2023). Understanding the epidemiology of dengue and its vector in the Caribbean region: A review. *Journal of Vector Borne Diseases*, 60(1), 1-13. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10090388/>
- ⁵⁴⁶ UN Women. (2022). Gender inequality of climate change and disaster risk in Grenada. https://wrd.unwomen.org/sites/default/files/2022-02/EnGenDER_Gender%20Inequality%20CC%20DRR%20Brief_GrenadaF_20220203.pdf
- ⁵⁴⁷ UN Women. (2022). Gender inequality of climate change and disaster risk in Grenada. https://wrd.unwomen.org/sites/default/files/2022-02/EnGenDER_Gender%20Inequality%20CC%20DRR%20Brief_GrenadaF_20220203.pdf
- ⁵⁴⁸ Zhao, Q., Zhang, L., & Zhang, X. (2021). Climate change and human health in the Asia-Pacific region: A review of current impacts and future risks. *International Journal of Environmental Research and Public Health*, 18(16), 8541. <https://doi.org/10.3390/ijerph18168541>
- ⁵⁴⁹ World Bank. (n.d.). Gender and disaster risk management (DRM): Jamaica country profile. <https://documents1.worldbank.org/curated/en/099222502072333889/pdf/P1712560775ac709e0bb100a84d7d5fd956.pdf>
- ⁵⁵⁰ UN Women. (2021). Gender inequality of climate change and disaster risk in Dominica. https://wrd.unwomen.org/sites/default/files/2022-02/EnGenDER_Gender%20Inequality%20CC%20DRR%20Brief_DominicaF_20220203.pdf
- ⁵⁵¹ UN Women. (2022). Gender inequality of climate change and disaster risk in Jamaica. https://wrd.unwomen.org/sites/default/files/2022-02/EnGenDER_Gender%20Inequality%20CC%20DRR%20Brief_JamaicaF_20220203.pdf
- ⁵⁵² CDEMA 2014
- ⁵⁵³ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁵⁴ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.

- ⁵⁵⁵ Economic Commission for Latin America and the Caribbean (ECLAC). (2021). Disasters and inequality in a pandemic context. Retrieved from <https://repositorio.cepal.org/server/api/core/bitstreams/f31b2e7b-6ed8-4d0d-96a9-c75e4a059747/content>
- ⁵⁵⁶ Joseph, D. D., & Jones, A. D. (2023). Understanding violence against women in the Caribbean through an exploration of men's perspectives. *Violence Against Women*, 29(5), 1005-1023. <https://doi.org/10.1177/10778012221104845>
- ⁵⁵⁷ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁵⁸ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁵⁹ Caribbean Development Bank. (2020). The state of the Caribbean climate report. *Caribbean Development Bank*.
- ⁵⁶⁰ Sirker, K. (2021, June 14). Strengthening disaster recovery in the Caribbean using a gender lens. World Bank Blogs. <https://blogs.worldbank.org/en/latinamerica/strengthening-disaster-recovery-caribbean-using-gender-lens>
- ⁵⁶¹ World Bank. (n.d.). Gender and disaster risk management (DRM): Jamaica country profile. <https://documents1.worldbank.org/curated/en/099222502072333889/pdf/P1712560775ac709e0bb100a84d7d5fd956.pdf>
- ⁵⁶² York, C. (2021, November 15). Climate change adaptation strategies in the Caribbean. Association of Commonwealth Universities. <https://www.acu.ac.uk/our-work/projects-and-programmes/universities-for-our-planet/climate-change-adaptation-strategies-in-the-caribbean/>
- ⁵⁶³ <https://reliefweb.int/report/grenada/acaps-briefing-note-hurricane-beryl-humanitarian-impact-5-july-2024>
- ⁵⁶⁴ UNICEF. (n.d.). The hidden impact of climate change on children with disabilities in Belize. Retrieved from <https://www.unicef.org/belize/stories/hidden-impact-climate-change-children-disabilities-belize>
- ⁵⁶⁵ UNICEF Belize. (2023, February 27). The hidden impact of climate change on children with disabilities in Belize. UNICEF Belize. <https://www.unicef.org/belize/stories/hidden-impact-climate-change-children-disabilities-belize>
- ⁵⁶⁶ UN Women. (2022). Gender inequality of climate change and disaster risk in Jamaica. https://wrd.unwomen.org/sites/default/files/2022-02/EnGenDER_Gender%20Inequality%20CC%20DRR%20Brief_JamaicaF_20220203.pdf
- ⁵⁶⁷ Economic Commission for Latin America and the Caribbean (ECLAC). (2017). Mainstreaming gender in climate change and disaster risk reduction in the Caribbean. https://www.cepal.org/sites/default/files/events/files/draft_-_mainstreaming_gender_in_climate_change_and_disaster_risk_reduction_in_the_caribbean.pdf
- ⁵⁶⁸ Economic Commission for Latin America and the Caribbean (ECLAC). (2017). Mainstreaming gender in climate change and disaster risk reduction in the Caribbean. https://www.cepal.org/sites/default/files/events/files/draft_-_mainstreaming_gender_in_climate_change_and_disaster_risk_reduction_in_the_caribbean.pdf
- ⁵⁶⁹ Cabieses, B., & Huerta, C. (2024). Effects of climate change on migration in Latin America and the Caribbean: A scoping review. *Frontiers in Climate*, 6, 1412285. <https://doi.org/10.3389/fclim.2024.1412285>
- ⁵⁷⁰ Francis, A. (2019). Free-movement agreements & climate-induced migration: A Caribbean case study. Sabin Center for Climate Change Law. https://scholarship.law.columbia.edu/sabin_climate_change/62/
- ⁵⁷¹ World Bank. (n.d.). Gender and disaster risk management (DRM): Jamaica country profile. <https://documents1.worldbank.org/curated/en/099222502072333889/pdf/P1712560775ac709e0bb100a84d7d5fd956.pdf>
- ⁵⁷² Sirker, K. (2021, June 15). Strengthening disaster recovery in the Caribbean using a gender lens. UN Women. <https://wrd.unwomen.org/explore/insights/strengthening-disaster-recovery-caribbean-using-gender-lens>
- ⁵⁷³ Rozenberg, J, Browne, N, De Vries Robbé, S, Kappes, M, Lee, W, and Prasad, A. 2021. 360° Resilience: A Guide to Prepare the Caribbean for a New Generation of Shocks. Washington, DC: The World Bank.
- ⁵⁷⁴ Gahman, L., & Thongs, G. (2017, September 20). In the Caribbean, colonialism and inequality mean hurricanes hit harder. UN Women. <https://wrd.unwomen.org/explore/insights/caribbean-colonialism-and-inequality-mean-hurricanes-hit-harder>

⁵⁷⁵ Wellenstein, A., Rozenberg, J., Turner, S., & Walsh, B. (2022, February 2). Climate change and poverty: The perfect storm. World Bank. <https://blogs.worldbank.org/en/latinamerica/climate-change-and-poverty-perfect-storm>

⁵⁷⁶ <https://www.bahamas.gov.bs/wps/portal/public/gov/government/contacts/agencies/government%20ministries/ministry%20of%20the%20environment%20and%20natural%20resources>

⁵⁷⁷ <https://bahamaspublicservice.com/>

⁵⁷⁸ https://www.bahamas.gov.bs/wps/portal/public/!ut/p/b1/vdPbkqlwEAbgZ_EBGJpTwMuoGUDITBC5oQRGDQyCBwR9-

nG39m5rdm62SF8l9Vd93VUdPuFjPjnt7uywu7HmtPv8dU9Q6s3AC9ZTCQNSNDBDJPu6K4GGEL_hY2N7HhYV7gmZp8PtmMPGjBiVrLWxUuLziZdln_IUntPcq3WSc2ifb61LmC5ybqAtmJJ5bCs6K-

dPZ3bS1nOz85JXaziwctD53jJoDPYtTw9uAMATUdeaN2L7qMzMJ7feNu4qjqV2fvMmr2a3r2bhm4Ph51mS3xEJdAtjWbN0BCRY1F1jVzVER4Y_gX8Q21dA_R5R-ZCPQU6D8tGaz-

rplzBYFmhPmyPLgQhOWLrUDgmExUYIiGILFMAKydmuzT6g_es9c4vlpzOMWy3huB9AC40NKiODBMYGxbFBYWxw7C2l8tjg_8WSz5hWf3W5_UbvCFRFaWppoGqgKzJAh8t88Mwb3C_IaV_-jxWdvJZzMJiuASIZZF-

DOjVjnTujlxvb_Si04nt-WDOVqv9ZshrKLEAuYL9lRM2hvxHWJEusd20iCY9F5uNfp5xqNtDCi4RmZS-

T8VqyN5jAZvBzuusCW8bTf3Bt_V9jXxN-Kukw-QL_ASlyA!!/dl4/d5/L2dBISEvZ0FBIS9nQSEh/

⁵⁷⁹ <https://www.bahamas.gov.bs>

⁵⁸⁰ chrome-

extension://efaidnbmnnnibpcajpcglclefindmkaj/https://disasterlaw.ifrc.org/sites/default/files/media/diaster_law/2023-03/IFRC%20-%20Disaster%20Law%20Programme%20-%20Bahamas-REVISE.pdf

⁵⁸¹ [https://www.bahamas.gov.bs/wps/portal/public/About%20Us/Department%20of%20Social%20Services/!](https://www.bahamas.gov.bs/wps/portal/public/About%20Us/Department%20of%20Social%20Services/!ut/p/b1/vZPbrppAFIafxQdwm8Nw8nJkQBQ5n7khyGYrClgCgix9NW3SZidtb9o9czXJL_Wtf60MFVMhFTfpvTimfX)

ut/p/b1/vZPbrppAFIafxQdwm8Nw8nJkQBQ5n7khyGYrClgCgix9NW3SZidtb9o9czXJL_Wtf60MFVMhFTfpvTimfX

Fp0ur1jrkEbQzNEhlBEzhmBbbQ1bdEMtHGRFRAHUr0mMhF08qSn5yiwD7qalFqad3EF6PdagPj9y6orHE53JDMwmEumx3rwHuY4RjxjNz55j7cIkkvHOYd23AlQmnaJ0V8F5wwcmX0WrbFJ0vs2V_vHVV5uDaqJfJpImP3MpalbESe

pK5wAQRadQIC2CQdoUEXZG3BNnwhlgjMJrOSn1SPizV6IJGqMwVTk1j9z4uniGjZ0jwm4PB32cQf0fARsP4iWxcH

zwRgG0HWgAg-gfwB0X0BPifFQRu95KohrpfqUjCPOVSIWASp3y02_k82-

XsgE4aoU5EGhIPuG4Y6q5E670KXal7VYV6qSJXYnXN63WtN8133_bWWCwjuKs-

Cw3afQlFyKkeCwQZ_G_hp4QW99VC9LUjVcnX7nBDC_9euKPi4lC_jVn9Bt5olqMZnmYBD1kolET5ZCrNpNuORLK

TNuqVtFt1snUMJMMQfflk1df42oqO4d1y-f7lcbBWXDpfnofnl9kz-

jbE2nqf9Q7dp2FdlgsduhF3oaT4YmNr53JTEN3yRuu-

58yBxuSdzP2h7cw1v4u9mTzGxtN7l2OTThO99B5peO828HktVbsviktvXN9-

_XU96fQU0nR2SuKBrJdePXs_4RlQ9gvQjCGJEKjuZnQ2nqVPPTcPhUGbIPDTufAkv4jY7X-1xsaB05VLnVFs_m7EF-

MtFR7xYfAOMaE9T/dl4/d5/L2dBISEvZ0FBIS9nQSEh/

⁵⁸² <https://sustainabledevelopment.gov.bz/>

⁵⁸³ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://sustainabledevelopment.gov.bz/wp-

content/uploads/2024/03/NPAS-Act-Final-Draft-for-review_March-2024-2.pdf

⁵⁸⁴ <https://www.health.gov.bz/>

⁵⁸⁵ Breaking Belize News. 2023. [https://www.breakingbelizenews.com/2023/08/04/ministry-of-](https://www.breakingbelizenews.com/2023/08/04/ministry-of-agriculture-food-security-and-enterprise-discuss-national-agriculture-and-food-policy/)

[agriculture-food-security-and-enterprise-discuss-national-agriculture-and-food-policy/](https://www.ruraltransformation.gov.bz/)

⁵⁸⁶ <https://www.ruraltransformation.gov.bz/>

⁵⁸⁷ <https://www.nwcbelize.org/about/about-us>

⁵⁸⁸ <https://www.nwcbelize.org/partners/women-family-support-department>

⁵⁸⁹ <https://www.gov.gd/index.php/econdev>

⁵⁹⁰ [https://www.thenewtodaygrenada.com/commentary/vote-50-ministry-of-health-wellness-religious-](https://www.thenewtodaygrenada.com/commentary/vote-50-ministry-of-health-wellness-religious-affairs/)

[affairs/](https://www.thenewtodaygrenada.com/commentary/vote-50-ministry-of-health-wellness-religious-affairs/)

⁵⁹¹ <https://socialprotection.org/connect/stakeholders/grenada-ministry-social-development-housing-and-community-development-msod>

⁵⁹² <https://www.moa.gov.jm/content/ministry>

⁵⁹³ Ministry of Health & Wellness. [https://www.moh.gov.jm/wp-content/uploads/2019/05/MOHV-Vision-](https://www.moh.gov.jm/wp-content/uploads/2019/05/MOHV-Vision-for-Health-2030-Final.pdf)

[for-Health-2030-Final.pdf](https://www.moh.gov.jm/wp-content/uploads/2019/05/MOHV-Vision-for-Health-2030-Final.pdf)

⁵⁹⁴ <https://opm.gov.jm/ministry/ministry-of-local-government-and-community-development/>

⁵⁹⁵ <https://opm.gov.jm/ministry/ministry-of-education-skills-youth-and-information/>

⁵⁹⁶ <https://www.mlss.gov.jm/vision-mission-and-mandate/>

⁵⁹⁷ <https://jis.gov.jm/government/agencies/bureau-gender-affairs/>

⁵⁹⁸ <https://moaslu.govt.lc/>

- 599 <https://health.govt.lc/>
- 600 <https://education.govt.lc/>
- 601 Commonwealth Local Government Forum. (2025). [The Bahamas](#)
- 602 Commonwealth Local Government Forum. (2025). [Belize](#).
- 603 Ministry of Rural Transformation. (2025). [Village Council](#).
- 604 Elections and Boundaries Department. (2025). [2025 Village Councils Elections](#).
- 605 Government of Grenada. (2025). [Ministry of Carriacou & Petite Martinique Affairs and Local Government](#).
- 606 Ministry of Local Government and Community Development. (2025). [Roles and Functions](#).
- 607 Commonwealth Local Government Forum. (2025). [Saint Lucia](#).
- 608 Government Information Service. (2025). [Government of Saint Lucia](#).
- 609 CANARI. 2024. <https://canari.org/who-we-are/>
- 610 <https://canari.org/coastal-and-marine-livelihoods-and-governance/#>
- 611 <https://canari.org/forests-livelihood-and-governance/>
- 612 CANARI. 2024. Civil Society and Governance. <https://canari.org/civil-society-and-governance/>
- 613 CANARI. 2024. Climate Change and Disaster Risk Reduction. <https://canari.org/climate-change-and-disaster-risk-reduction/>
- 614 CANARI. 2024. Green Economy. <https://canari.org/green-economy/>
- 615 CANARI. 2024. Rural Livelihoods. <https://canari.org/rural-livelihoods/>
- 616 CANARI. 2021. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://canari.org/wp-content/uploads/2022/02/CANARI-Strat-Plan-2021-2030_English.pdf
- 617 CANARI and the GCF. 2021.
- 618 CANARI. 2022. Green Climate Fund Readiness Support: Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance.
- 619 CANARI. 2022. Green Climate Fund Readiness Support: Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance.
- 620 CANARI. 2022. Green Climate Fund Readiness Support: Enhancing Caribbean Civil Society's Access and Readiness for Climate Finance.
- 621 CANARI. 2021. Powering Innovations in Civil Society and Enterprises for Sustainability in the Caribbean (PISCES) Summary report Component 1: Capacity building of civil society
- 622 CANARI. 2021. Powering Innovations in Civil Society and Enterprises for Sustainability in the Caribbean (PISCES) Summary report Component 1: Capacity building of civil society.
- 623 CANARI. Critical Ecosystem Partnership Fund (CEPF) Caribbean Islands Biodiversity Hotspot Phase II. <https://canari.org/cepf-caribbean-islands-phase-2/>
- 624 SGP. 2024. Bahamas Country Page. <https://sgp.undp.org/component/countrypages/?view=countrypage&country=18&Itemid=184>
- 625 SGP. 2023. SMALL GRANTS PROGRAMME RESULTS REPORT (FY 2017-2023) BAHAMAS.
- 626 SGP. Bahamas Projects. <https://sgp.undp.org/search.html?searchword=bahamas&ordering=newest&searchphrase=all&limit=20>
- 627 BPAF. <http://bahamasprotected.com/>
- 628 BPAF. <https://bahamasprotected.com/hurricane-dorian-recovery-small-grant-proposals/#>
- 629 SGP. 2024. Belize Country Page. <https://sgp.undp.org/component/countrypages/?view=countrypage&country=21&Itemid=204>
- 630 SGP. 2023. SMALL GRANTS PROGRAMME RESULTS REPORT (FY 2017-2023) BELIZE.
- 631 SGP. Belize Projects. <https://sgp.undp.org/search.html?searchword=belize&searchphrase=all>
- 632 The Belize Fund. <https://belizefund.bz/about-us/blue-bond-thematic-areas/>
- 633 PACT Belize. <https://www.pactbelize.org/>
- 634 SGP. 2024. Belize Country Page. <https://sgp.undp.org/component/countrypages/?view=countrypage&country=21&Itemid=204>
- 635 SGP. 2023. SMALL GRANTS PROGRAMME RESULTS REPORT (FY 2017-2023) GRENADA.
- 636 SGP. Grenada Projects. <https://sgp.undp.org/search.html?searchword=grenada&ordering=newest&searchphrase=all&limit=20>
- 637 GSDTF. <https://gsdtf.org/about-grenada/>
- 638 Grenada Fund for Conservation. <https://www.grenadafundforconservation.org/>
- 639 SGP. 2024. Jamaica Country Page. <https://sgp.undp.org/component/countrypages/?view=countrypage&country=58&Itemid=204>

- ⁶⁴⁰ SGP. 2023. SMALL GRANTS PROGRAMME RESULTS REPORT (FY 2017-2023) JAMAICA.
- ⁶⁴¹ SGP. Jamaica Projects.
<https://sgp.undp.org/search.html?searchword=jamaica&ordering=newest&searchphrase=all&limit=20>
- ⁶⁴² NCTFJ. <http://conservejamaica.org/>
- ⁶⁴³ SGP. 2024. Saint Lucia Country Page.
<https://sgp.undp.org/component/countrypages/?view=countrypage&country=144&Itemid=204>
- ⁶⁴⁴ SGP. 2023. SMALL GRANTS PROGRAMME RESULTS REPORT (FY 2017-2023) SAINT LUCIA.
- ⁶⁴⁵ SGP. Saint Lucia Projects.
<https://sgp.undp.org/search.html?searchword=saint%20lucia&ordering=newest&searchphrase=all&limit=20>
- ⁶⁴⁶ SLUNCF. <http://sluncf.org/>
- ⁶⁴⁷ Organisation for Economic Co-operation and Development (OECD). (2024). Climate resilience, access to finance, and regional integration are the keys to unleashing the potential of Caribbean economies.
<https://www.oecd.org/en/about/news/press-releases/2024/12/climate-resilience-access-to-finance-and-regional-integration-are-the-keys-to-unleashing-the-potential-of-caribbean-economies.html>
- ⁶⁴⁸ International Monetary Fund (IMF). (2023). The Caribbean climate crisis demands urgent action by governments and investors. <https://www.imf.org/en/Blogs/Articles/2023/06/27/caribbean-climate-crisis-demands-urgent-action-by-governments-and-investors>
- ⁶⁴⁹ AP News. (2024). Hurricane Dorian's lasting impact on The Bahamas.
<https://apnews.com/article/bahamas-climate-change-debt-united-nations-edf659ccd2a8e185288d3378caf84676>
- ⁶⁵⁰ Council on Foreign Relations (CFR). (2023). Building climate resilience in the Caribbean.
<https://www.cfr.org/backgrounder/how-caribbean-building-climate-resilience>
- ⁶⁵¹ RMI. (2023). Caribbean countries on the frontline of climate change get lasting support to unlock critical finance. <https://rmi.org/press-release/caribbean-countries-on-the-frontline-of-climate-change-get-lasting-support-to-unlock-critical-finance/>
- ⁶⁵² International Monetary Fund (IMF). (2023). The Caribbean climate crisis demands urgent action by governments and investors. <https://www.imf.org/en/Blogs/Articles/2023/06/27/caribbean-climate-crisis-demands-urgent-action-by-governments-and-investors>
- ⁶⁵³ Caribbean Community Climate Change Centre (CCCCC). (2023). Enhancing regional capacity for climate resilience. <https://climatepromise.undp.org/news-and-stories/how-countries-latin-america-and-caribbean-are-financing-their-climate-goals>
- ⁶⁵⁴ Zero Carbon Analytics. (2023). Promises and reality of climate finance flows in Latin America and the Caribbean. <https://zerocarbon-analytics.org/archives/economics/promises-and-reality-of-climate-finance-flows-in-latin-america-and-the-caribbean>
- ⁶⁵⁵ Financial Times. (2024). Grenada's hurricane clause: A model for climate-resilient finance.
https://www.ft.com/content/06bdabb2-2abb-45ab-9ee4-94e1c328598f?utm_source=chatgpt.com
- ⁶⁵⁶ Le Monde. (2024). The climate crisis and the architecture of national debt.
https://www.lemonde.fr/en/opinion/article/2024/09/05/the-climate-crisis-is-forcing-countries-bankers-and-investors-to-review-the-architecture-of-national-debt_6724833_23.html?utm_source=chatgpt.com
- ⁶⁵⁷ Time. (2024). Grenada's resilience journey under Prime Minister Dickon Mitchell.
https://time.com/7172447/dickon-mitchell/?utm_source=chatgpt.com
- ⁶⁵⁸ Ibid.
- ⁶⁵⁹ Caribbean Biodiversity Fund. (2024). At the CORE: Inclusive and gender-responsive actions for a more climate-resilient Caribbean. https://caribbeanbiodiversityfund.org/press/at-the-core-inclusive-and-gender-responsive-actions-for-a-more-climate-resilient-caribbean/?utm_source=chatgpt.com
- ⁶⁶⁰ CIF. (2024). Jamaica's participation in the Pilot Program for Climate Resilience.
https://www.cif.org/country/latin-america-caribbean?utm_source=chatgpt.com
- ⁶⁶¹ IMF. (2023). Urgent climate action needed in the Caribbean.
https://www.imf.org/en/Blogs/Articles/2023/06/27/caribbean-climate-crisis-demands-urgent-action-by-governments-and-investors?utm_source=chatgpt.com
- ⁶⁶² Green Climate Fund. (2024). Saint Lucia's readiness support for climate finance.
https://www.greenclimate.fund/countries/saint-lucia?page=2&utm_source=chatgpt.com
- ⁶⁶³ OECD. (2024). Climate resilience and regional integration in the Caribbean.
https://www.oecd.org/en/about/news/press-releases/2024/12/climate-resilience-access-to-finance-and-regional-integration-are-the-keys-to-unleashing-the-potential-of-caribbean-economies.html?utm_source=chatgpt.com

⁶⁶⁴ UNDP Climate Promise. (2024). Financing climate goals in Latin America and the Caribbean. https://climatepromise.undp.org/news-and-stories/how-countries-latin-america-and-caribbean-are-financing-their-climate-goals?utm_source=chatgpt.com

⁶⁶⁵ CCORAL. (2024). Caribbean Climate Online Risk and Adaptation Tool.

⁶⁶⁶ IDB. (2024). Saint Lucia Climate Adaptation Finance Facility.

⁶⁶⁷ CFAN. "Climate Finance Access Network Expands to the Caribbean." https://rmi.org/press-release/caribbean-countries-on-the-frontline-of-climate-change-get-lasting-support-to-unlock-critical-finance/?utm_source=chatgpt.com

⁶⁶⁸ U.S. State Department. "PACC 2030: Advancing Climate Resilience in the Caribbean." https://bb.usembassy.gov/the-united-states-announces-new-projects-to-support-climate-adaptation-and-resilience-in-the-caribbean/?utm_source=chatgpt.com

⁶⁶⁹ Green Climate Fund. "Resilience Projects in the Caribbean." <https://www.greenclimate.fund/>

⁶⁷⁰ The Bahamas Government. (2019). Hurricane Dorian Damage Assessment.

⁶⁷¹ Belize Climate Change Office. (2022). National Climate Action Plan.

⁶⁷² Grenada Ministry of Finance. (2024). Hurricane Clause Activation Post-Beryl.

⁶⁷³ Caribbean Biodiversity Fund. (2023). At the CORE: Inclusive and Gender-Responsive Actions for a More Climate-Resilient Caribbean. Retrieved from <https://caribbeanbiodiversityfund.org>

⁶⁷⁴ GCF. (2023). Green Climate Fund Readiness Support for Saint Lucia.